

---

---

# UNITED STATES SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

---

## FORM 10-K

---

**(Mark One)**

- ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the fiscal year ended December 31, 2021

OR

- TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For transition period from \_\_\_\_\_ to \_\_\_\_\_  
Commission File Number 001-40354

---

### Zymergen Inc.

(Exact name of registrant as specified in its charter)

---

**Delaware**

(State or other jurisdiction of incorporation or organization)

**46-2942439**

(I.R.S. Employer Identification Number)

**5980 Horton Street, Suite 105  
Emeryville, California 94608**

(Address of Principal Executive Offices) (Zip Code)

**(415) 801-8073**

(Registrant's telephone number, including area code)

---

### Securities registered pursuant to Section 12(b) of the Act:

<u>Title of each class</u>	<u>Trading Symbol</u>	<u>Name of each exchange on which registered</u>
Common stock, \$0.001 par value per share	ZY	The Nasdaq Global Select Market

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes  No

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. Yes  No

Indicate by check mark whether the Registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the Registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes  No

Indicate by check mark whether the Registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the Registrant was required to submit such files). Yes  No

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company" and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer	<input type="checkbox"/>	Accelerated filer	<input type="checkbox"/>
Non-accelerated filer	<input checked="" type="checkbox"/>	Smaller reporting company	<input type="checkbox"/>
		Emerging growth company	<input checked="" type="checkbox"/>

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 7(a)(2)(B) of the Securities Act.

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report.

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act): Yes  No

The aggregate market value of the voting and non-voting common stock held by non-affiliates of the registrant as of June 30, 2021 was \$2.1 billion, based on the closing price reported for such date on the Nasdaq Global Select Market.

As of March 18, 2022, there were approximately 103,120,808 shares of the registrant's common stock, par value \$0.001 per share, outstanding.

#### DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's definitive Proxy Statement for the registrant's 2022 Annual Meeting of Stockholders, to be filed subsequent to the date hereof with the Securities and Exchange Commission ("SEC") are incorporated by reference into Part III of this report. Such proxy statement will be filed with the SEC not later than 120 days after the end of the registrant's fiscal year ended December 31, 2021.

---

---

TABLE OF CONTENTS

	<u>PART I</u>	<u>Page</u>
<u>Item 1. Business</u>		5
<u>Item 1A. Risk Factors</u>		27
<u>Item 1B. Unresolved Staff Comments</u>		69
<u>Item 2. Properties</u>		70
<u>Item 3. Legal Proceedings</u>		70
<u>Item 4. Mine Safety Disclosures</u>		70
	<u>PART II</u>	
<u>Item 5. Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities</u>		71
<u>Item 6. [Reserved]</u>		72
<u>Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations</u>		73
<u>Item 7A. Quantitative and Qualitative Disclosures About Market Risk</u>		86
<u>Item 8. Financial Statements and Supplementary Data</u>		87
<u>Item 9. Changes in and Disagreements With Accountants on Accounting and Financial Disclosures</u>		122
<u>Item 9A. Controls and Procedures</u>		122
<u>Item 9B. Other Information</u>		122
<u>Item 9C. Disclosure Regarding Foreign Jurisdiction that Prevent Inspections</u>		122
	<u>PART III</u>	
<u>Item 10. Directors, Executive Officers and Corporate Governance</u>		123
<u>Item 11. Executive Compensation</u>		123
<u>Item 12. Security Ownership of Certain Beneficial Owner and Management and Related Stockholder Matters</u>		123
<u>Item 13. Certain Relationships and Related Transactions, and Director Independence</u>		123
<u>Item 14. Principal Accounting Fees and Services</u>		123
	<u>PART IV</u>	
<u>Item 15. Exhibits, Financial Statement Schedules</u>		124
<u>Item 16. Form 10-K Summary</u>		126
<u>Signatures</u>		127

## SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K (this "Form 10-K") contains forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended, which statements involve substantial risk and uncertainties. In some cases, you can identify forward-looking statements by the following words: "anticipate," "believe," "can," "continue," "could," "estimate," "expect," "intend," "may," "might," "ongoing," "plan," "potential," "positioned," "predict," "project," "should," "target," "will," "would," or the negative of these terms or other comparable terminology, although not all forward-looking statements contain these words.

These statements involve risks, uncertainties and other factors that may cause actual results, levels of activity, performance or achievements to be materially different from the information expressed or implied by these forward-looking statements. Although we believe we have a reasonable basis for each forward-looking statement contained in this Form 10-K, we caution you that these statements are based on a combination of facts and factors currently known by us and our projections of the future, about which we cannot be certain. Forward-looking statements in this Form 10-K include, but are not limited to, statements about:

- our ability to successfully commercialize our products;
- our ability to execute on our new strategic plan;
- our ability to reduce our operating costs and fund our operations to the middle of 2023;
- the scope and timing of restructuring activities and the effects of restructuring activities on our business;
- our ability to focus on a smaller number of programs that capitalize on our capabilities;
- the potential applications of our technologies and the commercial opportunities and market sizes for the programs on which we are focused, including in advanced materials, drug discovery and automation;
- the differentiation and capabilities of our platform, including with respect to our collection of accessible biomolecules, our software and data science technology, and our data driven microbe optimization processes;
- our ability to identify candidates for drug development;
- our ability to generate revenues from our products and timelines for our products;
- our plans for the development, launch and commercialization of the products in our pipeline;
- our ability to successfully produce products through fermentation that we initially launch using non-fermentation or non-bio-based molecules;
- the implementation of our business model and our ability to transition from revenues that are substantially all derived from research and development ("R&D") service contracts and collaboration agreements to revenues derived from the commercialization of our products;
- our ability to find and qualify sources of manufacturing;
- the potential benefits of our existing and potential future R&D collaborations and other partner relationships;
- our ability to accurately anticipate and address the market opportunity in our target markets, as well as the total market opportunity across numerous sectors;
- our ability to accurately anticipate the size and growth potential of the markets for our products and our ability to develop and commercialize products that gain customer acceptance in those markets;
- our expectations regarding our ability to obtain and maintain intellectual property protection for our platform, products and related technologies;
- our ability to obtain and maintain regulatory approval for certain of our products;
- regulatory developments in the United States and foreign countries;

- the ability of incumbent chemical companies and synthetic biology companies to address the needs of our existing and potential customers;
- developments relating to our competitors and our industry;
- the success of competing products that are or may become available;
- our goals for producing bio-based products that contribute to a more sustainable future;
- our ability to successfully enter new markets and manage any international expansion;
- our financial performance;
- our ability to obtain funding for our operations, including funding necessary to complete further development of our current and future products;
- our estimates regarding margins, future revenue, our ability to manage our expenses, capital requirements and needs for additional financing;
- our preliminary allocation of the purchase price of acquisitions;
- the success of our significant investments in our continued R&D of new products;
- the impact of COVID-19 on our business; and
- our ability to attract, train, and retain key personnel, including a permanent Chief Executive Officer.

You should refer to the “*Risk Factors*” section of this Form 10-K for a discussion of important factors that may cause actual results to differ materially from those expressed or implied by the forward-looking statements. As a result of these factors, we cannot assure you that the forward-looking statements in this Form 10-K will prove to be accurate. Furthermore, if the forward-looking statements prove to be inaccurate, the inaccuracy may be material. In light of the significant uncertainties in these forward-looking statements, you should not regard these statements as a representation or warranty by us or any other person that we will achieve our objectives and plans in any specified time frame, or at all. The forward-looking statements in this Form 10-K represent our views as of the date of this Form 10-K. We anticipate that subsequent events and developments will cause our views to change. However, while we may elect to update these forward-looking statements at some point in the future, we have no current intention of doing so except to the extent required by applicable law. You should, therefore, not rely on these forward-looking statements as representing our views as of any date subsequent to the date of this Form 10-K.

## PART I

### Item 1. Business

#### OVERVIEW

We partner with Nature to design, develop and commercialize microbes, molecules, and materials for diverse end markets. Our goal is to create new products with our proprietary platform that unlocks the design and manufacturing efficiency of biological processes with technology's ability to rapidly iterate and control diverse functions. We believe our process will create better products, a better way, for a better world.

Our platform revolves around three key capabilities: our collection of accessible biomolecules, our software and data science technology and our data driven microbe optimization processes. We have one of the world's largest collections of accessible biomolecules. This physical and DNA sequence database has within it the potential to create hundreds of thousands of small molecules, millions of natural products and hundreds of millions of proteins. This provides novel starting points for the creation of interesting molecules, materials, enzymes, and potential therapeutics. Our software and data science platform informs, guides, and records our experiments forming the infrastructure for the virtuous learning cycle that continually enriches our processes. Once a promising biomolecule is selected, using our strain engineering capabilities we can work across organisms and employ numerous strategies to optimize performance, cost, and scalability to meet an unmet market need. Throughout our work, we power and scale the science with high-throughput automation.

Using our platform we are building three businesses focused on multiple markets:

1. **Advanced Materials.** Our advanced materials business seeks to employ bio-advantaged molecules or microbes to develop and deliver high performance products and is currently focused on four markets: agriculture, water repellency, advanced polymers, and healthcare. In agriculture, our most advanced product aims to improve crop nutrient uptake for significant markets, including corn, wheat, and sorghum. In the water repellency program, we are developing a family of molecules that improve the water repellency characteristics of cellulosic substrates. Our advanced polymers products include our ZYM0101 electronics film, which is being developed in partnership with Sumitomo, and use of our ZYM0102 polymer (the basis for Hyaline, which we have discontinued) for 3D printing applications. Finally, in healthcare materials, our first products are two enzymes that are critical to produce mRNA vaccines, namely 2'-O'-Methyltransferase ("2'-O-MT") and Vaccinia Capping Enzyme ("VCE").
2. **Drug Discovery.** Our drug discovery business leverages our differentiated access to natural products as a source of diverse chemical matter provided by our unified metagenomics database ("UMDB").
3. **Automation.** Our automation business offers proven automation technology to organizations interested in improving the throughput, efficiency, and reliability of their lab operations.

Our products are in various stages of development ranging from concept to pilot stage. We have not yet generated revenue from product sales (except for nominal revenue related to the sale of samples) and we continue to expect product revenue to be immaterial in 2022. However, most of these programs leverage data and learnings from our earlier work, which we believe enables our teams to move more quickly and precisely with each new program, and ultimately helps power our platform and make it more robust over time. For example, as part of our review of our product pipeline we researched market adjacencies for molecules we have already developed, including molecules that were the basis for Hyaline. Stemming from those efforts, we identified opportunities for using ZYM0102 polymer in high-performance 3D printing applications.

With our platform and building blocks derived from Nature, we believe we can design, develop, and manufacture high-performance products more cleanly and with less waste than traditional chemicals and materials companies. Our goal is to utilize our proprietary platform to make products that will not clog our waterways or pollute our oceans. Consumers, regulators and customers are all demanding solutions to these problems. We believe that by partnering with Nature we can make better products, a better way, for a better world.

## Restructure

Since our business update on August 3, 2021, we have made significant progress on our previously announced assessment of our target markets and the fit of the products in our pipeline to those markets (the “Portfolio Review”), and the development of our new strategic plan. We have reorganized the company with a focus on creating a more efficient organization by eliminating leadership layers and consolidating distributed functions. As part of those efforts, we eliminated approximately 220 positions. We also established new operating systems and processes across the company, including more rigorous annual strategic planning and product development processes. Additionally, we reviewed our potential market opportunities and the related project portfolio, using a standardized evaluation process applied to current and potential market segments. This included a review of market size, addressable market, competitive profiles, product development cost, cost of goods of the final offering, cost of customer acquisition, time to market, margin profile, and development risk. As a result of our Portfolio Review, we determined to focus on a smaller number of programs that we believe capitalize on our capabilities and provide commercial opportunities. To that end, we discontinued our electronics film programs, other than ZYM0101, which is being developed in partnership with Sumitomo Chemical, because emerging data on the market segment we were targeting with Hyaline and other electronics films indicated a smaller near-term opportunity than previously expected. We also discontinued our consumer care programs, including our insect repellent, ZYM0201, because we determined through our Portfolio Review that the costs of customer acquisition with a direct-to-consumer model would have been prohibitive and, in the case of ZYM0201, it could not be produced and distributed at a price point competitive with incumbent products.

With our focus on a smaller number of programs and reduced cost structure, and with the benefit of the analyses and evaluations that we conducted through the Portfolio Review, we developed a 3-year strategic plan which details clear milestones and goals. Our plan has a multiple component framework. Our investments will prioritize near-term revenue and build a pipeline of new opportunities by investing in research. We believe this will fuel the creation of distinctive high-performing products. We have refocused our research team to work on rapid cycles of innovation and are now working across multiple categories of opportunities.

We also restructured some of our expenses, including lease expenses. We recorded restructuring costs of \$28.8 million in 2021, including \$8.7 million in severance and employee-related restructuring costs and an impairment charge of \$11.8 million with respect to certain manufacturing equipment. The restructuring activities were substantially complete as of December 31, 2021. We expect to incur additional restructuring costs which are currently estimable of approximately \$0.5 million in 2022. However, certain activities, such as lease restructuring, will extend into the first half of 2022. With this downsizing and restructuring we believe that we will have sufficient operating capital to continue to fund our operations to the middle of 2023.

## PRODUCTS & PIPELINE

We believe the market opportunity addressable by our platform is enormous and diverse. In addition to the industries and applications we are currently targeting in our three businesses, our research team is working across many categories of additional potential opportunities.

### Advanced Materials

The chemicals and materials sectors are large and diverse and play an essential part in producing most of the material goods we interact with on a daily basis. We believe that Zymergen is well suited to create and deliver distinctive, high-performing products into this space that are better for our customers, better for our world, and better for the people who make them.

Our goal with Advanced Materials is to employ bio-advantaged molecules or microbes to develop and deliver high performance products. In some cases, the end product delivered to a customer may be an engineered microorganism, not a molecule or material. We utilize our three-step platform—Design Product, Create Microbe, and Scale Production, described in more detail in “*Our Platform*”—to translate market needs into materials. We plan to prioritize molecules from our known molecular families that are relatively inaccessible through petrochemistry, but we may launch products with non-fermented production means to accelerate time to market, provided there is an ultimate biological source. Our focus on time to market will dictate that we first look for extensions of existing products and/or applications of existing assets, opening new market segments cautiously. We seek to develop products that offer both improved performance and value versus incumbents, while viewing sustainability as a mechanism to convert markets quickly. We recognize that, short of regulatory requirements, existing markets will likely convert slowly to sustainable products if the cost and performance do not offer advantages.

The Advanced Materials business is initially focused on developing microbes, molecules and materials for four key markets: Agriculture, Water Repellency, Advanced Polymers, and Healthcare.

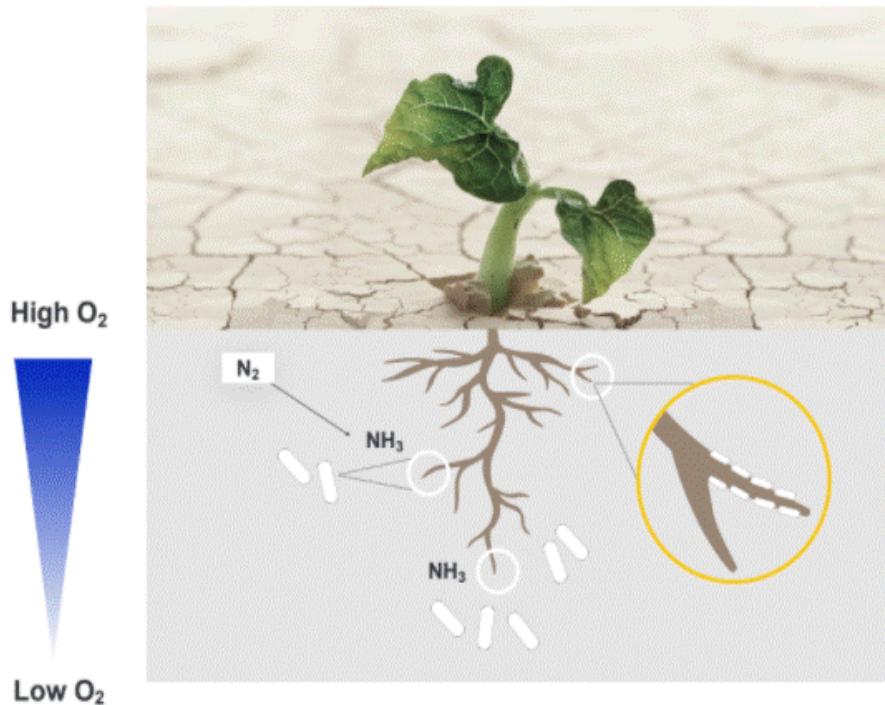
## A. Agriculture

Agriculture is 4% of global GDP and faces a range of urgent challenges, according to the World Bank. Current projections estimate that by 2050 there will be approximately 10 billion people on the planet, according to an Elementa study. There will be more mouths to feed, and richer and more varied diets will become more widespread as countries become more prosperous. Crop production needs are expected to more than double by 2050 to feed the global population, according to an Elementa study. The environmental impact of the agriculture industry is also profound with agriculture being one of the largest contributors to human-caused greenhouse gas emissions. This is driven in part by carbon dioxide released into the atmosphere through the nitrogen fertilizer production process, nitrous oxide from fertilized fields, and deforestation to create room for crops or livestock. The pollution generated by runoff from fertilizers and manure is also devastating to fragile natural ecosystems.

### Nitrogen fixation partnership: ZYM0301

Our most advanced agricultural product is focused on improving crop nutrient uptake for significant markets, including corn, wheat, and sorghum. We have partnered with a company that is catalyzing the shift from the traditional Haber-Bosch process of nitrogen fertilizer manufacturing to microbial nitrogen fixation. We believe that microbes can meet all of corn's nitrogen needs, reducing or eliminating dependence on synthetic nitrogen fertilizer. According to the U.S. Environmental Protection Agency (the "EPA"), around 50% of crops globally are reliant on synthetic nitrogen today. Roughly 1% of the world's energy consumption is used to produce nitrogen fertilizer, and this comes with serious environmental impacts, ranging from dead zones at sea to decomposition into nitrous oxide, a greenhouse gas that is nearly 300 times more potent than carbon dioxide and responsible for approximately 5% of human-caused greenhouse gas emissions.

The program's goal is to design a consortium of microbial strains that improve a crop's access to nitrogen by colonizing the plant's root system and producing sufficient plant-available nitrogen (in the form of ammonia) to meet a sizable portion of the plant's overall nitrogen needs. We are finalizing our second-generation consortia, which we expect to go into field testing in 2022, and commencing work on our third-generation consortia. We believe the increased amount of nitrogen accessible to the plant has the potential to improve environmental outcomes and lead to more favorable economics across the value chain.

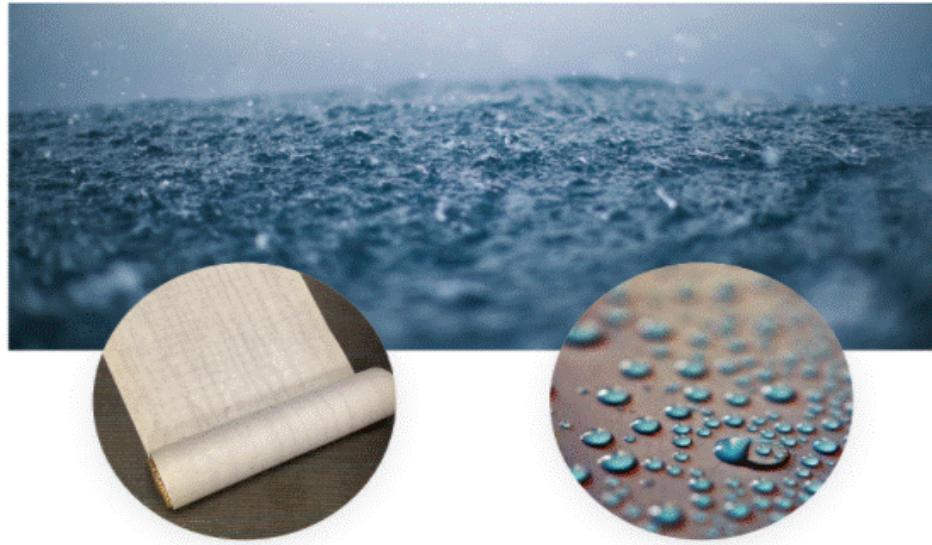


*Microbial strains capture nitrogen from the atmosphere while optimizing ammonia capture across crop roots at various depths.*

Our partnership program is focused on cereal crops and nitrogen fixation, and we believe that the same predictive assays that have enabled our efficient strain engineering during our partnership program can be applied to future opportunities.

## B. Water Repellency

Our water repellency program focuses on a family of molecules that adhere to cellulose and functionalize the coated substrate to repel water. Coated paper that repels water has numerous potential applications in food and beverage packaging and other related markets.



*Zymergen is creating a family of molecules that adhere to cellulose and repel water.*

The first water repellency product we are targeting is paper straws. The world consumes billions of single-use plastic drinking straws each year. Plastic straws are neither biodegradable nor recyclable, and often end up in landfills and waterways. Consumer demand for a high performing, eco-friendly straw is high, as is demonstrated by the rise in metal, glass, paper, bamboo, and other types of more eco-friendly straws. In line with customer demand, the regulatory environment has become more restrictive, with dozens of countries imposing restrictions or bans on single-use plastic packaging. Correspondingly, there has been a rise in “eco-friendly” packaging products. Problematically, currently marketed paper straws often lack in performance: they soften in liquids, quickly losing their structural integrity, resulting in an overall unpleasant user experience. Additionally, many paper straws currently on the market are not recyclable. When our coating is applied to paper and rolled into a straw, the result is a straw that is both water resistant and, based on the chemical composition of the coated paper, we believe will be recyclable.

We believe our water repellency technology is extensible to other substrates, which may broaden the application to markets such as clothing.

## C. Advanced Polymers

The markets being targeted for our advanced polymers are large and diverse and demand ever improving high-performance materials to enable rapid product evolution at a competitive cost. Our products have potential to be used in a broad variety of applications. Our advanced polymers products include our ZYM0101 electronics film, which is being developed in partnership with Sumitomo, and our ZYM0102 polymer (which was the basis for Hyaline, which we have discontinued) for 3D printing applications.

### Flexible optical film with high modulus: ZYM0101

ZYM0101 is a colorless polyimide film made using a bio-based monomer produced using fermentation. The product is being developed under our partnership with Sumitomo Chemical for potential applications including cover windows for foldable phones, tablets, and laptops. The distinctive features of ZYM0101 are high modulus, high hardness, high elongation-at-break, and strong optical properties in terms of transparency and haze. We have demonstrated that ZYM0101 offers a higher modulus than competing colorless polyimide films and more flexibility than ultra-thin glass. We believe ZYM0101 is particularly well suited for the following applications:

- Display cover window applications in foldable smartphones, tablets, and notebooks
- Rollable displays (e.g., rollable TVs or rollable tablets)

Consistent with similar products in this industry, we expect ZYM0101 to undergo a qualification process with all customers that typically takes 6-18 months.

### **3D printing polymer: ZYM0102**

3D printing enables manufacturers to make specially designed parts by printing layers of a material, such as polymer, that are fused together to create a single object designed using a computer-generated model. 3D printing has the potential to revolutionize supply chains—reducing waste, creating efficiencies, allowing flexibility, and producing parts that are lighter-weight, more reliable, and custom-made. Imagine, for example, if a military team deployed to a remote location could use 3D printing to replace a part in a broken vehicle, instead of waiting weeks or months for that same part to ship from a traditional parts manufacturer.

We anticipate making our ZYM0102 polymer available in both powder and pellets, which we are seeking to sell to original equipment manufacturers who could use it to 3D print parts for application in military/defense, aerospace, and automotive industries. We believe our ZYM0102 polymer, which was the basis for Hyaline, has advantages for printing parts that require higher tensile strength and improved yield, showing higher strength compared to incumbents. Its lower glass transition temperature, which is the softening temperature, opens the possibility to print at lower temperatures and therefore, with lower cost printers.

We believe ZYM0102 has the potential for broad applicability across a wide range of market segments. We are currently pursuing applications in parts and tooling for military/defense, aerospace, and high-end automotive markets.

### **D. Healthcare - Enzymes**

In the healthcare market, we are developing a portfolio of enzymes for use in vaccine production. Our first two enzyme products are 2'-O-MT and VCE, both of which are key enzymes used in the production of mRNA vaccines.

The COVID-19 pandemic catalyzed the scientific community to deliver novel vaccines based on mRNA technology, generating a global market for enzymatic capping in 2022 estimated at approximately \$800 million. As supply catches up with demand, the focus is now shifting to high-quality materials that support post-COVID regulatory requirements for mRNA manufacturing. Accelerated investment in mRNA technology concurrently opened doors to many potential new and adjacent therapeutic options (e.g., cell and gene therapies). Currently, there are over 200 mRNA vaccines and therapeutics in pre-clinical and clinical development.

We believe we can provide high-quality, reliable, cost-leading enzyme supply. For example, although we began our VCE program just over a year ago, we have already achieved significant progress, all enabled by our platform, which provided the infrastructure to move quickly and allowed us to take creative approaches to solving big challenges in enzyme production. In our phase 1 mRNA program we established baseline processes. Using a combination of strain and process engineering, we then improved expression by up to 20 times. With these improvements our enzyme soluble protein measurements exceed known industry benchmarks, and we believe we are on track to achieve further improvement before scale-up.

This initial work provides key enzyme products and also builds the infrastructure to launch future programs for additional and/or improved enzymes more quickly and efficiently. We believe this is just the start of a significant opportunity to support ongoing development of post-COVID mRNA therapeutics and vaccines with the potential to treat a wide range of other diseases. We believe we can help not just with the near term raw material requirements but also with the future demand for reagents for frontier therapeutics.

### **E. Research**

We plan to invest aggressively in research to fuel a growing pipeline of what we call “seeds,” which are early-stage ideas that demonstrate promise to grow into products. We plan to divide this investment between evolutionary opportunities (for example, follow-on versions of existing products or natural extensions of existing capabilities) and revolutionary ones that we believe could evolve into blockbuster products. We expect to focus these research efforts on advanced materials, with some capacity assigned to exploring enzymes and microbes-as-a-product.

### **Drug Discovery**

Natural products are the basis for some of the most important drugs on the market including immunomodulators (e.g., rapamycin), cardiovascular medicines (e.g., statins), many chemotherapeutics (e.g., paclitaxel, Kyprolis) and the majority of antibiotics. While traditional approaches to natural product drug discovery are no longer considered effective, advances in metagenomics, machine learning, and synthetic biology have the potential to transform how natural products are discovered and developed. Our drug discovery platform combines three core competencies—metagenomics, machine learning, and synthetic biology.

### **Unified Metagenomics Database (UMDB)**

Our UMDB is one of the largest metagenomics databases of its kind, and it has continued to grow, providing us access to millions of novel bioactives from uncultured bacteria and fungi.

### **Machine Learning (ML)**

Our proprietary ML tools, including data science and cheminformatics, allow us to efficiently search our databases and enrich for the most promising candidates for activity against human targets. From millions of biosynthetic gene clusters in our UMDB, we can downselect to dozens of candidates with the highest potential to encode molecules with activity against the target of interest. Our target-focused *in silico* downselect and follow-on analyses can be completed in a few weeks, which has the potential to transform early drug discovery into a rapid and accurate database search.

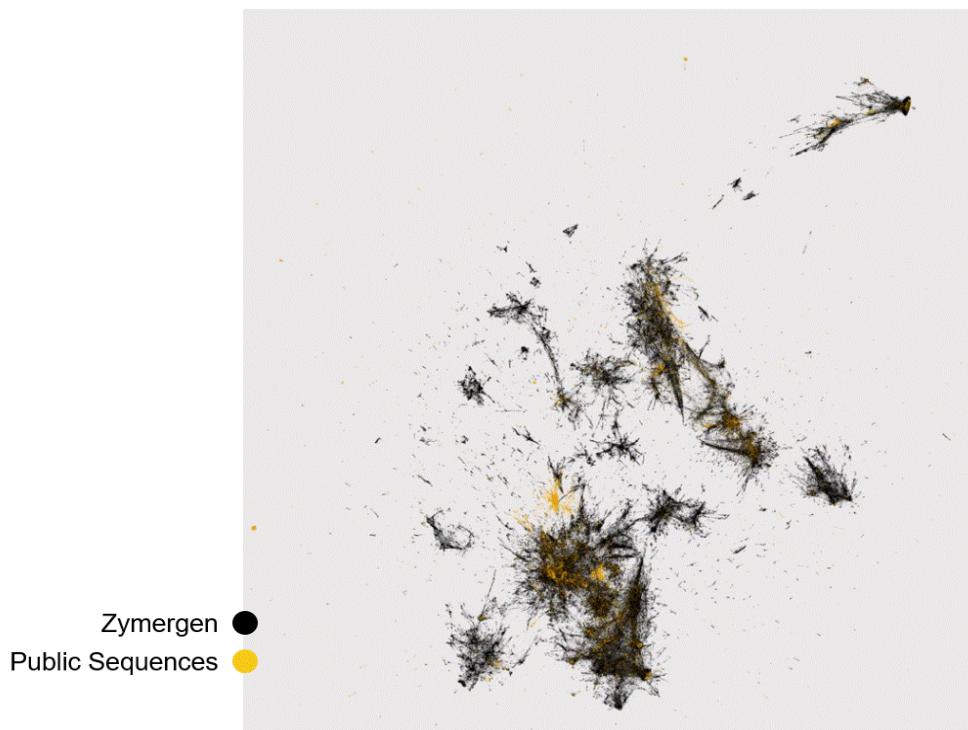
### **Synthetic Biology**

Our proprietary synthetic biology platform enables us to make complex molecules that are challenging or sometimes impossible to make with synthetic chemistry. We can engineer microbes to make a wide range of complex compounds across a wide range of biological hosts, providing potential to produce physical material for activity validation, derivatization, and other aspects of preclinical development.

### **Our Approach**

Many important drug targets are challenging to address with today's leading therapeutic modalities. Traditional synthetic small molecules are insufficient for many targets, and monoclonal antibodies are too large to pass through cellular membranes. Natural products can offer a potential solution for challenging intracellular targets. They are larger than traditional synthetic small molecules, but can have good cell penetrance and bioavailability. They are structurally diverse, are enriched for bioactivity, and exhibit novel binding mechanisms relative to other sources of chemical diversity. Natural products could potentially form the basis of traditional modulators, targeted protein degraders (PROTACS), or other conjugates such as antibody-drug conjugates ("ADCs"). The majority of ADCs approved to date leverage natural product warheads.

Natural Products are encoded in biosynthetic gene clusters (known as "clusters" or "BGCs") in the genomes of bacteria and fungi as well as plants. These clusters of genes work as a factory to produce natural product molecules that have been selected over millions of years of evolution to efficiently modulate a target protein. Our UMDB is one of the largest and highest quality of its kind, containing terabases of proprietary metagenomics data from uncultured microbes.



*This snapshot shows ~1 million natural product gene clusters from our fully sequenced UMDB that we have projected onto a 3D space. Each point is an individual cluster, with distances between points reflecting similarity among the clusters - and by extension among the natural products they encode.*

We search our UMDB using a variety of data science methods to associate clusters with targets of interest. Whereas natural product drug discovery campaigns previously started with tedious physical library screening our process begins with a rapid and accurate digital database search. Once we have prioritized clusters for a target of interest, we then use our synthetic biology platform to express the natural product(s) encoded by the cluster and subsequently work to empirically validate our computational predictions.

Once a molecule with confirmed activity is identified, we can use a variety of tools to create analogs with potentially improved properties to advance the program towards drug-like performance. In addition to total synthesis of discovered molecules, we can use semi-synthetic approaches as well as “natural analoging,” further leveraging our UMDB to access complex analogs with core scaffold changes. This combination of analoging approaches, as well as other approaches enabled by synthetic biology, can de-risk lead optimization of natural products compared to historical industry practices. In addition, we have proprietary cheminformatics tools that can aid the design of advanced analogs with superior properties.

Critical to the power of this process is the ability to rapidly and accurately identify novel clusters relevant to a specific human target. We have patented one method to do this by exploiting the concept of “resistance genes.” Clusters encode molecules that are designed to inhibit a target protein in a competitor species. One strategy that microbes use to protect themselves from the metabolite they produce is to encode an extra copy of the target protein with mutations that make it resistant to the chemical element it produces. Examining this resistance gene can reveal the protein target of the inhibitor encoded by the cluster prior to structural or biochemical elucidation. By accessing a very large number of clusters in our metagenomic libraries, we have sufficient scale to find the cases where a resistance gene is encoded, revealing the target of the molecule.

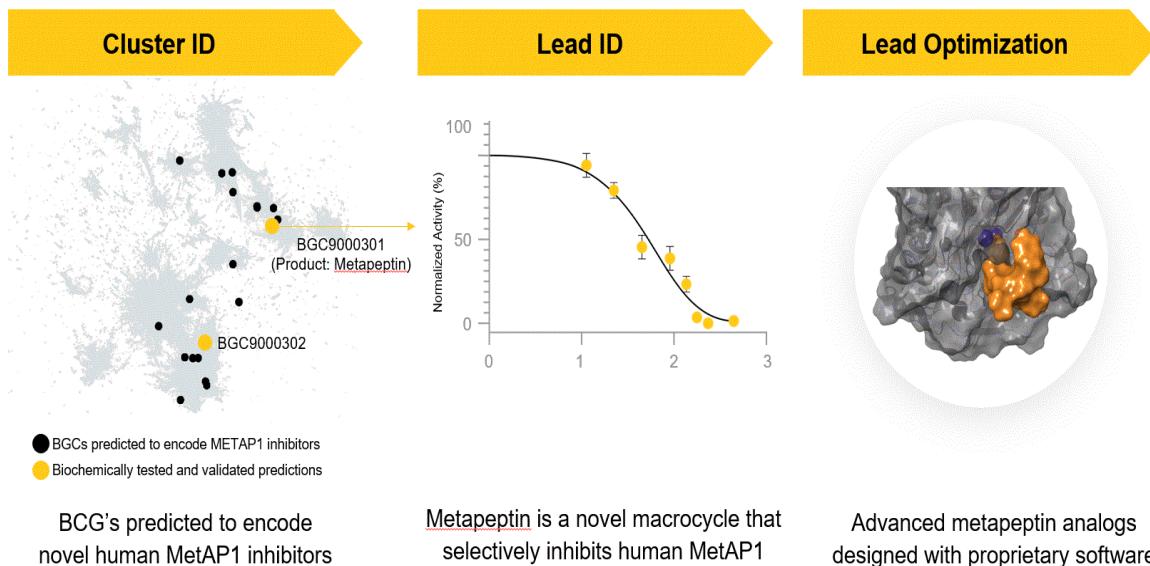
Using this methodology, we have been able to confirm multiple currently marketed blockbuster drugs and molecules in late clinical development and discover novel modulators of important oncology targets. For example, we searched our UMDB for clusters that we predicted to encode molecules active against PSMB5, an essential subunit of the proteasome. This is the target of multiple drugs such as Velcade, Kyprolis and Ninlaro. We identified multiple clusters:

- Certain clusters we identified related to the known natural product salinosporamide family. Salinosporamide A was previously progressed to phase III clinical trials as Marizomib. Identification of these clusters demonstrates our ability to accurately discover BGCs with clinical potential.
- Other clusters we identified related to the Epoxomicin gene cluster that is the progenitor of the commercialized drug Kyprolis. This further demonstrates our ability to rapidly identify high quality chemical matter as well as showing that we can identify diverse scaffolds in a single search.
- We identified other clusters that we predict encode molecules active against PSMB5. The identification of these clusters demonstrates the utility of our platform for de novo discovery.



We searched for clusters that we predicted to encode molecules active against PSMB5, an essential subunit of the proteasome. This is the target of multiple drugs such as Velcade, Kyprolis and Ninlaro. At the top right, we identified clusters, all of which were related to a known natural product, salinosporamide. In the middle right, we identified a set of clusters related to the Epoxomicin gene cluster that is the progenitor of the commercialized drug Kyprolis. On the bottom right we highlight one of several novel clusters that we predict encode molecules active against PSMB5.

In another example, we searched our UMDB for novel inhibitors of MetAP1, a target that has been linked to lung and bone cancers. Of the millions of clusters in our UMDB, our informatics search predicted 20 clusters to encode novel, structurally distinct inhibitors. To date, we have tested two of these predictions in *in vitro* assays and confirmed their bioactivity against the human protein in both cases. The first active molecule is a novel peptide macrocycle we have named Metapeptin. We have validated that Metapeptin is selective for MetAP1 over MetAP2. The second cluster that we tested is also active and is structurally distinct. Subsequently, we used our proprietary design tools to create analogs predicted to have improved properties, demonstrating our ability to discover and develop novel leads for human therapeutic targets.



*Our UMDB contains structurally novel inhibitors for human targets of interest.*

Based on our *in silico* analyses of industry prioritized cancer targets, we believe that our approach for identifying novel natural products may be applicable to a broad set of oncology targets.

Our position in the drug discovery space was strengthened by our acquisition of Lodo Therapeutics in mid-2021. Lodo Therapeutics brings additional expertise in metagenomics as well as an experienced drug discovery team and proprietary technology, including experience with “natural analoging” (as discussed above) and proprietary natural products cheminformatics and structure-based drug design capabilities. Lodo continues to progress its existing multi-target discovery collaboration with Genentech (part of the Roche Group) by building on its earlier achievements of preclinical milestones.

Our initial drug discovery pipeline is focused on industry-recognized oncology targets where precision medicine and our distinctive, complex molecules are expected to provide competitive and therapeutic advantages. We initially plan to advance our drug discovery business via collaborations with leading industry partners.

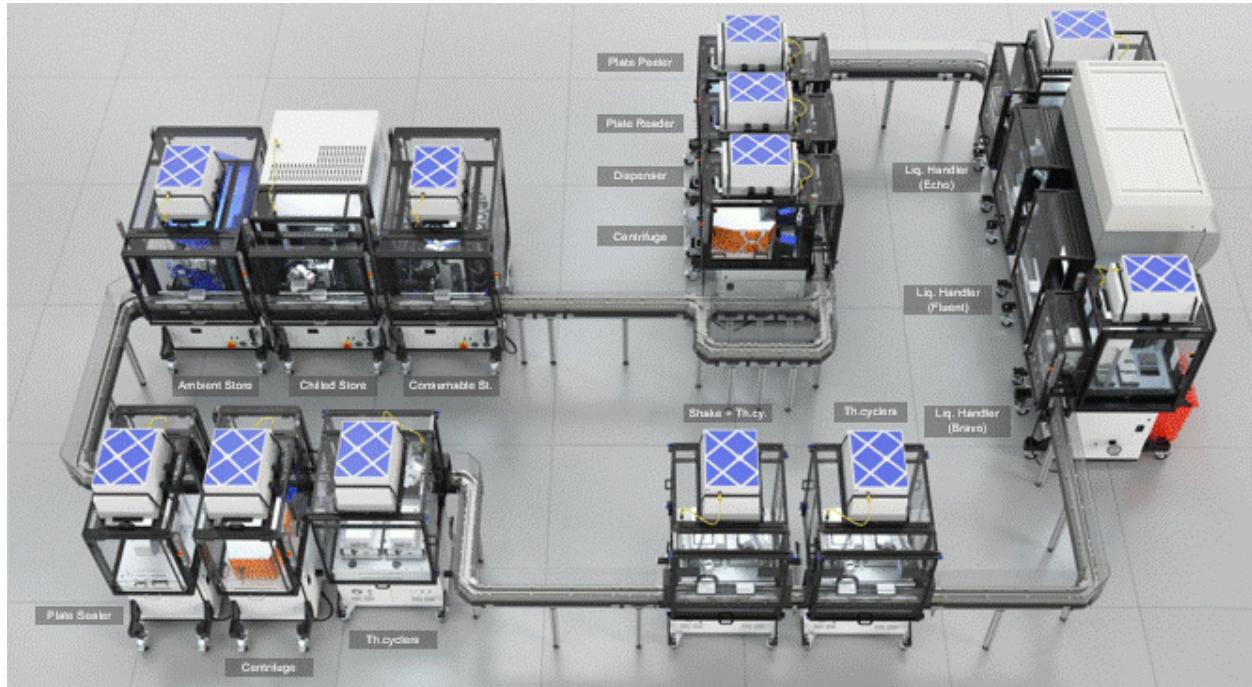
### Automation

Early in its history, Zymergen recognized a technology gap: despite increasing demand by the scientific community for lab automation, investment in new automation technologies was not keeping pace, and the solutions available were insufficient to meet demands for progress, growth, and efficiency. Unsatisfied with existing off-the-shelf solutions, we created a patented full-stack automation system that meets the needs of dynamic lab operations with integrated hardware (our RAC system) and custom software (our ACS), improving performance and reducing some workloads from months to days.

Now, we are offering our advanced automation technology to organizations interested in improving the throughput, efficiency, and reliability of their lab operations.

### **Reconfigurable Automation Cart (RACs)**

The Reconfigurable Automation Cart (“RAC”) is the hardware building block of our system. It uses standardized connections and an integrated conveyor, enabling creation and modification of workcells of all sizes in hours or days, rather than months. RACs contain laboratory devices such as liquid handlers, thermal cyclers, and plate readers that perform the work at each station in the work cell. We currently support 20 device types and have designed the system to enable adding new ones easily. We think of each RAC as a building block for lab automation, where connecting any two blocks is easy and the blocks themselves can take different shapes for different applications. This reconfigurability can enable scientists and automation engineers to collaborate on new process development with lower capital expenditures and shorter development lead times.



*The workcell shown here was assembled in a single day and is reconfigured many times per year with very little down-time, adding or subtracting RACs for load balancing or for new capabilities.*

### **Automation Control Software (ACS)**

Automation Control Software (“ACS”) is our custom, cloud-based software used to control integrated automation systems—both RACs and traditional (non-RAC) workcells. ACS is built with a microservices architecture on a modern web stack. ACS can dynamically schedule workflows, collect scientific and process data (instrument performance, utilization, plate data, etc.), and monitor progress, improving schedules as work is dispatched.

We are offering to third party customers our RAC system and ACS, coupled with a combination of one-time services (e.g., installation, training, customization, application engineering) and recurring services (e.g., basic maintenance and support, comprehensive managed system support). We intend to market our technology both to customers who desire scalable, high-throughput, high-upptime turnkey solutions for established workflows, as well as to those who are interested in customizing our flexible systems to their unique needs. Initially, we will offer the protocols that were developed for in-house use, adding additional protocols based on market demand. Over time, we plan to build an extensive library of solutions in service of different life science industry segments. These standardized, validated turn-key workflow solutions could then be sold to customers without the need for additional R&D investment.

We are also developing a solution called AutoPal for centrally managing liquid handler protocols and associated parameters. We plan to start offering this solution to customers in 2023.

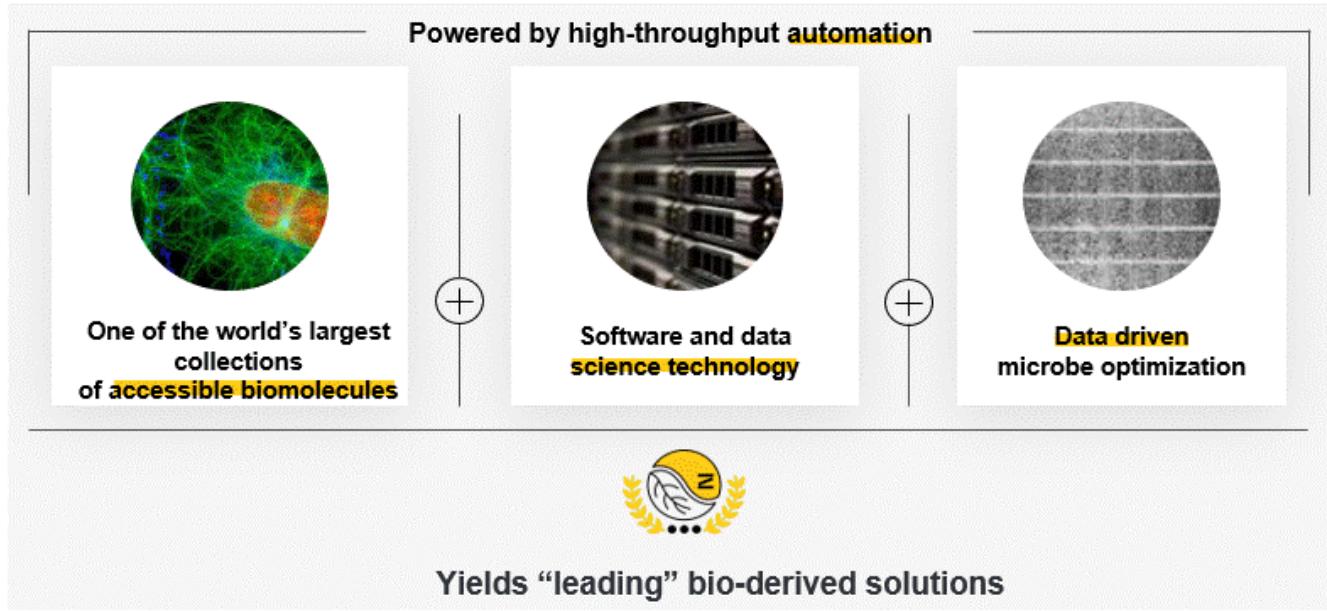
## OUR STRATEGY

Substantially all of our revenue to date has been generated from R&D service contracts and collaboration arrangements aimed at developing, testing and validating our platform by providing custom services for use only by the collaboration partner. Over the next few years, we are seeking to develop and commercialize our products and generate revenue from these products. Our long-term objective is to generate revenue from the sale of numerous breakthrough products across a variety of industries. For the next several years, we plan to pursue opportunities where partners can carry the burden of commercial marketing and distribution of the final product, allowing us to focus on creation and delivery of compelling products to those partners. In addition, although we currently outsource our manufacturing to third-party vendors, over time, we plan to increase manufacturing value capture and accelerate time to market by vertically integrating pilot scale fermentation.

Our long-term objective is to generate revenue from the sale of numerous products across a variety of industries. In particular, launching fermentation-produced products or products with fermentation-produced components or ingredients is a key element of our strategy for lowering manufacturing costs and launching products desirable to our customers. In some cases, we may initially launch products using molecules we have identified during the design phase of our process but which are first produced with non-fermentation based methods. We refer to this strategy as Launch Acceleration and expect to utilize it where we believe it will allow us to achieve commercial launch more quickly and where we believe there is an ultimate biological source and a clear path to transition to the biological source. Launch Acceleration often results in a higher cost of production than can be achieved with fermentation-based production. We expect to temporarily absorb this cost if we believe it is outweighed by the benefit of faster product launch. We may also source molecules from biological sources other than fermentation where we identify a molecule available in nature that we believe has attractive properties and that is available from a non-fermentation based source such as plant derived molecules. In some cases we may develop a fermentation based process for production of those biomolecules where we believe it makes commercial sense to do so, and in other cases we may source such biomolecules from their biological sources.

## PLATFORM

Our platform is a unique, end-to-end fusion of biology, chemistry and technology built on a stack that integrates techniques in molecular biology, chemistry, materials science, lab automation systems, software applications, unique databases, and machine learning algorithms. We have demonstrated the ability to complete each step in the entire product, microbe, and process development effort multiple times. We have innovations and intellectual property across this stack—for example, techniques for editing the genomes of industrial microbes or multiple proprietary data sets. The real power, however, comes from the fusion of these innovations into an integrated whole.



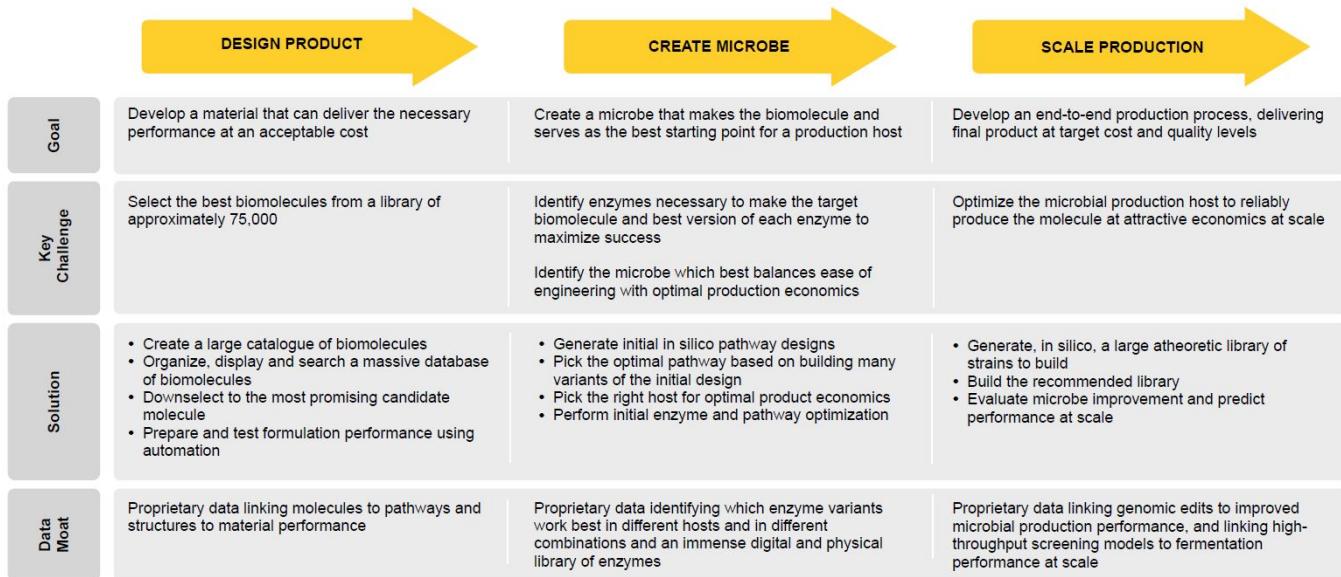
*Our platform fuses biology, chemistry, and technology and grows smarter over time*

Using the platform, our product developers generally follow a three-step process designed to translate market needs into materials. The three steps are:

1. **Design Product:** Develop a material that can deliver the necessary performance at an acceptable cost.
2. **Create Microbe:** Create or engineer a microbe to make the desired biomolecule and pick the optimal microbe for the lifecycle of the material.
3. **Scale Production:** Develop an end-to-end production process, including microbe optimization, fermentation, downstream process, and finally scale up.

Although these are described as “steps,” our platform is inherently flexible, allowing each step to be completed sequentially, in parallel, or independently. In some cases, the design, development, and commercialization of a product may only leverage certain of the steps, or even just certain of the features within the platform’s suite of offerings. Generally, our Advanced Materials business deploys all three steps, while our Automation and Drug Discovery businesses take unique approaches, as described in those respective sections above. However, even within Advanced Materials, certain products may be better suited for some steps within the platform and not others. For example, with our healthcare materials pipeline, the products sought (2'-O-MT and VCE) were already known, which allowed us to start with step 2 (Create Microbe).

Building our platform required us to solve hard problems at each step. Biology is powerful but often unfathomably complex. Classical scientific approaches to bio-based product design, microbe creation, and scaling production have been slow, expensive, unpredictable, and prone to failure. By integrating software and data science with cutting-edge biology tools, we believe that we have addressed many of the technical problems that kept many earlier synthetic biology companies from commercial success. Crucially, our workflow has improved over time as successive rounds of biomolecule design, microbe creation, and product optimization have generated more proprietary data, further enhancing our algorithms.

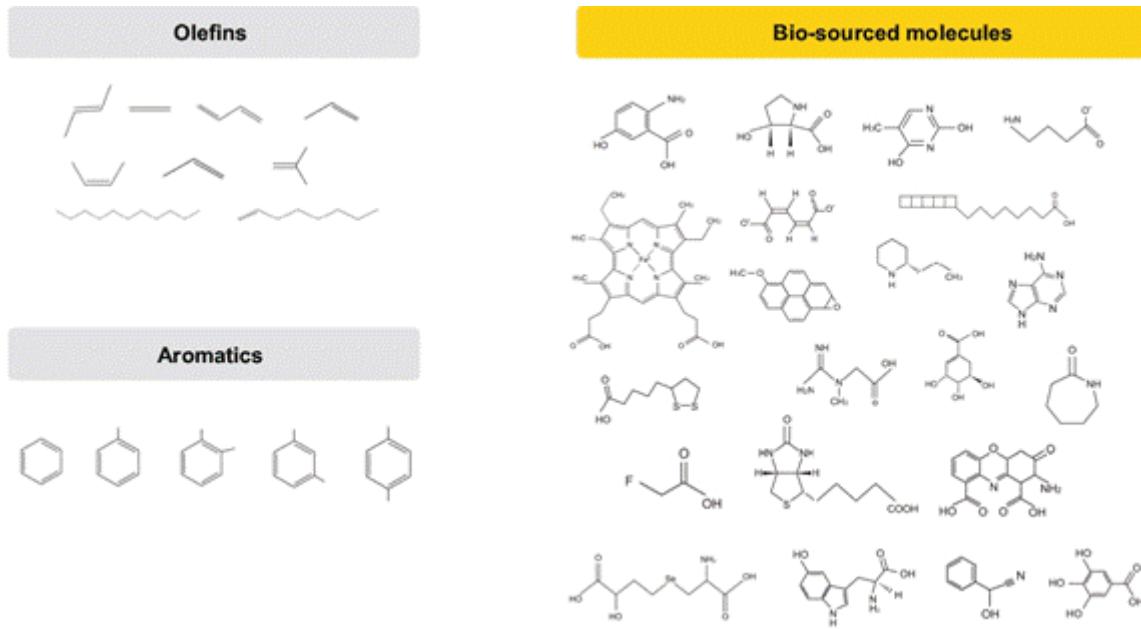


### **Step 1: Design Product**

Our platform has the potential to create new and better products because we start with the molecular diversity of biology. Living cells are the most sophisticated chemical factories known. They continuously produce and interconvert tens of thousands of molecules through the thousands of reactions catalyzed by the enzymes encoded in their genomes. Today there are approximately 150,000 metabolic reactions cataloged and approximately 200,000,000 known proteins capable of catalyzing these reactions. The total number of potential organic small molecules is estimated at  $10^{60}$ . Importantly, many of these molecules have properties that are hard or impossible to obtain from synthetic chemistry, such as chirality (the property of left- and right-handedness, common to the biochemistry of all life forms). Zymergen has systems in place to access approximately 75,000 biomolecules today with strategies in place to access many more over time.

**Challenge: Discovering the best biomolecule.**

But the very diversity of the molecules that living cells produce inevitably creates a challenge. How should we select the best biomolecules to solve a customer's problem from a library of approximately 75,000? We have created a set of processes and tools designed to solve this problem.



*Classical chemical building blocks (left) are considerably less rich in potential function than bio-sourced molecules (right), a small number of which are shown here. Biomolecules frequently employ heteroatoms, chirality, or reactive moieties which offer unique functional property combinations.*

**A. Create a large catalog of biomolecules.**

Our collection of potential biomolecules consists of molecule structures that we can choose from and the enzymatic reactions ("pathway") that allow us to produce them. The total that our chemists and material scientists use today for advanced materials is approximately 75,000, which is a subset of the full catalog we have created and that is available to our platform (more than one million biomolecules). The database is a combination of public and proprietary data, and the data unique to Zymergen is growing all the time.

## Bio-molecules in active use today for advanced materials:

- We have approximately 10,000 biomolecules where we know both the structure and pathway exactly at the outset. This is a proprietary asset that we have created using our software algorithms. Relative to traditional petrochemicals, it is a huge untapped resource.
- We have approximately 65,000 additional molecules where we know the structure (from external databases) but the pathway is not complete. We can complete the pathway with additional molecular biology work if advanced to the "Create microbe" stage. Because all of these molecules exist in Nature, we believe that all of the pathways can be assembled, though the effort will vary by molecule.
- Our database also includes a large catalog of biomolecules not currently actively used today. For example, there are more than 80,000 additional molecules where we have computed the structures, but do not yet know the complete pathway and another one million complex molecules where the pathway is complete, but where we do not yet have the structure. We expect to use this expansive database to expand and improve product development in existing and new markets.

## B. Organize, display and search this massive catalog of molecules.

The molecules computed above are stored in our Bioreachables Database and accessed through a graphical user interface called ZYNC. Among other functions, ZYNC enables chemists and material scientists to use Boolean logic to search for chemical substructures and properties among the collection.

Molecule	Molecular Weight	Calculated LogP
(Unknown)	null	0.7275
2-Aminobenzamide	130.154	0.3677
(Unknown)	null	0.7699999999999999

*Using the substructure search interface in ZYNC to identify bioreachable molecules of interest.*

## C. Downselect to the most promising candidate molecules.

Zymergen selects the biomolecules that would be the best fit for a given task by using data science and machine learning to predict performance. Where appropriate, we use molecular simulations to enhance human judgment in selecting candidate biomolecules with potential to solve a customer's problem or a market need. We experimentally validate the top candidates to determine which perform best. Over the course of a project, we may test several hundred formulations of the molecule to get the desired properties. For certain applications and properties, we have also collected data that informs machine learning models that help prioritize the biomolecules most likely to confer the desired properties. We expect that these models will become increasingly broad over time.

## D. Prepare and test formulation performance using automation.

The ultimate tests are empirical. We incorporate the chosen biomolecules into the product formulation and experimentally evaluate performance. The assays performed depend on the application, and we have facilities and expertise to bring online additional American Society for Testing and Materials assays as needed. We employ automation and miniaturization when possible to increase throughput, reduce the need for material and improve assay precision and accuracy. The empirical data generated feeds back into our computational systems to improve the quality of our models and predictions in a virtuous cycle.

Collectively, our solutions are designed to effectively and efficiently address the challenge of identifying the right molecules to enable target product performance and solve customers' problems.

We believe that our approach to product design gives us an advantage over existing and future competitors. This advantage comes from the databases, tools, and patents we have already put in place and is reinforced as we continue to collect data on molecules and their performance.

### **Step 2: Create Microbe**

Once we have identified a biomolecule that solves a customer's problem or addresses a market need, we need to engineer a microbe capable of generating that biomolecule. Microbes are modular factories that can perform thousands of distinct chemical reactions, which can be reorganized and remixed to produce myriad biomolecules. That microbe must make the non-native biomolecule and do so in a way that we believe can later be scaled to meet market volume and price demands. We have done this many times: We have successfully created microbes that produce detectable amounts of more than 100 distinct biomolecules.

## **Challenge: Engineering a microbe fit for purpose.**

Several problems have blocked previous attempts by synthetic biology companies to build microbes capable of producing biomolecules for commercial use.

- First, while databases do capture some information about some of the molecules observed in Nature, we are not aware of any comprehensive commercially available tools that show the biochemical steps that are used in Nature to produce each of them, making selecting the pathway genes challenging.
- Secondly, even if the biochemical steps can be discovered or developed, traditional bioengineering facilities are unable to prototype the complete set because of the vast number of configurations of the steps and the enzymes that biocatalyze each step.
- Finally, many companies pick a host microbe that is well understood or easy to engineer but is not well suited to industrial production because, for example, product toxicity limits productivity or the host is not robust to the inherent variability of non-GMP manufacturing conditions. This makes selecting the optimal host important for commercial viability and a challenging technical problem.

We solve these problems in the following ways:

### **A. Generate initial *in silico* pathway designs.**

We generate and store biosynthesis pathways—the set of genes that, in sequence, could encode for the enzymes that create a biomolecule—for each molecule using ZYNC. ZYNC suggests options for pathways and provides a score for each pathway so we can prioritize the right designs. Where we have missing pathway genes, we search UMDB for phylogenetically diverse enzymes with homology to ones shown experimentally to catalyze the missing chemical transformation.

### **B. Pick the optimal pathway based on building many variants of the initial design.**

We know, however, that our initial *in silico* designs are but one of many possible pathways and configurations of each pathway to test. The number of variants is far greater than anything that could be tested in the lab and humans have little ability to predict which variant will perform best. To address this challenge, we use our Automated Pathway Explorer (“APE”) which takes the pathway information from ZYNC, uses machine learning algorithms to search the UMDB for candidate enzymes, populates generalized pathway templates with specific enzyme variants, ranks each pathway instance and recommends a diverse set of candidate pathways to be installed into host microbes for evaluation.

### **C. Pick the right host for optimal product economics.**

Finally, we use automation and a range of multipart and multisite gene editing tools to test the basic biochemical pathway in panels of hosts to be sure we have the optimal microbe for the lifecycle of the product. We choose the optimal host using a combination of techno-economic analysis and empirical data. Then we typically use robotic automation to build up to 1,000 variants of the biomolecule-producing microbe and identify the best starting point for subsequent improvement. We have experience in engineering for all major classes of microbes, including at least 15 gram-positive bacteria, 6 gram-negative bacteria, 4 yeasts, and 4 filamentous fungi.

### **D. Perform initial enzyme and pathway optimization.**

Once a candidate pathway has been validated, we typically deploy our deep expertise in enzymology to alter and improve the biocatalytic performance of the enzymes in the biosynthesis pathway so that the pathway can deliver and meet the commercial targets. We may also create very large libraries of microbes with multiple simultaneous genetic edits. In these cases, we may choose to build biosensors into each edited microbe in the library so that the very best performing cells fluoresce and can be rapidly identified for further testing. This is enabled by our acquisition of EnEvolv alongside other technologies.

## **Step 3: Scale Production**

Initial work to engineer a microbe in the “Create Microbe” step results in an organism that manufactures the desired biomolecule. The efficiency of this microbe at this stage, however, is insufficient to commercialize a product. Success in the “Scale Production” phase means engineering the microbe and the accompanying process so that it will produce the desired biomolecule at scale with attractive margins.

## **Challenge: Scaling production.**

Scaling production is a significant challenge. This final step is critical, and we believe the inability of early synthetic biology companies to solve this challenge is one of the reasons why they failed.

A key challenge to optimizing the host microbe genome and scaling production is our very limited knowledge of host biology and metabolism. Even in the best studied hosts used in academia, 20% to 35% of genes lack experimentally validated functions. For many industrially important production hosts, the vast majority of genes lack experimentally validated functions. To reinforce this point, while there are hundreds of thousands of academic papers describing well-studied hosts, industrial hosts are often described by just a few thousand or even a few hundred.

While computational methods are commonly used to predict gene functions in industrial hosts, the performance is very poor with the consequence that our real understanding of the biochemistry and genetics of these hosts is very poor. Practically, this means that biological engineers are unable to reliably engineer a microbe to reliably perform at full commercial scale. Approaches based on rational design, which presume a good understanding of the biology system to be engineered, are particularly challenged.

We believe our platform has solved these problems: we can reliably improve many traits of the microbe, including yield, titer, rate, tolerance to high concentrations of product or co-products, avoidance of co-product production, thermal tolerance, or other factors associated with the commercial production process. We believe we are leaders at optimizing microbe performance to produce molecules at industrial scales.

We achieve these results by applying an *atheoretic* approach where we systematically edit all parts of the genome without being guided by mechanistic hypotheses of why certain changes might lead to performance benefits. We apply this strategy because while early efficiency gains can be made by analyzing the metabolic pathway and targeting changes in key enzymes, this strategy is generally insufficient to reach commercial performance. Raw DNA sequences are virtually uninterpretable and cannot be manipulated or debugged like computer software code. We have typically found that more than 60% of the beneficial changes in microbes we introduced with our machine learning processes defy known human explanation, even *ex post facto*, and were only identifiable through powerful machine learning.

This process of radical empiricism involves several key steps:

**A. Generate a large library of atheoretic designs.**

Our process generally starts with a machine learning system that proposes a specific library of possible genomic edits. These recommendations include library type (e.g. deletions, insertion, etc.), loci in the genome and a number of other variables. Each recommended library would typically encompass hundreds to thousands of specific microbes. While informed by host-specific features, our algorithms do not rely on mechanistic understanding of each gene's function.

**B. Build the recommended library.**

*In silico* designs, however, only go so far; we must actually build (and then test) our microbes to have confidence in our results. And, because we routinely probe hundreds to thousands of loci within the genome for potential improvements in performance, we have had to develop custom software tools to facilitate work at this scale. These tools include software that enables us to design the large libraries of specified microbes, run lab operations, and perform subsequent batch analyses. Our robots use a number of molecular biology techniques—which vary by microbe—to assemble DNA constructs and insert them into pre-specified loci in the genome. To date we have built and tested 450,000 microbes with specific genomic edits. This excludes microbes we have built using random mutagenesis and other non-targeted methods.

**C. Evaluate microbe improvement and predict performance at scale.**

Once fabricated and quality controlled, these new microbes must be evaluated experimentally to determine their performance. This process is challenging for two reasons: first, standard high throughput assays do not resemble performance at scale because the physical environment of a 3ml microtiter plate well in a lab is very different from the conditions in a 100,000 liter full scale manufacturing environment; and second, our detection methods must be exceptionally precise since performance gains from any individual edit may be quite small. Our testing platform is able to use data collected over years of experiments to predict how microbes will perform at scale based on high-throughput, small-scale experiments. This allows us to identify winning variants with a high degree of accuracy.

We use a machine learning system called Orion to design our assays. Each microbe and molecule requires its own set of test assays, and these assays must be periodically refreshed as we climb the performance curve. These assays provide insight into fermentation characterization (e.g., concentrations of nutrients, intermediates and byproducts), microbe growth and health (e.g., cell density, cell size, growth rate) and target production (e.g., yield, titer, productivity). We utilize a broad array of analytical techniques which may include spectroscopy, colorimetric assays, mass spectrometry, Nuclear Magnetic Resonance, and a range of separation techniques (e.g., chromatography). In addition to classical analytical chemistry, we may also use cell-based assays, such as FACS (fluorescence activated cell sorting) and technologies such as biosensors where appropriate. Factors such as precise nutrient composition in the media or the cultivation time points used for assaying can have a significant impact on the predictability of the assay relative to larger-scale fermentation and must be carefully tuned.

We then confirm our results by performing bench-scale fermentation runs. Each process run in bench-top reactors is monitored by our active data capture process which builds a continuous digital model of every fermentation run and is associated with microbe and genetic edit data stored in our Laboratory Information Management System (“LIMS”). This data relationship enables us to better understand the way that incremental genetic change affects the performance of a particular fermentation process. These runs also offer us the ability to iterate on the fermentation process itself; our in-house machine learning tool set runs a complex set of analyses on the fermentation run data and digital models of our microbes. These analyses highlight key issues that guide subsequent process and genetic changes. Our process consistently finds genomic edits that improve performance despite the enormous design space. Many of the improvements we identify are not predictable in advance using traditional human-generated hypotheses. For example, across the programs conducted for our largest R&D partner, more than 50% of all genomic edits identified by our platform were not predictable using traditional human-generated hypotheses.

#### **Our platform is an end-to-end solution based on a common infrastructure.**

Our technology platform has been built as a set of discrete applications that solve the challenge of designing products, creating microbes, and scaling production. These applications, however, are built on a shared infrastructure.

The most important pieces of this infrastructure are:

#### **Unified Metagenomics Database (UMDB)**

UMDB is a digital and physical collection of DNA with approximately 300 million genes, and is the extension of the metagenomic capabilities of Radiant Genomics, Inc., a company we acquired in 2017. This database is a deep, rich repository of enzymes incorporating both publicly available enzyme information and enzymes discovered first by Radiant and now by us. Since acquiring Lodo Therapeutics in 2021, we have further extended our UMDB to incorporate metagenomic data from Lodo Therapeutics’ metagenomic libraries. Our UMDB is one of the largest collections of its kind, and it is continually growing. For many but not all of the enzymes, we possess associated functional information based on prior published research. For enzymes without functional information, we use sequence similarity, the identity of neighboring genes in the genome, and other information to predict likely enzymatic function. We utilize the information from UMDB in, among other things, predicting molecules which can then be searched by ZYNC and providing a source of data for APE to design pathways.

#### **Reconfigurable Automation Carts & Automation Control Software**

Our RAC system is a collection of modular hardware building blocks that allow for assembly of work cells customized for the particular needs of a lab. The system is configurable, scalable, and mobile, advancing the state of the art in lab automation.

ACS is our custom software orchestration layer for RACs. ACS is cloud-based and remotely controls collections of instruments (including the RAC system itself) to optimize work schedules, execute and monitor lab workflows, and centralize data.

RAC and ACS are described in more detail in “—*Automation*.”

#### **Laboratory Information Management System**

LIMS is a cloud-scale database that we have been running and extending since 2014. LIMS captures experimental designs, instrument execution and run parameters, relevant environmental conditions, and data as it is generated by our high throughput lab. This multi-year data repository enables us to perform analyses and train machine learning systems on an incredibly rich data set of, among other things, genotype:phenotype correlations and lab process metadata. This proprietary data moat expands every day in both depth and breadth.

## **MANUFACTURING**

We rely on contract manufacturing organizations (“CMOs”) to manufacture our products and anticipate continuing to do so for the foreseeable future. We do not have our own commercial scale manufacturing capabilities. We oversee our manufacturing production and activities at CMOs using internal personnel, CMO resources, and other contract services with technical, manufacturing, analytical, and quality experience. In some cases, we also utilize consultants when we believe unique expertise would be beneficial. We are working to expand and strengthen our network of CMOs with a near-term focus on fermentation and down-stream processing. CMOs often have long lead times and our products often require complex technology transfer during manufacturing scale-up. When possible, we are targeting CMOs with both fermentation and downstream processing capability, and who have the ability to span a wide range in scale, to reduce the number of transfers in the manufacturing process and the associated risks and additional time requirements. We also target manufacturers that have capacity to produce multiple products for us over time. Where appropriate we may also rely on partners for manufacturing.

Longer term, one of our key imperatives is to drive down the cost of manufacturing synthetic biology products. We also plan to increase manufacturing value capture and accelerate time to market by vertically integrating pilot scale fermentation.

## **INTELLECTUAL PROPERTY**

To date, we have filed approximately 500 patent and provisional patent applications, of which approximately 361 are currently pending. These include patents and pending applications that generally relate our innovations in the areas of:

- High Throughput (HTP) screening platform and discovery tools, including our HTP genomic engineering platform and automated HTP tools for exploring genomic space, as well as HTP screening hardware components such as electroporators, robotics and instruments and our platform for sourcing natural products from metagenomic libraries;
- Machine learning tools used to inform genomic engineering, including computer aided methods for our machine learning approaches, metabolite fingerprinting, microbial improvements and bioreachable molecule discovery;
- production microbe development, including organism specific HTP genomic engineering in such organisms as filamentous fungi, *Corynebacterium*, *Escherichia coli*, Chinese Hamster Ovary (CHO) cells and *Bacillus* sp.;
- molecular and gene editing tools such as CRISPR gene editing tools for our HTP genomic engineering approaches, and silent gene cluster activation via bacteriophage;
- gene editing approaches such as transposon mutagenesis, multiplexed assembly of DNA libraries, rapid genotyping of cell edits, circular-permeated nucleic acid for homology directed editing, prototrophic gene editing, removal of self-replicating fungal plasmids and detection of ectopic integration of transforming DNA;
- advanced materials and molecule products, including insecticidal proteins such as monalysin and cry proteins, biodegradable water repellency coatings, adhesives such as epoxies from bioreachables, histamine bioproduction, advanced polymers such as polyimides for films and components, molecular biology reagents for nucleic acid modification including mRNA enzymes;
- products and pipeline products, including production methods and our chemistry programs such as for phenol surface formulations, and energy storage electrolytes and electrodes;
- drug discovery, including the use of our UMDB discovery platform, wherein resistance genes are identified using a set modeling threshold from a statistical Hidden Markov Model (HMM); and
- automation devices, systems and software, including for scalable and mobile RACs designed to process materials such as biological or chemical materials using HTP approaches.

In the United States, patent rights generally have a term of twenty years from the date in which they were filed as non-provisional patent applications.

In addition to our proprietary methods and technologies, we also license certain U.S. and foreign patents and patent applications from various third parties. Some of these license agreements provide the exclusive right to practice the licensed intellectual property subject to specific field or territory restrictions and certain fee and royalty arrangements. Subject to common termination rights, these exclusive license agreements typically are in force until the last of the licensed patents expires or, in some cases, upon our failure to achieve specified sales volume thresholds.

We intend to pursue additional intellectual property protection to the extent we believe it would be beneficial and cost-effective. We cannot provide any assurance that any of our current or future patent applications will result in the issuance of patents, or that any of our current or future issued patents will effectively protect any of our products or technology from infringement or prevent others from commercializing infringing products or technology.

We also protect our proprietary information by requiring our employees, consultants, contractors and other advisers to execute nondisclosure and assignment of invention agreements upon commencement of their respective employment or engagement. Agreements with our employees also bar them from bringing the proprietary rights of third parties to us. In addition, we also require confidentiality or material transfer agreements from third parties that receive our confidential data or materials.

## COMPETITION

We design, develop and commercialize microbes, molecules, and materials that can be used to create new products and deliver value to customers in a broad range of industries, including electronics, packaging, healthcare, agriculture, and other categories. To our knowledge, there are currently no other companies that serve these industries with the same breadth or with a comparable platform. Competing platforms may emerge from various sources, including synthetic biology companies, biopharma companies, and public and private research institutions. Some incumbents and emerging, narrowly-focused biotech companies that compete with us on a product / market vertical basis. We expect our novel bio-based products to compete with materials produced using traditional chemical processes.

Across our markets, we believe customers place value on, among other things:

- Product quality and performance advantages
- Price
- Security of supply
- Sustainability / ability to deliver products with a smaller environmental footprint

We expect our products to target the agriculture, packaging, advanced polymers, healthcare, pharmaceutical, and lab automation industries, among others.

### **Advanced Materials**

#### ***Agriculture***

We expect the agriculture products in our pipeline to compete with traditional synthetic nitrogen fertilizers and traditional chemical-based crop protection products such as herbicides. Our competitors in this market are global agrochemical companies that produce traditional chemical-based agriculture products. In addition, some global agrochemical companies have created partnerships with start-ups to develop non-traditional nitrogen fixation technology.

#### ***Water Repellency***

The packaging industry is innovating at different levels of the value chain to create better performing paper-based products. This includes chemical and material science companies creating novel coatings and treatments, paper manufacturers developing new substrates, and converters creating novel final products. Based on current data, we have not identified any raw material companies that may capture significant market share in the short-term in the paper straw market. We expect to face competition from plastic straws, which is a large and fragmented market. Specifically, with respect to paper straws, we expect to face competition from paper companies such as Stora Enso, Georgia-Pacific, and Mondi, as well as coating companies that provide barrier technologies.

#### ***Advanced Polymers***

##### **3D Printing**

Our advanced polymer products are designed for various uses and applications, but we are primarily targeting end parts and tooling for defense, aerospace, and high-end automotive. Our primary competitors in the high-performance polymer segment are Ultem PEI (Sabic), PEKK (Arkema) and PEEK (Victrex).

##### **Electronics**

There are two leading material options for the cover window component in the foldable display panels used by smartphones and notebooks. They are Ultra-Thin Glass (“UTG”) and colorless polyimide (“CPI”). UTG has significant share of the cover material market with high adoption among Korea-based handset manufacturers. As Chinese brands ramp up sales of their foldable devices, we expect that their selection of CPI will take some share, while UTG is expected to retain the majority of the market. UTG competitors include Schott and Corning, while CPI competitors include Kolon.

#### ***Healthcare - Enzymes***

The competitor and competitive alternative landscape is rapidly evolving with respect to enzymes for mRNA vaccine production. Incumbents include New England Biolabs, Hongene, and Tinzyme, with ThermoFisher and Aldevron expected to enter this market. We believe our strain engineering capabilities enable us to compete in this space. A technology alternative to VCE and 2'-O-MT is a synthetic capping solution, the market leader for which is TriLink's CleanCap product.

## Drug Discovery

We anticipate that our drug discovery products will compete with traditional drug makers. Our competitors in this market are global pharmaceutical companies with capabilities that may include small molecules, monoclonal antibodies, novel modalities, and in some cases, natural products. In addition, some global pharmaceutical companies have created partnerships with smaller, natural product drug discovery companies. We are aware that other companies, organizations, and persons have developed technologies that appear to have some similarities to our platform. For example, LifeMine Therapeutics and Hexagon Biomay are attempting to access fungal natural products using genome-mining. To the best of our knowledge, neither has access to the bacterial metagenome that we are mining for our novel natural products. Academic and research institutions may also develop technologies that compete with our drug discovery business.

## Automation

Customers seeking to automate their lab operations will often combine layers of the life sciences automation technology stack by engaging with multiple vendors. For example, they might use one vendor for instrument control, another for data handling, another for workcell management, and so on. Our automation offering seeks to provide a unified and comprehensive set of products to address all layers of the stack. To our knowledge, we are the only company aiming to do this. Our competitors are the various vendors addressing individual layers of the stack. In particular, there are competitor companies that offer single or multi-workcell management: Strateos, ThermoFisher Scientific, HighRes Biosolutions, and Biosero.

For more information about our competitive landscape, see “*Risk Factors—Risks Related to Our Business—We expect to face competition for our products from established enterprises and new companies, and if we cannot compete effectively against these companies, products or prices, we may not be successful in bringing our products to market.*”

## GOVERNMENT REGULATIONS

### Environmental Regulations

Our development and production processes involve the use, generation, handling, storage, transportation and disposal of hazardous and non-hazardous chemicals and regulated and non-regulated biological materials. We are subject to a variety of federal, state, local and international laws, regulations and permit requirements governing the use, generation, manufacture, transportation, storage, handling and disposal of these materials in the United States and other countries where we operate or may operate or sell our products in the future. These laws, regulations and permits can require expensive fees, exposure or pollution control equipment or operational changes to limit actual or potential impact of our technology on the environment and violation of these laws could result in significant fines, civil sanctions, permit revocation or costs from environmental remediation. Future developments, including the commencement of or changes in the processes relating to commercial manufacturing of one or more of our products, more stringent environmental regulation, policies and enforcement, the implementation of new laws and regulations or the discovery of unknown environmental conditions, may require expenditures that could have a material adverse effect on our business, results of operations or financial condition. See “*Risk Factors—Risks Relating to Our Business—We may incur significant costs to comply with environmental laws and regulations, and failure to comply with these laws and regulations could expose us to significant liabilities.*”

### Agricultural Regulations

The U.S. government agencies primarily responsible for overseeing the products of modern agricultural biotechnology are the United States Department of Agriculture (“USDA”), the Food and Drug Administration (“FDA”), and the EPA. In addition, some products are regulated at the state level by state Departments of Agriculture. Our future bio-differentiated agricultural products may be subject to the regulatory requirements of one or more of these agencies. Those requirements will vary depending on the particular product, the mode of action and intended use of the product for commercial purposes.

Currently, we are subject to USDA Animal and Plant Health Inspection Service (“APHIS”) regulations regarding the R&D use of some of our microorganisms. APHIS is responsible for promoting U.S. agricultural health, including protecting agricultural plants from pests, diseases and noxious weeds. Accordingly, under the Plant Protection Act, USDA APHIS has regulatory oversight over organisms and products of modern biotechnology, including those produced through genetic modifications, that are known or suspected to be plant pests or pose a plant pest risk to domestic agriculture and native plants. As some of our microorganisms are considered regulated articles by APHIS, we are required to obtain the necessary APHIS permits prior to their use. Any future regulated microorganism we wish to use will also be subject to the same requirement for an APHIS permit. See “*Risk Factors—Risks Relating to Our Business—We may not be able to obtain, or may experience significant delays or costs in obtaining, regulatory approval for our products or their components and even if approvals are obtained, complying on an on-going basis with numerous regulatory requirements will be time-consuming and costly.*”

## Chemical Regulations

Our bio-differentiated products use chemical substances that may be subject to government regulations in our target markets. The chemicals used to manufacture ZYM0101 and ZYM0102 are currently subject to U.S. EPA chemical regulations. Specifically, the EPA administers the requirements of the Toxic Substances Control Act (“TSCA”), which regulates the commercial registration, distribution and use of many chemicals. Before an entity can commercially produce or distribute a chemical, it needs to determine whether that chemical is listed in the TSCA inventory. If the substance is listed, then manufacture or distribution is permitted. If not, then in most cases a pre-manufacture notice must be filed with the EPA. Similarly, in the European Union we are subject to Registration, Evaluation, Authorization and Restriction of Chemical Substances (“REACH”) regulation, which is administered by the European Chemicals Agency (“ECHA”). REACH requires companies to identify and manage risks linked to chemicals and chemical substances that we manufacture, import, or market in the EU and to demonstrate to ECHA how the substance can be safely used. Although there are prescribed regulatory timelines with most agencies, the process may result in significant delays or significant costs. See “*Risk Factors—Risks Relating to Our Business—We may not be able to obtain, or may experience significant delays or costs in obtaining, regulatory approval for our products or their components and even if approvals are obtained, complying on an on-going basis with numerous regulatory requirements will be time-consuming and costly.*”

## GMO and GMM Regulations

The use of genetically modified organisms (“GMOs”) and genetically modified microorganisms (“GMMs”) are subject to laws and regulations in many countries. In the United States, the federal agencies governing the commercial use of GMOs and GMMs as well as potential products made from GMOs and GMMs include, among others, the USDA, the FDA and the EPA. Various states within the United States could choose to regulate products made with GMOs and GMMs as well. We expect to encounter GMO and GMM regulations in most, if not all of the countries in which we may seek to make our genetically modified or genetically derived products; however, the scope and nature of these regulations will likely vary from country to country. In addition, such regulations may change over time. If we cannot meet the applicable requirements in countries in which we intend to produce our products using our GMOs or GMMs, then our business will be adversely affected. See “*Risk Factors—Risks Related to Our Business—We may face risks relating to the use of our genetically modified organisms and microorganisms and if we are not able to secure regulatory approval or if we face material ethical, legal and social concerns about use of our GMO or GMM technology, our business could be adversely affected.*”

## Pharmaceutical Regulations

Any future products for the pharmaceutical market may be subject to regulation by the FDA, as well as similar agencies of states and foreign jurisdictions where these products are manufactured, sold or proposed to be sold. Pursuant to the Federal Food, Drug, and Cosmetic Act (“FDCA”), the FDA is responsible for ensuring the safety, efficacy and security of drugs, biological products and medical devices by regulating the processing, formulation, safety, manufacture, packaging, labeling and distribution of these products. The FDA has broad authority to enforce the provisions of the FDCA, including powers to issue a public warning letter to a company, to publicize information about illegal products, to request a recall of illegal products from the market and to request the United States Department of Justice to initiate a seizure action, an injunction action or a criminal prosecution in the U.S. courts. Failure to obtain requisite approval from, or comply with the laws and regulations of, the FDA or similar agencies of states and applicable foreign jurisdictions could prevent us from fully commercializing certain of our products. See “*Risk Factors—Risks Relating to Our Business—We may not be able to obtain, or may experience significant delays or costs in obtaining, regulatory approval for our products or their components and even if approvals are obtained, complying on an on-going basis with numerous regulatory requirements will be time-consuming and costly.*”

## Other Regulations

We are also subject to regulation by the Occupational Safety and Health Administration, labor and employment laws and our end-user products are subject to the regulations of the U.S. Federal Trade Commission (“FTC”) and similar agencies of states and foreign jurisdictions where these products are sold or proposed to be sold regarding the advertising of such products. In recent years, the FTC has instituted numerous enforcement actions against companies for failure to have adequate substantiation for claims made in advertising or for the use of false or misleading advertising claims. The FTC has broad authority to enforce its laws and regulations applicable to cosmetics, including the ability to institute enforcement actions which often result in consent decrees, injunctions and the payment of civil penalties by the companies involved. Failure to comply with the laws and regulations of the FTC or similar agencies of states and applicable foreign jurisdictions could impair our ability to market our end-user products.

We are unable to predict whether any agency will adopt any laws or regulations that could have a material adverse effect on our operations. We have incurred, and will continue to incur, capital and operating expenditures and other costs in the ordinary course of our business in complying with these laws and regulations. See “*Risk Factors—Risks Related to Our Business—Governmental trade controls, including export and import controls, sanctions, customs requirements and related regimes, could subject us to liability or loss of contracting privileges or limit our ability to compete in certain markets.*”

## **HUMAN CAPITAL**

### **Human Capital Strategy**

We believe our employees are among our most important resources and are critical to our success. We strive to build a culture that supports collaboration, learning, and innovation, with a goal of attracting, developing, and challenging amazing people.

#### **Diversity, equity, and inclusion (“DEI”)**

We believe the diversity of humankind is needed to be successful in our mission. We take an intentional, data-driven, action-oriented, and innovative approach with a goal of attracting, engaging, and developing a diverse, equitable, and inclusive community. We aim to build a company where every Zymergen employee has a sense of belonging and is operating at their full potential.

We are focused on DEI throughout the employee lifecycle and along five primary dimensions: data, processes, programs, Zymergen community, and the external community. To set the strategic course for our DEI initiatives, we have established a DEI Council, which includes our Chief People Officer and we expect will include our CEO once our permanent CEO is hired. This Council guides our DEI efforts by articulating and establishing priority areas, sharing progress, and building broad community engagement. A DEI working group was also established to help execute on the Council’s strategic vision. Their efforts include conducting periodic internal audits to assess our progress against DEI goals and launching learning and development courses to foster discussion among our employees about difficult topics.

Overall, our aim is to integrate attention to diversity, equity, and inclusion into our work, so that it becomes, quite literally, part of everyone’s job.

#### **Recruiting, Hiring, Development & Retention**

We devote significant resources and attention to identifying, recruiting, retaining, incentivizing, and integrating talented and experienced individuals. To attract and maintain talent, we provide generous packages that include comprehensive health insurance, family-friendly and flexible work policies, wellness resources and activities, community clubs, and opportunities for professional development and career mobility, among other benefits. We design our cash and equity compensation packages to be competitive with other biotechnology companies in the San Francisco Bay Area.

In order to foster strong relationships with our employees, we conduct regular employee engagement surveys and maintain channels for providing upward feedback. We also have a learning and development department that curates courses for our employees covering a number of different topics, from technical seminars to health and wellness teachings.

#### **COVID-19 employee safety and benefits.**

In response to the COVID-19 pandemic, we have implemented and adapted measures to protect our workforce. Many of our employees, including members of our management team, have been working remotely during this time. Throughout 2020 and 2021, we provided COVID 19 testing at no cost to our employees. For certain employees who report on-site, we have implemented health screening protocols, as well as a number of on-site health and safety measures designed to address COVID-19 risks. For additional discussion of the impact of the COVID-19 pandemic on our company, see “*Risk Factors—Risks Related to Our Business—The COVID-19 pandemic has had, and is expected to continue to have, an impact on our business, results of operations and financial condition.*”

#### **Employee Health & Safety**

Workplace health and safety are of paramount importance in all aspects of our work and especially in the laboratory setting. During onboarding, all new hires receive our Code of Business Conduct & Ethics and Employee Handbook and take workplace safety training. Employees are then annually asked to review and confirm their understanding of the Code of Business Conduct & Ethics and our Employee Handbook, which includes a requirement that they abide by all company policies. We also conduct periodic training to reinforce workplace safety procedures among our employee population. We have an onsite Environmental, Health & Safety team that partners with employees to promote the safety of our environment and its people, processes, and infrastructure.

All employees and managers are required to complete annual sexual harassment training that includes details on how to report any violations of company policies regarding sexual harassment.

***Employee Population***

As of December 31, 2021, we had 507 employees, of whom approximately 99% were full-time employees. All of our employees are located in the United States, except for 6 who were located outside the United States. Our employees are not represented by any labor union or any collective bargaining arrangement with respect to their employment with us. We have never experienced any work stoppages or strikes as a result of labor disputes.

**CORPORATE INFORMATION**

We were incorporated in Delaware in 2013. Our principal executive offices are located at 5980 Horton Street, Suite 105, Emeryville, CA 94608, and our telephone number (415) 801-8073. Our corporate website address is [www.zymergen.com](http://www.zymergen.com). We do not incorporate the information contained on, or accessible through, our corporate website into this Form 10-K, and you should not consider it part of this Form 10-K. We have included our website address only as an inactive textual reference and do not intend it to be an active link to our website.

“Zymergen,” our logo and our other registered or common law trademarks, service marks, or trade names appearing in this Form 10-K are the property of Zymergen Inc. Other trademarks and trade names referred to in this Form 10-K are the property of their respective owners.

**AVAILABLE INFORMATION**

We file Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K, proxy statements, and related amendments, exhibits and other information with the Securities and Exchange Commission (the “SEC”). You may access and read our filings without charge through the SEC’s website at [www.sec.gov](http://www.sec.gov) or through our website at [investors.zymergen.com](http://investors.zymergen.com), as soon as reasonably practicable after such materials are electronically filed with or furnished to the SEC pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended, or the Exchange Act. Information contained on, or accessible through, our website shall not be deemed incorporated into and is not a part of this Form 10-K.

We announce material information to the public through a variety of means, including filings with the SEC, press releases, public conference calls, and our website. We use these channels to communicate with investors and the public about our Company, our products, and other matters. Therefore, we encourage investors, the media, and others interested in our Company to review the information we make public in these locations, as such information could be deemed to be material information. Information on or that can be accessed through our websites or these social media channels is not part of this Form 10-K, and references to our website addresses are inactive textual references only.

## **Item 1A. Risk Factors**

*Investing in our common stock involves a high degree of risk. You should carefully consider the risks described below, as well as the other information in this report, including our financial statements and the related notes and the section titled “Management’s Discussion and Analysis of Financial Condition and Results of Operations” in this Form 10-K, before deciding whether to invest in our common stock. The occurrence of any of the events or developments described below could harm our business, financial condition, results of operations and growth prospects. In such an event, the market price of our common stock could decline and you may lose all or part of your investment. Additional risks and uncertainties not presently known to us or that we currently deem immaterial also may impair our business operations.*

### **Risk Factors Summary**

Our business is subject to numerous risks and uncertainties, including those outside of our control, that could cause our actual results to be harmed. These risks include, but are not limited to, the following:

- We may not be able to successfully commercialize or generate revenue from our products.
- We may not be able to successfully execute on our new strategic plan.
- Our efforts to reduce our operating costs and extend our cash runway may not be successful.
- We have a history of operating losses and we do not expect to be profitable for the foreseeable future.
- We have a limited operating history, which has made it and may continue to make it difficult to evaluate the prospects for our future viability and predict our future performance.
- The size of the market for our products and solutions may be smaller than estimated and new opportunities may not develop as quickly as we expect, or at all.
- The market, including customers and potential investors, may be skeptical of the viability and benefits of our pipeline products because they are based on a relatively novel and complex technology and we may encounter challenges to align the fit of the products in our pipeline to the relevant market.
- The success of our drug discovery business depends on the quality of our drug discovery platform and synthetic biology capabilities and their acceptance by partners in our market.
- Biopharmaceutical drug development is inherently uncertain, and it is possible that none of the leads discovered using our platform that are further developed will receive marketing approval or become viable commercial products on a timely basis, or at all.
- Our efforts to market our automation solutions externally may not succeed.
- Our automation sales cycle may be long and unpredictable.
- Our automation solutions involve complex hardware and software, and if our automation solutions fail to perform as expected, our ability to develop, market and sell our solutions could be harmed.
- Any failure to offer high-quality technical support services could adversely affect our relationships with our automation customers and our operating results.
- Loss of key personnel and/or failure to attract, train and retain additional key personnel, including a permanent Chief Executive Officer, could delay our product development programs and harm our R&D efforts and our ability to meet our business objectives.
- It is difficult to predict the time and cost of development of our pipeline products, which are produced by or based on a relatively novel and complex technology and are subject to many risks, any of which could prevent or delay revenue growth and adversely impact our market acceptance, business and results of operations.
- The Perceptive Credit Agreement provides our secured lender with liens on substantially all of our assets, including our intellectual property, contains financial covenants and other restrictions on our actions, which may cause significant risks to our stockholders and may impact our ability to pursue certain transactions and operate our business, and provides that a material adverse change constitutes an event of default.
- Our restructuring activities have resulted in impairment and other charges, which may adversely affect our financial condition and results of operations.
- If goodwill, other intangible assets or long-lived assets become impaired, we may be required to record a significant charge to earnings.
- We may not be successful in our efforts to use our proprietary platform to build a pipeline of products.
- Even if we are successful in expanding our platform, rapidly changing technology and extensive competition in the synthetic biotech and petrochemical industries could make the products we are developing and producing obsolete or non-competitive unless we continue to develop and manufacture new and improved products and pursue new market opportunities.
- The success of our advanced materials business relies heavily on the performance of our products and developing new products at lower costs and faster development timelines.
- We may launch products with a non-fermentation produced molecule and, if we are not successful in our efforts to convert to a fermentation-produced version of our product, our products may not be commercially successful.



- We do not have our own commercial scale manufacturing capability, and any disruptions or interruptions in our manufacturing capacity may prevent us from launching products or producing products at necessary volumes to meet commercial demand, which may result in loss of customers or lost revenue opportunities.
- The manufacture of our products is complex, and we may be unable to secure necessary talent to establish and scale our manufacturing and supply chain to the extent necessary to make a profit or sustain and grow our current business.
- We depend on a limited number of suppliers for critical components of development and manufacturing of our products. The loss of any one or more of these suppliers, or their failure to supply us with the necessary components on a timely basis, could cause delays in our production capacity and adversely affect our business.
- We face increased supply chain risks with respect to our automation business.
- Unfavorable global economic or political conditions, such as the ongoing COVID-19 pandemic, the current war in Ukraine (the “Ukraine War”), and inflation and other cost increases, could adversely affect our business, financial condition or results of operations.
- The COVID-19 pandemic has had, and is expected to continue to have, an impact on our business, results of operations and financial condition.
- Our revenue, results of operations, cash flows and reputation in the marketplace may suffer upon the loss of a significant customer.
- We are involved in securities litigation and other related matters that are expensive and time-consuming. Such litigation and other related matters could harm our business.
- Governmental trade controls, including export and import controls, sanctions, customs requirements and related regimes, could subject us to liability or loss of contracting privileges or limit our ability to compete in certain markets.
- We expect to need to raise additional capital to fund our operations, which we may not be able to obtain on favorable terms, or at all, and which, if obtained, may cause dilution to our stockholders or cause us to further limit our operations.

## Risks Related to Our Business

### ***We may not be able to successfully commercialize or generate revenue from our products.***

We have not yet generated revenue from product sales (except for nominal revenue related to the sale of samples) and expect product revenue to be immaterial in 2022. During the second half of 2021, we conducted the Portfolio Review to assess our target markets and the fit of the products in our pipeline to those markets. As a result of our Portfolio Review, we determined to focus on a smaller number of programs that we believe capitalize on our capabilities and provide clear commercial opportunities. As a result, we discontinued our electronics film programs, other than ZYM0101, which is partnered with Sumitomo Chemical, because emerging data on the market segment we were targeting with Hyaline and other electronics films indicated a smaller near-term opportunity than previously expected. We also discontinued our consumer care programs, including our insect repellent, ZYM0201, because we determined through our Portfolio Review that the costs of customer acquisition with a direct-to-consumer model would have been prohibitive and, in the case of ZYM0201, it could not be produced and distributed at a price point competitive with incumbent products. Following our Portfolio Review, we are focused on our advanced materials business, including agriculture, water repellency, advanced polymers, and healthcare, as well as our drug discovery and automation businesses. We are also investing heavily in research with the goal of building a pipeline of new opportunities. We do not currently know which, if any, of our future products will be successfully commercialized, we do not have a firm pipeline of customers or visibility on commitments, and our prospects for sales of our products are highly uncertain. In addition, if we are unable to commercialize or generate revenue from the products in our focus areas, we may be unable to identify or develop suitable alternative product candidates in a timely manner or at all. If we are unable to successfully commercialize or generate revenue from product sales, our results of operations could differ materially from our expectations, and our business, financial condition and results of operations would be materially and adversely affected and the value of our common stock could decline.

**We may not be able to successfully execute on our new strategic plan.**

With the benefit of the analyses and evaluations that we have conducted through the Portfolio Review, we adopted a new strategic plan in early 2022 with clear milestones and goals. Under our new strategic plan, we are focused on our advanced materials business, including agriculture, water repellency, advanced polymers, and healthcare, as well as our drug discovery and automation businesses. We are also investing heavily in research with the goal of building a pipeline of new opportunities. Some or all of the programs on which we are focused could fail to produce commercially viable products on the timelines that we anticipate or at all. We expect that some of our programs will not reach commercialization because we determine that the commercial opportunities we target are smaller than we anticipate, we encounter technical difficulties, the competitive landscape shifts, or we otherwise determine in our business judgment to terminate a program. We may also modify our strategic plan. Any decision to terminate a program will further reduce the number of programs that we are pursuing and reduce the number of opportunities available to us. The success of our narrowed focus and our new strategic plan depends on our ability to identify and execute on commercial opportunities for our products in our focus areas. If we are unable to successfully execute our strategy, our business, financial condition and results of operations may be materially and adversely affected.

**Our efforts to reduce our operating costs and extend our cash runway may not be successful.**

We recently implemented several cost reduction measures, including reductions in force in the fall of 2021 that resulted in the elimination of approximately 220 positions and the discontinuation of a number of programs. We believe that following these measures we will have sufficient capital to support our operations to the middle of 2023, but our estimates of our future costs and the resources required to support our operations may prove incorrect, and we may be unable to support our operations for such period. For example, widespread inflationary pressures exist across global economies, which could result in the costs to support our operations exceeding our estimates. Further, global economic, financial, and political conditions, such as a resurgence of COVID-19, political unrest or war, including the Ukraine War, a weakening economy or any other disruption of the global economy or financial markets, could result in a variety of risks to our business, including further inflation or other increases to the costs of our operations. In addition, our recent reductions in force, and any future reductions in force or other cost-cutting measures, could adversely affect our ability to attract and retain employees, which could require us to expend more resources on employee attraction and retention than we currently anticipate. Even if our efforts to reduce our operating costs are successful, our resources may not be sufficient to support our current research, development or commercialization efforts to success, and we may have insufficient resources to invest in research, development or commercialization of otherwise promising future programs or activities, either of which could be detrimental to the success of our programs or our strategy and our ability to commercialize and generate revenue from our products. Any inability to support our operations could also require us to raise additional capital. See the risk factor titled “—*We expect to need to raise additional capital to fund our operations, which we may not be able to obtain on favorable terms, or at all, and which, if obtained, may cause dilution to our stockholders or cause us to further limit our operations.*” If we do not have sufficient funds to support our programs, then our programs, business, financial condition and results of operations may be materially and adversely affected.

In addition, our customers, vendors and partners may consider our credit profile when considering whether to contract with us or negotiating or renegotiating contract terms, and certain third parties have issued negative reports regarding our business and financial risk. If our existing or potential customers, vendors or partners develop a negative perception of our short- or long-term financial prospects, including as a result of third-party reports, such parties may decide not to do business with us or change the terms on which they do business with us, which could limit our ability to develop products and generate revenue, require us to find alternate vendors, customers or partners, or limit the availability of credit from vendors and increase our costs. Any of these consequences could have a material adverse effect on our business, prospects, results of operations, financial condition, and efforts to reduce our operating costs and extend our cash runway.

**We have a history of operating losses and we do not expect to be profitable for the foreseeable future.**

We have incurred significant operating losses in each period since our inception. Our operating losses reflect the substantial investments we made to develop our platform and to work on the development of our products. We incurred net losses of \$361.8 million, \$262.2 million and \$236.8 million for the years ended December 31, 2021, 2020 and 2019, respectively. As of December 31, 2021, we had an accumulated deficit of \$1.1 billion. We have not yet generated revenue from product sales (except for nominal revenue related to the sale of samples) and expect product revenue to be immaterial in 2022. We expect our losses to continue for the foreseeable future as we continue to invest significant additional funds toward ongoing R&D as we develop new products. We have recently implemented several cost reductions measures, but incurred increased operating costs in 2021 given the external consultants that we engaged to assist with our Portfolio Review and development of our new strategic plan and one-time restructuring costs. We may incur additional similar costs in the future. Further, our limited operating history makes it difficult to effectively plan for and model future growth, revenue and operating expenses. Our ability to achieve or sustain profitability is based on numerous factors, many of which are beyond our control, including whether or when we achieve market acceptance of our products, product and platform development, our ability to develop and commercialize new products, our ability to scale our manufacturing capacity, our ability to manufacture products with a fermentation-produced biomolecule and our market penetration and margins. We may never be able to generate sufficient revenue to achieve or sustain profitability or it may take longer than we anticipate. Our failure to achieve or maintain profitability could negatively impact the value of our common stock.

**We have a limited operating history, which has made it and may continue to make it difficult to evaluate the prospects for our future viability and predict our future performance.**

As a business with a limited operating history, we have encountered unforeseen expenses, difficulties, complications, delays and other known and unknown obstacles. For example, as a result of our Portfolio Review, we discontinued our electronics film programs, other than ZYM0101, which is partnered with Sumitomo Chemical, because emerging data on the market segment we were targeting with Hyaline and other electronics films indicated a smaller near-term opportunity than previously expected. We also discontinued our consumer care programs, including our insect repellent, ZYM0201, because we determined through our Portfolio Review that the costs of customer acquisition with a direct-to-consumer model would have been prohibitive and, in the case of ZYM0201, it could not be produced and distributed at a price point competitive with incumbent products. We are now focused on opportunities in advanced materials, drug discovery and automation, which are areas in which we have a limited operating history and which may present expenses, difficulties, complications, delays and other obstacles that we do not currently foresee.

Our long-term objective is to generate revenue from the sale of numerous breakthrough products across a variety of industries. We expect that there will be variability between individual products with respect to the timelines and costs for launching a product, which may be greater where regulatory requirements lead to longer timelines, which could apply to certain of our products. In addition, with respect to some of our products, we expect to generate revenue only after customers have completed all aspects of their qualification processes for those products and have decided to place orders for such products, which is typically done on a purchase order basis, rather than under long-term contractual commitments.

Substantially all of our revenue to date has been generated from R&D service contracts and collaboration and other arrangements aimed at developing, testing and validating our platform by providing custom services for use only by the collaboration partner. Our prospects must be considered in light of the uncertainties, risks, expenses and difficulties frequently encountered by companies in their early stages of operations. We have not yet achieved market acceptance for our products, generated revenue from product sales (except for nominal revenue related to the sale of samples), produced our products at scale, scaled our manufacturing capabilities to meet potential demand at a reasonable cost, established a sales model or conducted sales and marketing activities necessary for successful product commercialization. Predictions about our future success or viability are highly uncertain and may not be as accurate as they could be if we had a longer operating history or a company history of successfully developing, commercializing and generating revenue from products.

We have encountered in the past, and will encounter in the future, risks and uncertainties frequently experienced by growing companies with limited operating histories in emerging and rapidly changing industries, such as our recent decision to focus on opportunities in advanced materials, drug discovery, and automation and our determination to discontinue our electronics film programs, other than ZYM0101, which is partnered with Sumitomo Chemical, and our consumer care programs, including our insect repellent, ZYM0201. If our assumptions regarding these risks and uncertainties, which we use to plan and operate our business, are incorrect or change, or if we do not address these risks successfully, our results of operations could differ materially from our expectations, and our business, financial condition and results of operations could be adversely affected.

***The size of the market for our products and solutions may be smaller than estimated and new opportunities may not develop as quickly as we expect, or at all.***

The demand for our products and solutions is new and evolving, making it difficult to predict with any accuracy the total potential demand for our current and future products and solutions. Our estimates of the annual total addressable markets and serviceable addressable markets for our current and future products and solutions are based on a number of internal and third-party estimates and assumptions. In addition, our strategy involves building our drug discovery and automation businesses, which we have only recently launched, and we have limited experience marketing these solutions to biopharmaceutical or other customers. Sales of new products or solutions may take several years to develop and mature, if at all, and these opportunities may not develop as we expect. As a result, the sizes of the annual total addressable markets and serviceable addressable markets for our products and solutions are even more difficult to predict. Our assumptions regarding and the data underlying our estimates of the total annual addressable markets and serviceable addressable markets may not be correct, and the conditions supporting our assumptions or estimates, or those underlying the third-party data we have used, may change at any time, thereby reducing the accuracy of our estimates. As a result, our estimates of the annual total addressable markets and serviceable addressable markets for our products and solutions may be incorrect. The future growth of our current and future products and solutions depends on many factors, including factors that are beyond our control, such as recognition and acceptance of our products and solutions by our customers and the growth, prevalence and costs of competing products and solutions. Such recognition and acceptance may not occur in the near term, or at all. If demand for our current and future products and solutions is smaller than estimated or does not develop as we expect, our growth may be limited and our business, financial condition and operational results may be adversely affected. For example, as a result of our Portfolio Review, we discontinued our electronics film programs, other than ZYM0101, which is partnered with Sumitomo Chemical, because emerging data on the market segment we were targeting with Hyaline and other electronics films indicated a smaller near-term opportunity than previously expected.

***The market, including customers and potential investors, may be skeptical of the viability and benefits of our products because they are based on a relatively novel and complex technology and we may encounter challenges to align the fit of the products in our pipeline to the relevant market.***

The market, including customers and potential investors, may be skeptical of the viability and benefits of our products because they are based on a relatively novel and complex technology. There can be no assurance that, once we launch them, our products will be understood, approved, or accepted by customers, regulators and potential investors or that we will be able to sell our products profitably at competitive prices and with features sufficient to establish demand. In addition, in order for novel materials to get designed into new products, dialogue across the relevant supply chain is needed. While the ultimate customers for our products may only be specific parts of the relevant value chain, relationships with all parts of the chain are important in order to gain visibility into market trends and feature and specification requirements, and in order to get designed into the end products. If we are unable to convince these potential customers, including the consumers or businesses who purchase end-products containing our products, of the utility and value of our products or the end products in which they are incorporated or that our products are superior to the products they currently use, we will not be successful in entering these markets and our business and results of operations will be adversely affected. If potential investors are skeptical of the success of our products, our ability to raise capital and the value of our stock may be adversely affected.

***The success of our drug discovery business depends on the quality of our drug discovery platform and synthetic biology capabilities and their acceptance by partners in our market.***

We utilize our drug-discovery platform, which combines access to our UMDB with our machine learning and synthetic biology capabilities, to identify drug candidate leads for further development and potential commercialization by partners or internally. As a result, the quality and sophistication of our drug discovery platform and capabilities is critical to our ability to conduct our research and discovery activities and to deliver promising molecules. In particular, the success of our drug discovery business depends, among other things, on:

- our ability to successfully identify therapeutic leads on the desired timeframes;
- our ability to enter into partnerships and establish an internal pipeline of drug candidates;
- our ability to increase awareness of the capabilities of our drug discovery business;
- our potential partners' willingness to embrace new technologies;
- our potential partners' perception of the cost effectiveness and reliability of our drug discovery platform, including in comparison to legacy and other alternative technologies;
- the rate of adoption of our solutions by pharmaceutical companies, biotechnology companies, government organizations and non-profit organizations and others;
- the timing and scope of any approvals that may be required by the FDA or any other regulatory body for drugs that are developed based on leads we discover;
- any negative publicity regarding defects or errors in our or our competitors' technologies; and

- our ability to validate our drug discovery platform through research and accompanying publications.

There can be no assurance that we will successfully address any of these or other factors that may affect the market acceptance of our drug discovery platform or our technology. If we are unsuccessful in achieving and maintaining market acceptance of our platform, our business, financial condition, results of operations and prospects could be materially and adversely affected.

***Biopharmaceutical drug development is inherently uncertain, and it is possible that none of the leads discovered using our platform that are further developed will receive marketing approval or become viable commercial products on a timely basis, or at all.***

We seek to use our drug discovery platform to offer drug-discovery solutions to partners who are engaged in drug discovery and development. Our potential partners include pharmaceutical companies, biotechnology companies of varying sizes, and non-profit and government organizations. While we expect that we would receive upfront payments generated through our receipt of technology access fees and discovery research fees for performing research activities for our partners, we estimate that the vast majority of the economic value of any contracts that we enter into with drug discovery partners will be in the downstream payments that are payable if certain milestones are met or approved products are sold. As a result, the success of our drug discovery business will depend on the ability of our partnerships to successfully develop and commercialize therapies based on drug candidate leads discovered using our drug discovery platform. Due to our initial plan to rely on partners in our drug discovery business, the risks relating to product development, regulatory clearance, authorization or approval and commercialization will apply to us derivatively through the activities of our partners, but we will face the same risks with any drug candidates that we develop on our own. There can be no assurance that drug candidate leads that we discover will be successfully developed, approved or commercialized. As a result, we may not realize the intended benefits of our partnerships. We launched our drug discovery business in 2022 and have not yet executed any partnerships.

Due to the uncertain, time-consuming, and costly clinical development and regulatory approval process, there may not be successful development of any drug candidates with the drug candidate leads that we discover, and we and our partners may choose to discontinue the development of these drug candidates for a variety of reasons, including due to safety, lack of efficacy, risk versus benefit profile, exclusivity, competitive landscape, commercialization potential, production limitations or prioritization of resources. It is possible that none of the drug candidate leads that we discover will ever receive regulatory approval and, even if approved, such drug candidates may never be successfully commercialized. Furthermore, approved drugs may not achieve broad market acceptance among physicians, patients, the medical community and third-party payors, in which case revenue generated from their sales would be limited. Additionally, given the costs of drug development, companies frequently must make decisions about which drug candidates to develop and advance, and we or any partners may not have the resources to invest in all of the drug candidates that we discover using our platform, or clinical data and other development considerations may not support the advancement of one or more drug candidates. Decision-making about which drug candidates to prioritize involves inherent uncertainty, and any partners' development program decision-making and resource prioritization decisions, which would be outside of our control, may adversely affect the potential value of those partnerships or perceptions regarding the potential for drug candidate leads discovered using our drug discovery platform. Further, if the development of drug candidate leads discovered using our drug discovery platform encounter safety issues or fail to demonstrate efficacy in clinical trials, such failure could result in skepticism about the likelihood of success of other drug candidate leads discovered with our drug discovery platform, making it more difficult to attract partners. The failure to effectively advance, market and sell suitable drug candidates with the leads that we discover could materially and adversely affect our business, financial condition, prospects and results of operations.

***Our efforts to market our automation solutions externally may not succeed.***

We launched our automation business in early 2022 and have limited experience selling our automation solution to external customers. Our efforts to offer our automation solution to external customers may not succeed. We do not know if we can successfully compete in this new market, and our expectations for this business may not materialize. It is difficult to predict customer adoption rates and demand for our automation solutions, the entry of competitive products or the future growth rate and size of the market. The expansion of this market depends on a number of factors, including: the cost, performance, and perceived value associated with automation hardware and software as an alternative to legacy systems or manual processes. If there is a reduction in demand or demand is lower than we expect, whether as a result of a lack of customer acceptance, technological challenges, weakening economic conditions, data security or privacy concerns or competing technologies and products, the market for our solutions might not develop or might develop more slowly than we expect. Even if we succeed in selling automation solutions we may not be able to generate significant revenues and cash flows from these activities. The failure to successfully build our automation business may materially adversely affect our business, financial condition, prospects and results of operations.

***Our automation sales cycle may be long and unpredictable.***

Our automation solution combines hardware and software offerings, and the sales cycle for such solutions can vary and be long and unpredictable. The timing of sales of our automation solution is difficult to forecast, in part because of our lack of experience selling this offering to external customers. Further, we anticipate that some potential customers may want custom solutions that require longer sales cycles as we work with the potential customer to understand their needs and design a solution to meet those needs, which we expect will often be an iterative process. Initially, we intend to focus our sales efforts for automation on the biotech industry, where we believe the processes and systems that we have built for our own programs will have the most utility. Our solutions may be viewed as a large expenditure for smaller or early-stage biotech companies and larger, more established companies may have long approval processes and/or be reluctant to switch to a new technology, all of which may further extend our sales cycles or limit our ability to acquire customers. We expect the length of time that potential automation customers devote to their evaluation, contract negotiation, and budgeting processes will vary significantly, depending on the sizes of the organizations and the nature of their needs. In addition, we might devote substantial time and effort to a particular unsuccessful sales effort, and as a result, we could lose other sales opportunities or incur expenses that are not offset by an increase in revenue, which could harm our business.

***Our automation solutions involve complex hardware and software, and if our automation solutions fail to perform as expected, our ability to develop, market and sell our solutions could be harmed.***

Our automation solutions, including our RACs and ACS, use a substantial amount of proprietary software and complex technological hardware to operate, some of which is still subject to further development and testing. The development and implementation of such advanced technologies is inherently complex, and requires coordination with our vendors and suppliers in order to integrate such technology into our products and ensure it interoperates with other complex technology as designed and as expected.

Our automation solutions may contain software bugs or defects in design and manufacture that may cause them not to perform as expected or that may require software patches, repairs, recalls, and design changes, any of which would require significant financial and other resources to successfully navigate and resolve. These products use a substantial amount of software code to operate, and software products are inherently complex and may contain defects and errors when first introduced. If our products contain defects in design or manufacture that cause them not to perform as expected or that require repair, our ability to develop, market and sell our solutions could be harmed. Although we will attempt to remedy issues we observe in our products effectively and rapidly, such efforts could significantly distract management's attention and divert technical resources from other important business objectives, may not be timely, may hamper production or may not be to the satisfaction of our customers. Further, our limited operating history and limited field data reduce our ability to evaluate and predict the long-term quality, reliability, durability and performance characteristics of our RACs. There can be no assurance that we will be able to detect and fix any defects in our products prior to their sale to customers.

Any defects, bugs or other failure of our automation solutions to perform as expected could harm our reputation and result in delivery delays, product recalls, breach of warranty claims and significant warranty and other expenses, and could have a material and adverse impact on our business, results of operations, prospects and financial condition. As a new entrant to the industry attempting to build customer relationships and earn trust, these effects could be significantly detrimental to us.

***Any failure to offer high-quality technical support services could adversely affect our relationships with our automation customers and our operating results.***

As part of our automation solution, we will offer customers our support to resolve technical issues relating to our automation offerings, including hardware and software. We anticipate that customers will rely on us to troubleshoot problems with the performance of our automation solutions, design customized automation systems, inform them about the best way to set up and analyze various types of experiments, among other services and advice. We just launched our automation business in early 2022 and do not yet have significant experience responding to external customer demands. We may be unable to resolve problems that customers encounter with our solution quickly enough to accommodate their needs or at all. Additionally, we may experience short-term increases in customer demand for these support services, particularly as we roll out new implementations of our solutions and may not have sufficient resources to adequately satisfy those demands. Increased customer demand for our services, without corresponding revenues, could increase costs and adversely affect our operating results. In addition, we expect that our sales process for automation will be highly dependent on the reputation of our solutions and business and on positive recommendations from existing customers. Any failure to offer high-quality technical support, or a market perception that we do not offer high-quality support, could adversely affect our reputation, our ability to sell our automation solutions and our business and operating results.

***Loss of key personnel and/or failure to attract, train and retain additional key personnel, including a permanent Chief Executive Officer, could delay our product development programs and harm our R&D efforts and our ability to meet our business objectives.***

Our business involves complex, global operations across a variety of markets and requires a management team and employee workforce that is knowledgeable in the many areas in which we operate, including our target industries. As a result of some of the issues we have experienced with our commercial product pipeline, we are working to bring additional talent to our commercial team and to our sales pipeline qualification and forecast processes. Our future success depends upon our ability to attract, train, retain and motivate highly qualified management, scientific, engineering, information technology, and sales personnel, among others, including a permanent Chief Executive Officer. The market for qualified personnel is very competitive because of the limited number of people available who have the necessary technical skills and understanding of our technology and products and the nature of our industry which requires certain of our technical personnel to be on-site in our facilities. We compete for qualified scientific and information technology personnel with other life sciences and information technology companies as well as academic institutions and research institutions in the markets in which we operate, including the San Francisco Bay Area, California and Boston, Massachusetts. To attract top talent, we believe we will need to offer competitive compensation and benefits packages, including equity incentive programs, which may require significant investment.

The departure of one or more of our senior management team members or other key employees could be disruptive to our business until we are able to hire qualified successors. Our employees, including members of our management team, could leave our company with little or no prior notice and would be free to work for a competitor. We do not maintain “key man” life insurance on any of our employees.

On August 3, we announced that Josh Hoffman, our former Chief Executive Officer, stepped down, and we appointed Jay Flatley as Acting Chief Executive Officer. Additionally, Aaron Kimball, our Chief Technology Officer, resigned effective as of April 1, 2022. Our Board of Directors has commenced a search process to identify a permanent Chief Executive Officer. We also recently reduced our workforce by approximately 220 positions and have experienced higher levels of voluntary attrition in recent months. In addition, our recent reductions in force and attrition levels have adversely affected, and any future reductions in force or other cost-cutting measures could adversely affect, employee morale and further increase voluntary attrition or increase the difficulty of attracting qualified personnel. During this period of management transition and uncertainty, we have experienced, and may experience in the future, diversion of management attention from business concerns, failure to retain other key personnel and loss of institutional knowledge. Additionally, the recent decline in the perceived value of our equity awards has affected and may continue to adversely affect our ability to attract and retain key employees. If we are unable to successfully identify and attract adequate candidates for the permanent Chief Executive Officer vacancy or any other key vacancies that occur in a timely manner, we could experience harm to our business, growth, financial conditions, results of operations and cash flows.

In addition, some of our scientific personnel are qualified foreign nationals whose ability to live and work in the United States is contingent upon the continued availability of appropriate visas. Due to the competition for qualified personnel in the key markets in which we operate, we expect to continue to utilize foreign nationals to fill part of our recruiting needs. As a result, changes to United States immigration policies have and could further restrain the flow of technical and professional talent into the United States and adversely affect our ability to hire qualified personnel.

***It is difficult to predict the time and cost of development of our products, which are produced by or based on a relatively novel and complex technology and are subject to many risks, any of which could prevent or delay revenue growth and adversely impact our market acceptance, business and results of operations.***

We concentrate our R&D efforts on a select number of products that we believe are both technically feasible and present a market opportunity. The typical development cycle of new pipeline products can be lengthy and may require new scientific discoveries or advancements and the development and engineering of complex technology, including improvements or modifications to our platform. Some of our products may also be subject to customer qualification processes, which may increase our costs and extend our timelines, and we may encounter unforeseen difficulties as we develop and commercialize our products. As we ramp the sale of new products, we may initially experience negative product gross margins. Material manufacturing process changes could also result in reduced or possibly negative margins. We expect our cost of product revenue to increase over time in absolute dollars, and our gross margins will vary based on the volume and mix of products sold. Timing for achieving positive gross margins for any product will depend on the pace at which we achieve commercial scale for that product. We may not achieve the product gross margins that we anticipate.

Further, the variety of our products and different industries as well as pricing pressures and other factors may lead to challenges in scaling production across our product portfolio as well as adapting our platform to solve different development problems arising in the development processes. We also may depend on third parties for the supply of key inputs and various components and for manufacturing capacity, making our ability to develop new products complex and subject to risks and uncertainties regarding commercial feasibility, timing and satisfactory technical performance of products. For example, as a result of the COVID-19 pandemic, the inability to travel delayed the establishment of our Hyaline manufacturing capacity and delayed the process of selecting and vetting contract manufacturing organizations ("CMOs") for our insect repellent product, ZYM0201, and we experienced delays at our U.S. CMO site for Hyaline and at a key supplier of a raw material for Hyaline and one of our other optical film products. If we experience additional problems or delays in developing our pipeline products, we may be subject to further unanticipated costs, including the loss of customers or potential customers. Additionally, even after the incurrence of significant costs to develop a product, we may not be able to solve development problems or develop a commercially viable product at all. For example, we launched our first product, Hyaline, in December 2020, but as a result of our Portfolio Review determined to discontinue our electronics film programs, other than ZYM0101, which is partnered with Sumitomo Chemical, because emerging data on the market segment we were targeting with Hyaline and other electronics films indicated a smaller near-term opportunity than previously expected. We also discontinued our consumer care programs, including our insect repellent, ZYM0201, because we determined through our Portfolio Review that the costs of customer acquisition with a direct-to-consumer model would have been prohibitive and, in the case of ZYM0201, it could not be produced and distributed at a price point competitive with incumbent products. If we do not achieve the required technical specifications or successfully manage our new product development processes, or if development work is not performed according to schedule, then our revenue growth from new products may be prevented or delayed, and our business and operating results may be harmed.

***The Perceptive Credit Agreement provides our secured lender with liens on substantially all of our assets, including our intellectual property, contains financial covenants and other restrictions on our actions, which may cause significant risks to our stockholders and may impact our ability to pursue certain transactions and operate our business, and provides that a material adverse change constitutes an event of default.***

In December 2019, we entered into a credit and guaranty agreement with Perceptive Credit Holdings II, LP and PCOF EQ AIV II, LP (the "Perceptive Credit Agreement"), which was amended and restated in February 2021 and further amended in October 2021 (the "October 2021 Amendment"), pursuant to which the secured lender agreed to provide us with a \$100 million credit facility. As of December 31, 2021, our debt under this credit facility totaled \$50 million in principal amount outstanding. During the course of 2020 and into 2021, we sought and obtained various default waivers and amendments under this agreement due to our inability, or anticipated inability, to comply with certain of our covenants relating to the treatment of our acquisitions as permitted transactions under the terms of the Perceptive Credit Agreement, the achievement of quarterly revenue milestones, the timing for consummation of specified debt or equity transactions and the timing for delivery of audited financials for the year ending December 31, 2019. As a result of the amendments and waivers to the Perceptive Credit Agreement, we regained compliance with the applicable covenants under the agreement. The October 2021 Amendment shortened the term of the loan by moving the final maturity date to June 2022. Pursuant to the terms of the October 2021 Amendment we also deposited funds equal to the remaining outstanding principal amount of the loans under the Credit Agreement plus interest through the maturity date and further prepayment premium into a blocked account controlled by the administrative agent, which was released in November 2021 upon the administrative agent's completion of diligence to its reasonable satisfaction regarding our anticipated operating costs and budget through the maturity date. We will be required to utilize cash that would otherwise be available to support our operations to repay this indebtedness when it becomes due.

In addition, in association with the secured debt, we have granted liens on substantially all of our assets, including our intellectual property, as collateral, and have agreed to significant covenants, including covenants that require us to maintain minimum liquidity and covenants that materially limit our ability to take certain actions, including our ability to pay dividends, make certain investments and other payments, incur additional indebtedness, undertake certain mergers and consolidations, encumber and dispose of assets and customary events of default, including failure to pay amounts due, breaches of covenants and warranties, material adverse effect events, certain cross defaults and judgements and insolvency. For example, the Perceptive Credit Agreement contains restrictions on our ability to purchase or dispose of assets and has other affirmative and negative covenants that impact how we run our business. A failure to comply with the covenants and other provisions of the Perceptive Credit Agreement, including any failure to make a payment when required, would generally result in events of default under such instruments. Although we have obtained waivers from the lender of certain defaults in 2020 and 2021, there can be no assurance that the lender would be willing to grant such waivers in the future. The Perceptive Credit Agreement also provides that a material adverse change constitutes an event of default. The occurrence of any default would cause the interest rate to increase during the period of such default and could permit acceleration of such indebtedness with a prepayment premium. Any required repayment of our indebtedness as a result of acceleration or otherwise would lower our current cash on hand such that we would not have those funds available for use in our business, which could also reduce our ability to support our operations.

If we are at any time unable to service our indebtedness when payment is due, we may be required to attempt to renegotiate the terms of the instruments relating to the indebtedness, seek to refinance all or a portion of the indebtedness, or obtain additional financing. There can be no assurance that we would be able to successfully renegotiate such terms, that any such refinancing would be possible or that any additional financing could be obtained on terms that are favorable or acceptable to us, if at all. Any debt financing that is available could cause us to incur substantial costs and subject us to covenants that significantly restrict our ability to conduct our business. If we seek to complete additional equity financings, the interests of existing equity holders may be diluted.

If we are unable to make payment on our secured debt instruments when due, our secured lender may foreclose on and sell the assets securing such indebtedness, which includes substantially all of our property (including our intellectual property), to satisfy our payment obligations, which could prevent us from accessing those assets for our business and conducting our business as planned. Our business, financial condition, prospects and results of operations could be materially adversely affected as a result of any of these events.

***Our restructuring activities have resulted in impairment and other charges, which may adversely affect our financial condition and results of operations.***

Our restructuring activities have resulted in the impairment of certain manufacturing equipment and may result in impairment of additional assets in the future. Impairment may result from, among other things, decisions to discontinue a program or dispose of assets, deterioration in our stock price or adverse market conditions. For example, in connection with our decision to discontinue our electronics film programs, other than ZYM0101, which is partnered with Sumitomo Chemical, we determined that certain assets used solely for our electronics film program were impaired and recorded a non-cash impairment charge of \$11.8 million related to that equipment during 2021. In addition, we incurred \$8.7 million in severance and employee-related restructuring charges, \$3.7 million of contract termination costs and \$4.6 million in consulting fees in 2021 related to our restructuring activities. We may incur further restructuring charges or impairment charges with respect to restructuring activities that we expect to complete through the first half of 2022 or as a result of the recent decline in our stock price or adverse market conditions, among other things. Determining whether an impairment exists and the amount of the impairment involves quantitative data and qualitative criteria that are based on estimates and assumptions requiring significant management judgment. Future events or new information may change management's valuation of assets in a short amount of time. The timing and amount of impairment charges recorded in our consolidated statements of operations and write-downs recorded in our consolidated balance sheets could vary if management's conclusions change. Any impairment of assets, which will result in non-cash charges against earnings, or other restructuring costs that we incur could have a material adverse effect on our financial condition and results of operations.

***If goodwill, other intangible assets or long-lived assets become impaired, we may be required to record a significant charge to earnings.***

We have recorded a significant amount of goodwill in our consolidated financial statements. As of December 31, 2021, goodwill recorded on our consolidated balance sheet totaled \$40.6 million. We review goodwill for impairment on at least an annual basis and at any interim date whenever events or changes in circumstances indicate that the carrying value may not be recoverable. We review our other intangible and long-lived assets for impairment whenever events or changes in circumstances indicate that the carrying amount of the assets may not be recoverable. Events or changes in circumstances (i.e., information that indicates an impairment might exist) could include: a significant sustained decrease in the market price of our common stock; current period cash flow losses or operating losses combined with a history of losses or a forecast of continuing losses associated with the use of the assets; slower growth rates in our industry; significant adverse changes in the business climate or legal factors; accumulation of costs significantly in excess of the amount originally expected for the acquisition or construction of the assets; loss of significant customers or partners; or the current expectation that the assets will more likely than not be sold or disposed of significantly before the end of their estimated useful life. We tested goodwill for impairment in the fourth quarter of 2021. Based on our analysis, we determined that the fair value of goodwill at the reporting unit level exceeded the carrying value and that no impairment was necessary as of December 31, 2021. Nevertheless, we may experience additional events or changes in circumstances in the future that we determine to be indicators of impairment and that may in turn require us to undertake impairment analysis in future periods. For example, the market price of our common stock has declined significantly in recent periods and may continue to decline in the future. If declines in the market price of our common stock cause the total book value of our company, including goodwill, to exceed its fair value, or if other circumstances and judgments require us to recognize impairment, we may be required to record a significant charge to earnings in our financial statements during the period in which any impairment of our goodwill or other intangible or long-lived assets is determined, resulting in an adverse effect on our financial condition and results of operations.

**We may not be successful in our efforts to use our proprietary platform to build a pipeline of products.**

A key element of our strategy is to build a pipeline of products through our platform and develop those pipeline products into commercially viable products. Although our R&D efforts to date have resulted in potential pipeline products, we have not yet successfully commercialized a product. We may not be able to continue to identify and develop additional pipeline products through the use of our platform.

Even if we are successful in continuing to build our product pipeline through the use of our platform, not all potential pipeline products we identify will be suitable for development and use in commercial products. For example, as a result of our Portfolio Review, we discontinued our electronics film programs, other than ZYM0101, which is partnered with Sumitomo Chemical, because emerging data on the market segment we were targeting with Hyaline and other electronics films indicated a smaller near-term opportunity than previously expected. We also discontinued our consumer care programs, including our insect repellent, ZYM0201, because we determined through our Portfolio Review that the costs of customer acquisition with a direct-to-consumer model would have been prohibitive and, in the case of ZYM0201, it could not be produced and distributed at a price point competitive with incumbent products.

In addition, machine learning and automation, generally, remain in the early stages of development. Although we expect machine learning and automation to improve over time, the operation of our platform will continue to require significant human interaction, which introduces risks of error and requires us to recruit and retain highly skilled employees, which is more challenging in a competitive market and particularly in light of our recent workforce reductions and higher levels of attrition. Identifying and developing commercially viable pipeline products may require us to make continued advancements in our platform to lower costs, reduce development time, better align our products with industry trends or customer demands or otherwise more quickly identify pipeline products. Our ability to advance our platform may be adversely impacted if our efforts to reduce our operating costs result in insufficient resources to support research and development in this area. See the risk factors titled “*—Even if we are successful in expanding our platform, rapidly changing technology and extensive competition in the synthetic biotech and petrochemical industries could make the products we are developing and producing obsolete or non-competitive unless we continue to develop and manufacture new and improved products and pursue new market opportunities*” and “*—Our efforts to reduce our operating costs may not be successful*.” If we are unable to use our platform to successfully identify and develop pipeline products, our business, results of operations and financial condition may be adversely and materially affected.

***Even if we are successful in expanding our platform, rapidly changing technology and extensive competition in the synthetic biotech and petrochemical industries could make the products we are developing and producing obsolete or non-competitive unless we continue to develop and manufacture new and improved products and pursue new market opportunities.***

The synthetic biotech and, to a lesser extent, the petrochemical industries, are characterized by rapid and significant technological changes, frequent new product introductions and enhancements and evolving industry demands and standards. Our future success will depend on our ability to develop and launch new products that address the evolving needs of our customers on a timely and cost-effective basis, to continually improve the products we are developing and producing and to pursue new market opportunities that develop as a result of technological and scientific advances. Due to the significant lead time involved in launching a new product, we are required to make a number of assumptions and estimates regarding the commercial feasibility of a new product, including assumptions and estimates regarding the size of an emerging product category and demand for those products, our ability to penetrate that emerging product category, customer adoption of a downstream product, the existence or non-existence of products being simultaneously developed by competitors, potential market penetration and obsolescence. As a result, it is possible that we may introduce a new product that has been displaced by the time of launch, addresses a market that no longer exists or is smaller than previously thought, that end-consumers do not like or otherwise is not competitive at the time of launch, in each case after the incurrence of significant costs to develop such product. For example, as a result of our Portfolio Review, we discontinued our electronics film programs, other than ZYM0101, which is partnered with Sumitomo Chemical, because emerging data on the market segment we were targeting with Hyaline and other electronics films indicated a smaller near-term opportunity than previously expected. We also discontinued our consumer care programs, including our insect repellent, ZYM0201, because we determined through our Portfolio Review that the costs of customer acquisition with a direct-to-consumer model would have been prohibitive and, in the case of ZYM0201, it could not be produced and distributed at a price point competitive with incumbent products. Any extended product qualification process and other delays in the timelines for launching our products may exacerbate these risks. The ultimate success of our products, even if successful in meeting the technical needs of our customers, may be dependent on the success of our customers within that market which, in each case, may not reach the size anticipated by us or may be replaced by another emerging product category.

There is extensive competition in the synthetic biotech and, to a lesser extent, the petrochemical industries, and our future success will depend on our ability to maintain a competitive position with respect to technological advances. Technological development by others may result in our technologies, as well as products developed using our technologies, becoming obsolete. Our ability to compete successfully will depend on our ability to develop proprietary technologies and products that are technologically superior to, otherwise differentiated from, and/or less expensive than our competitors' technologies and products. Our competitors may be able to develop competing and/or superior technologies and processes and compete more aggressively and sustain that competition over a longer period of time due to greater human and financial resources, longer operating histories, track records for product development and existing market share. If we are unable to successfully develop and manufacture new and improved products and successfully commercialize our products at scale, our business and results of operations will be adversely impacted.

***The success of our advanced materials business relies heavily on the performance of our products and developing new products at lower costs and faster development timelines.***

To date our revenue has primarily been derived from relationships with partners where we seek to test and validate the ability of our platform to improve or optimize our clients' products. However, the success of our advanced materials business will depend on our ability to successfully establish and maintain a sustainable business model and generate continuous streams of revenue through the sale of our products. Our current advanced materials business model is premised on innovating and producing new products rapidly and at lower costs than traditional methods and achieving results that may only be obtained through leveraging biology. While we may launch bio-based versions of existing products or existing molecules that are too expensive to utilize in products today, production of previously unavailable, superior molecules and materials is key to our plans for long-term success. If we are unable to successfully transition into becoming a producer of new products and create novel products at lower costs and on accelerated development timelines, our business and results of operations will be adversely affected.

***We may launch products with a non-fermentation produced molecule and, if we are not successful in our efforts to convert to a fermentation-produced version of our product, our products may not be commercially successful.***

During the design phase of our development cycle, we identify molecules from biology that we believe have the potential to add value to products and evaluate potential means of sourcing such molecules, including through fermentation. In some cases, we may initially launch products using molecules that we have identified during the design phase but which are first produced with traditional, non-fermentation based methods. We may use this approach for a variety of reasons, including, as was the case with Hyaline, when use of non-fermentation produced molecules allows for faster commercial launch, even if the cost of production or sourcing of these molecules is more expensive than can be achieved with fermentation-based production.

While the use of a non-fermentation produced molecule can accelerate product launch, it may result in consumer confusion or misperceptions about the characteristics or differentiation of our products. Launching fermentation-produced products or products with fermentation-produced components or ingredients is a key element of our strategy for lowering manufacturing costs and launching products desirable to our customers more quickly. If we do not successfully develop fermentation-produced versions of our products that lower the costs of manufacturing, we may not be able to achieve anticipated product margins in future periods and may lose our anticipated competitive advantage, each of which could have an adverse result on our business, results of operations and financial condition.

***We do not have our own commercial scale manufacturing capability, and any disruptions or interruptions in our manufacturing capacity may prevent us from launching products or producing products at necessary volumes to meet commercial demand, which may result in loss of customers or lost revenue opportunities.***

We do not have our own commercial scale manufacturing capability. If we are unable to establish or maintain adequate manufacturing capacity, we may not have sufficient supply of our products to satisfy demand from our customers, which may result in loss of customers and lost revenue opportunities. If our CMOs are unable to meet our future demand or do so at a reasonable cost or in a timely fashion, we may be required to identify a suitable replacement CMO, which is a burdensome and time-consuming process that could take significant time and requires us to become satisfied with their quality control, responsiveness and service, financial stability, security and labor and other ethical practices. Even if we are able to identify an alternative CMO, we may encounter delays in product development, production and added costs as a result of the time it takes to train a new CMO in our methods, products and quality control standards. Any future CMO agreements that we enter into could require us to agree to terms that may increase our costs and reduce our margins, or result in delays as we ramp up new manufacturing capabilities.

In addition, we outsource assembly of our automation hardware to CMOs, and the assembly process is characterized by long lead times between the placement of orders for and delivery of our hardware. We do not currently have long-term agreements with these CMOs but rather, secure our materials and services on a purchase order basis. As we seek to scale our automation business, we expect to significantly increase production of our automation hardware, which will increase our reliance on reliable, higher-volume manufacturing partners. If our CMO is unable to meet demand, if we do not accurately anticipate our needs, or if we are otherwise unable to assemble our automation hardware with the quality, at the quantities and on the timing we require, our ability to sell our automation solutions may be adversely affected.

Process development is a key component of product R&D to enable the manufacturing of products at scale. If we cannot attract, develop and retain product leaders and process engineers with the necessary expertise to drive process development of our manufacturing for our pipeline of products, we will be unable to achieve commercially viable volumes of our pipeline products to meet customer demand. Further, we will need the bio-manufacturing ecosystem to continue its emergence as we launch production at commercial scale, a process we have not yet undergone. If we encounter difficulties in accessing pilot plant facilities with the required downstream processing equipment to enable our process development, we may face delays in our time-to-market and increased R&D costs relative to our targets. If the bio-manufacturing ecosystem and overall capacity does not grow enough to provide the volumes we need to satisfy anticipated commercial needs, we may face delays in scaling our production of bioproducts which could cause delays, increase costs in scaling manufacture of our bioproducts, and negatively impact our financial position.

Any adverse developments affecting manufacturing of our pipeline products may result in shipment delays, inventory shortages, lot failures, product withdrawals or recalls or other interruptions in the supply of our pipeline products or enforcement actions by regulatory authorities. We may also have to take inventory write-offs and incur other charges and expenses for our pipeline products that fail to meet specifications or undertake costly remediation efforts. Accordingly, failures, difficulties or delays faced at any level of our manufacturing capabilities could adversely affect our business and delay or impede the development and commercialization of any of our pipeline products and could have an adverse effect on our business, financial condition, results of operations and prospects.

***The manufacture of our products is complex, and we may be unable to secure necessary talent to establish and scale our manufacturing and supply chain to the extent necessary to make a profit or sustain and grow our current business.***

The manufacture of our products is complex and to commercialize our products requires significant expertise in a variety of specialties and capital investment, including the development of advanced manufacturing techniques and process controls. We are targeting market opportunities in a wide variety of industries. Given the wide range of products we are developing and the even greater range of products we expect to develop in the future, manufacturing processes, including the necessary equipment for bio-manufacturing, for one product may not be translatable to other products and, therefore, we may need to identify and recruit additional internal talent to develop products and coordinate manufacturing techniques and process controls required for the variety of pipeline products in the various industries we are targeting. We may also require multiple facilities and partners in order to commercialize various products and to meet the volumes we need to satisfy our anticipated commercial needs. For example, our electronics films have been manufactured in different facilities than our agriculture pipeline products and require completely separate supply chains and manufacturing facilities. If we are unable to successfully establish adequate manufacturing capacity for all of our pipeline products, we may not have the capacity required to meet our commercial needs. See the risk factor titled “—We do not have our own commercial scale manufacturing capability, and any disruptions or interruptions in our manufacturing capacity may prevent us from launching products or producing products at necessary volumes to meet commercial demand, which may result in loss of customers or lost revenue opportunities.”

***We must continue to secure and maintain sufficient and stable supplies of disposable lab equipment, raw materials and synthetic biology materials and services.***

The COVID-19 pandemic has caused substantial disruption in global supply chains. The Ukraine War is further disrupting global supply chains. Additionally, widespread inflationary pressures exist across global economies, resulting in disruptions or higher costs for disposable lab equipment, raw materials and synthetic biology materials and services, and significant increases in the future could adversely affect our results of operations. We have experienced shortages in some of our key supplies, including materials required in our labs and may continue to do so in the future as a result of the pandemic, or otherwise. We have also experienced price increases due to unexpected material shortages, services disruptions and other unanticipated events. We typically do not enter into long-term agreements with our suppliers but secure our materials and services on a purchase order basis. Our suppliers may reduce or cease their supply of materials or services to us or increase prices at any time in the future. If the supply of materials or services is interrupted, our production processes may be delayed. Further, if we are unable to procure sufficient supplies of disposable lab equipment, raw materials and synthetic biology materials and services at acceptable costs for the development or production of our products or the sale of our automation solutions, our business, financial condition and results of operations could be negatively impacted.

A deterioration of our relationship with any of our suppliers, or problems experienced by these suppliers, could lead to shortages in our production capacity for the development or production of some or all of our products. Therefore, we may not be able to cost-effectively develop new products or fulfill the demand of existing customers or supply new customers. In addition, as we grow, our existing suppliers may not be able to meet our increasing demand, and we may need to find additional suppliers. In some cases, we purchase non-commodity or specially prepared consumables, materials or services, and obtaining such consumables, materials and services requires lead time. We may not be able to secure suppliers who provide materials at, or services to, the specification, quantity and quality levels that we demand (or at all) or be able to negotiate acceptable fees and terms of services with any such suppliers. Identifying a suitable supplier is an involved process that requires us to become satisfied with their quality control, responsiveness and service, financial stability, security and labor and other ethical practices. Even if we are able to expand existing sources, we may encounter delays in product development and production and added costs as a result of the time it takes to train new suppliers in our methods, products and quality control standards. If any of the above events occur, our operations and results of operations may be adversely affected.

We cannot assure you that any instability or other issues relating to the manufacture of any of our products will not occur in the future. Additionally, our manufacturers may experience manufacturing difficulties due to resource constraints or as a result of labor disputes or unstable global economic or political environments, including disruption in global supply chains as a result of the COVID-19 pandemic, the Ukraine War, or otherwise. Any future impact of such global economic and political events on our ability to procure sufficient supplies at acceptable costs for the development or production of our products or the sale of our automation solutions may negatively impact our business, financial condition and results of operations.

For the year ended December 31, 2021, our cost of disposable lab equipment, raw materials and synthetic biology materials and services accounted for a significant portion of our total cost of revenue. In the event of significant price increases by suppliers, including as result of inflation, we may have to pass the increased costs to our customers. However, we may not be able to raise the prices of our products sufficiently to cover increased costs resulting from increases in the cost of our materials and services, overcome the interruption of a sufficient supply of materials or services for our pipeline products or products, or adequately reduce supplier costs. As a result, materials and services costs, including any price increase for our materials and services may negatively impact our business, financial condition and results of operations.

***We depend on a limited number of suppliers for critical components of development and manufacturing of our products. The loss of any one or more of these suppliers, or their failure to supply us with the necessary components on a timely basis, could cause delays in our production capacity and adversely affect our business.***

We depend on a limited number of suppliers for critical components, including lab consumables, for the development and manufacturing of our products. The COVID-19 pandemic has caused substantial disruption in global supply chains, and the Ukraine War is further disrupting global supply chains. Additionally, widespread inflationary pressures exist across global economies, resulting in higher costs for disposable lab equipment, raw materials and synthetic biology materials and services used in our operations. We have experienced shortages in some of our key supplies, including lab consumables. We do not currently have the infrastructure or capability internally to manufacture these components. Although we have a reserve of supplies and although alternative suppliers exist for some of these critical components, our existing manufacturing process has been designed based on the functions, limitations, features and specifications of the components that we currently utilize. While we work with a variety of domestic and international suppliers, our suppliers may not be obligated to supply product or our arrangements may be terminated with relative short notice periods. Our supply of these components could be limited, interrupted, or of unsatisfactory quality or cease to be available at acceptable prices. Additionally, we do not have any control over the process or timing of the acquisition or manufacture of materials by our manufacturers and cannot ensure that they will deliver to us the components we order on time, or at all.

The loss of these components provided by these suppliers could require us to change the design of our development and manufacturing processes based on the functions, limitations, features and specifications of the replacement components or seek out a new supplier to provide these components.

However, the lead time needed to establish a relationship with a new supplier can be lengthy, and we may experience delays in meeting demand in the event we must switch to a new supplier. The time and effort to qualify a new supplier could result in additional costs, diversion of resources or reduced manufacturing yields, any of which would negatively impact our operating results. Further, we may be unable to obtain critical components on commercially reasonable terms, which could have a material adverse impact on our business, financial condition and results of operations.

In addition, some disposable lab equipment, synthetic biology materials and other supplies and materials that we purchase are purchased from single-source or preferred suppliers, which limits our negotiating leverage and our ability to rely on additional or alternative suppliers for these products. Our dependence on these single-source and preferred suppliers exposes us to certain risks, including the following:

- our suppliers may cease or reduce production or deliveries, raise prices or renegotiate terms;

- we may be unable to locate a suitable replacement on acceptable terms or on a timely basis, if at all;
- if there is a disruption to our single-source or preferred suppliers' operations, and if we are unable to enter into arrangements with alternative suppliers, we will have no other means of completing our manufacturing process until they restore the affected facilities or we or they procure alternative manufacturing facilities or sources of supply;
- delays caused by supply issues may harm our reputation, frustrate our customers and cause them to turn to our competitors for future projects; and
- our ability to progress the development and production of our pipeline products could be materially and adversely impacted if the single-source or preferred suppliers upon which we rely were to experience a significant business challenge, disruption or failure due to issues such as financial difficulties or bankruptcy, issues relating to other customers such as regulatory or quality compliance issues, or other financial, legal, regulatory or reputational issues.

Moreover, to meet anticipated market demand, our single-source and preferred suppliers may need to increase manufacturing capacity, which could involve significant challenges. This may require us and our suppliers to invest substantial additional funds and hire and retain the technical personnel who have the necessary experience. Neither we nor our suppliers may successfully complete any required increase to existing manufacturing capacity in a timely manner, or at all.

***We face increased supply chain risks with respect to our automation business.***

As we seek to scale our automation business, produce our automation hardware in greater quantities and sell our solutions to customers, we will face increased supply chain risks with respect to the components of our automation hardware, including our RACs. Our automation business involves the production of hardware that is complex and requires a large number of components, many of which are currently available only from a limited number of suppliers, and in some cases, single sources. We have chosen to source certain critical components from a single source, including with respect to certain hardware components of our RACs. In addition, certain suppliers of our components are competitors or potential competitors, and we may be unable to negotiate supply agreements with such competitors on terms that are favorable to us, or at all. Our limited, and in many cases single-source, supply chain exposes us to multiple potential sources of delivery failure or component shortages. Our third-party suppliers may not be able to meet our required product specifications and performance characteristics, which would impact our ability to achieve our product specifications and performance characteristics as well. Additionally, our third-party suppliers may be unable to obtain required certifications or provide necessary warranties for their products that are necessary for use in our RACs.

We have also been affected by ongoing, industry-wide challenges in logistics and supply chains, such as increased port congestion, intermittent supplier delays, and a shortfall of semiconductor supply. For example, we previously experienced significant delays in the supply of programmable logic controllers used in our RACs, and we have experienced, and may in the future experience, lengthy lead times on other components, which could impair our ability to produce our RACs on a timely basis and could result in increased costs. Likewise, any significant increases in our production may in the future require us to procure additional components in a short amount of time. Our suppliers may not ultimately be able to continually and timely meet our cost, quality and volume needs, requiring us to replace them with other sources. In many cases, our suppliers provide us with parts that would require significant lead time to obtain from alternative suppliers, or may not be available from alternative suppliers at all. If we are unable to obtain suitable components and materials used in our products from our suppliers or if our suppliers decide to create or supply a competing product, our business could be adversely affected. Further, if we are unsuccessful in our efforts to control and reduce supplier costs, our results of operations will suffer.

In addition, we do not currently have long-term agreements with our suppliers but rather, secure our materials and services on a purchase order basis. We may experience delays if our suppliers do not meet agreed upon timelines, experience capacity constraints, or deliver components that do not meet our quality standards. Any disruption in the supply of components, whether or not from a single-source supplier, could temporarily disrupt production of our RACs until an alternative supplier is able to supply the required material. Any such delay, even if caused by a delay or shortage in only one part, could significantly affect our ability to produce our RACs and sell our automation solutions. Even in cases where we may be able to establish alternate supply relationships and obtain or engineer replacement components for our single-source components, we may be unable to do so quickly, or at all, at prices or quality levels that are acceptable to us. This risk is heightened by the fact that we have less negotiating leverage with suppliers than larger and more established companies, which could adversely affect our ability to obtain necessary components and materials on a timely basis, on favorable pricing and other terms, or at all. Any such supply disruption could materially and adversely affect our results of operations, financial condition and prospects.

Furthermore, as the scale of our RAC production increases, we will need to accurately forecast, purchase, warehouse and transport components to our CMOs at much higher volumes. If we are unable to accurately match the timing and quantities of component purchases to our actual needs, successfully recruit and retain personnel with relevant experience, or successfully implement automation, inventory management and other systems or processes to accommodate the increased complexity in our supply chain and manufacturing operations, we may incur unexpected production disruption, storage, transportation and write-off costs, which could have a material and adverse effect on our ability to sell our automation solutions, results of operations and financial condition.

***Changes to our business focus and organization may place significant demands on our management and our infrastructure.***

As a result of our Portfolio Review, we determined to focus on a smaller number of programs. Our management team has also been focused on our plan to reduce our operating costs, the development of our new strategic plan and the development and implementation of our new product development process. These changes and our diversified operations have placed, and may continue to place, significant demands on our management and our operational and financial infrastructure. For example, our Portfolio Review and cost reduction activities, among other activities, have placed and will continue to place significant demands on our management team. Managing these changes has required, and will continue to require, significant expenditures and allocation of valuable management resources. If we fail to achieve the necessary level of efficiency in our organization as it changes, our business, financial condition and results of operations would be adversely impacted.

***We are subject to risks related to our reliance on collaboration arrangements to fund development and commercialization of certain of our products or drug candidate leads, and our financial results may be adversely impacted if such collaborations do not lead to the commercialization of products.***

Substantially all of our revenue to date has been generated from R&D service contracts and collaboration arrangements. For example, we have entered into a collaboration agreement with Sumitomo Chemical which led to the development of ZYM0101. Over the next several years, our goal for our advanced materials business is to commercialize our products, and we expect revenue from R&D and collaboration arrangements to represent a smaller component of our total revenue. However, in the near term, we expect to continue generating revenue from R&D service agreements and collaborations and may in fact pursue additional arrangements with new or existing partners as we seek to enter new industry verticals. Further, for our recently launched drug discovery business, we expect revenue from collaborations to represent the majority of our revenue from such business for the foreseeable future. Collaborations with strategic partners are necessary to successfully commercialize our existing and future products. The terms of our collaboration agreements typically include one or more of the following: joint ownership of the new intellectual property, assignment of the new intellectual property to either us or the collaborator, either exclusive or non-exclusive licenses to the new intellectual property to us or the collaborator and other restrictions on our sole use of developments, such as non-competes and rights of first refusal. Our collaboration agreements also typically include one or more of the following: payments for the R&D services to be performed, milestone payments to be received upon the achievement of the milestone events defined in the agreements, revenue-sharing and royalty payments upon the commercialization of the molecules or microbes in which we share in the customer's profits.

These exclusivity, revenue-sharing and other similar terms limit our ability to commercialize our products and technology and may impact the size of our business or our profitability in ways that we do not currently envision. The competition for collaborators is intense. Whether or not we pursue a collaboration will depend on a number of factors, including our assessment of the collaborator's resources and expertise, the terms and conditions of the proposed collaboration and their interest in our product or services. The collaborator must also, in turn, evaluate a number of factors, such as our technical and commercial capabilities as a partner, the potential market for the subject product, the costs and complexities of manufacturing and delivering the product to the market, and the potential for competing products. The collaborator may also consider alternative product or technologies for similar indications or applications that may be available to develop internally or to collaborate on with another partner and whether such alternative approaches could be more attractive than the proposed collaboration with us for our product.

Even if a suitable collaboration partner is identified, the negotiation process is time-consuming and complex. Any new collaboration may be on terms that are not optimal for us, and we may not be able to maintain any new collaboration. Any such collaboration may require us to incur non-recurring or other charges, increase our near- and long-term expenditures and pose significant integration or implementation challenges or disrupt our management or business. These transactions would entail numerous operational and financial risks, including exposure to unknown liabilities, disruption of our business and diversion of our management's time and attention to manage a collaboration, incurrence of substantial debt or dilutive issuances of equity securities to pay transaction consideration or costs, higher than expected collaboration, acquisition or integration costs, write-downs of assets or goodwill or impairment charges, increased amortization expenses, difficulty and cost in facilitating the collaboration or combining the operations and personnel of any acquired business, impairment of relationships with key suppliers, manufacturers or customers of any acquired business due to changes in management and ownership and the inability to retain key employees of any acquired business.

Many factors may impact the success of such collaborations, including our ability to perform our obligations, our collaborators' satisfaction with our products and services, our collaborators' participation and interest in supporting commercialization of products, and exposure to the risks of our collaborators. Like us, many of our collaborators are exposed to a number of risks, any of which could impact their ability to fulfil their obligations under our collaboration agreements, which in turn would adversely impact our ability to derive the anticipated benefits from these collaboration agreements. In addition, most of these agreements do not affirmatively obligate the other party to commercialize a product we have developed for them or to purchase specific quantities of any products. Some agreements do not require funding all R&D costs necessary to bring products to market. We may encounter numerous uncertainties and difficulties in developing, manufacturing and commercializing any new products subject to these collaboration arrangements that may delay or prevent us from realizing their expected benefits or enhancing our business, including uncertainties on the feasibility of taking new molecules to commercial-scale. Further, we have in the past and may in the future have disputes with our collaborators, which may harm these relationships or require us to settle the disputes on unfavorable terms. It is possible that these agreements could result in restrictions on our ability to use molecules which have been discovered through the collaborations, which could restrict our ability to commercialize certain products in the future. For example, ZYM0101, our optical film product, was developed through our collaboration with Sumitomo Chemical. In that agreement, we agreed to exclusive cooperation activities with Sumitomo Chemical within the defined field, as well as a right of first offer for Sumitomo Chemical to use Sumitomo Chemical technology or items developed for Sumitomo Chemical outside of the defined field. However, Sumitomo Chemical is not obligated to commercialize or support commercialization of any products developed through our collaboration. Sumitomo Chemical's continued interest and support in developing products, scaling up manufacturing for existing and new pipeline products, evaluating the market opportunity, providing potential sales channels or access to customers, and conducting sales and marketing activities will have an effect on the commercialization of ZYM0101 and our ability to access this market.

Any failure or difficulties in maintaining existing collaboration arrangements, establishing new collaboration arrangements, or building up or retooling our operations to meet the demands of our collaboration partners could have a significant negative impact on our business, including our ability to commercialize or achieve commercial viability for our products, lead to the inability to meet our contractual obligations, and could cause us to allocate or divert capital, personnel and other resources from our organization which could adversely affect our business, financial condition, results of operations, prospects and reputation.

***We expect to face competition for our products from established enterprises and new companies, and if we cannot compete effectively against these companies, products or prices, we may not be successful in bringing our products to market.***

We are focused on developing products that we expect will compete with both the traditional products that are currently being used in our target markets and with the alternatives to these existing products that established enterprises and new companies are seeking to produce. In the markets that we seek to enter, and in other markets that we may seek to enter in the future, we will compete primarily with the established providers of components used in products or finished products in these markets. Producers of these incumbent products include global agricultural companies, large international chemical and materials companies, pharmaceutical companies and companies specializing in specific products.

Some of the competitors in our target markets are large publicly-traded companies, or are divisions of or established contractors to large publicly-traded companies, and may enjoy a number of competitive advantages over us, including:

- greater name and brand recognition;
- greater financial and human resources;
- larger R&D departments;
- broader product lines;
- larger sales forces and more established distributor networks;
- substantial intellectual property portfolios;
- larger and more established customer bases and relationships;
- the leverage to enter into contracts on more favorable terms; and
- better established, larger scale and lower cost manufacturing capabilities.

With the emergence of many new companies seeking to produce products from renewable sources, we may face competition from such companies in bringing new products to market. Some of these companies may develop products that are disruptive to ours or may be able to establish production capacity and commercial partnerships to compete with us.

Some of our competitors may also receive government support that is not available to us. For example, there are risks that foreign governments may, among other things, provide government funding or support to domestic companies to produce new technology, require the use of local suppliers in place of non-domestic suppliers like us, compel companies to partner with local companies to conduct business or provide incentives to government-backed local customers to buy from local suppliers, thereby creating a significant competitive advantage for domestic companies and creating obstacles for us. Any such actions or similar actions taken by foreign governments could significantly harm our competitive position and adversely affect our business and results of operations.

If and when commercialized, our products may not compete favorably or be successful in the face of increasing competition from products and technologies introduced by our existing or future competitors or developed by our customers internally. In addition, our competitors may have or develop products or technologies that currently or in the future will enable them to produce competitive products with greater capabilities or at lower costs than ours or run comparable experiments at a lower total experiment cost. Any failure to compete effectively could materially and adversely affect our business, financial condition and results of operations.

***International expansion of our business exposes us to business, regulatory, political, operational, financial and economic risks associated with doing business outside of the United States.***

We currently operate portions of our business through various international subsidiaries. Further, because we and our collaborators currently conduct business outside of the United States and may market future products outside of the United States, our business is subject to risks associated with doing business outside of the United States, including an increase in our expenses and diversion of our management's attention from the development of future products. Accordingly, we are subject to a variety of risks inherent in doing business internationally, and our exposure to these risks will increase as we expand our operations, customer base and advertiser base globally. These risks include:

- political, social and economic instability, including wars, terrorism and political unrest, such as instability in Europe stemming from the Ukraine War;
- fluctuations in currency exchange rates;
- higher levels of credit risk, corruption and payment fraud;
- enhanced difficulties of integrating any foreign acquisitions;
- regulations that might add difficulties in repatriating cash earned outside the United States and otherwise prevent us from freely moving cash;
- import and export controls and restrictions and changes in trade regulations;
- compliance with the U.S. Foreign Corrupt Practices Act, the U.K. Bribery Act and similar laws in other jurisdictions;
- multiple, conflicting and changing laws and regulations such as privacy, security and data use regulations, tax laws, trade regulations, economic sanctions and embargoes, employment laws, anticorruption laws, regulatory requirements, reimbursement or payor regimes and other governmental approvals, permits and licenses;
- failure by us, our collaborators or our distributors to obtain regulatory clearance, authorization or approval for the use of our products in various countries;
- additional potentially relevant third-party patent rights;
- complexities and difficulties in obtaining intellectual property protection and enforcing our intellectual property rights;
- difficulties in staffing and managing foreign operations;
- logistics and regulations associated with shipping samples and customer orders, including infrastructure conditions and transportation delays;
- financial risks, such as inflation, longer payment cycles, difficulty collecting accounts receivable, the impact of local and regional financial crises, on demand and payment for our products and exposure to foreign currency exchange rate fluctuations;
- natural disasters and outbreak of disease, such as the ongoing COVID-19 pandemic;
- breakdowns in infrastructure, utilities and other services;
- boycotts, curtailment of trade and other business restrictions (including government-mandated and voluntary restrictions in response to the Ukraine War); and
- the other risks and uncertainties described in this report.

Any of these factors could significantly harm our future international expansion and operations and, consequently, our revenue and results of operations.

***Changes in government regulations and trade policies may materially and adversely affect our sales and results of operations.***

The markets where we expect to sell our products are heavily influenced by foreign, federal, state and local government regulations and policies. The U.S. or foreign governments may take administrative, legislative, or regulatory action that could materially interfere with our ability to sell products in certain countries and/or to certain customers, particularly in China. The uncertainty regarding future standards and policies may also affect our ability to develop our products or to license our technologies to third parties and to sell products to our end customers, which could have a material adverse effect on our business, financial condition and results of operations.

An escalation of recent trade tensions between the U.S. and China has resulted in trade restrictions that could harm our ability to participate in Chinese markets and numerous additional such restrictions have been threatened by both countries. The U.S. government, for example, has recently implemented stringent export license requirements on U.S.-origin and certain foreign-origin items going to or being used by certain Chinese technology companies. The United States and China have imposed a number of tariffs and other restrictions on items imported or exported between the United States and China. We cannot predict what actions may ultimately be taken with respect to tariffs or trade relations between the United States and China or other countries, what products may be subject to such actions, or what actions may be taken by the other countries in retaliation. The institution of trade tariffs both globally and between the United States and China specifically carries the risk of negatively impacting China's overall economic condition, which could have negative repercussions for our business. Our products are and may continue to be subject to export license requirements or restrictions, particularly in respect of China.

In addition, changes in U.S. trade policy more generally, or economic sanctions imposed against foreign governments and entities, such as the sanctions imposed against Russia in response to the Ukraine War, could trigger retaliatory actions by affected countries or increase the costs of materials, which could impose restrictions on our ability to do business in or with affected countries or prohibit, reduce or discourage purchases of our products by foreign customers, leading to increased costs of components contained in our products, increased costs of manufacturing our products and higher prices for our products in foreign markets. Changes in, and responses to, U.S. trade policy could reduce the competitiveness of our products, cause our sales to decline and adversely impact our ability to compete, which could materially and adversely impact our business, financial condition and results of operations.

In addition, the Chinese economic, legal and political landscape differs from other countries in many respects, including the level of government involvement and regulation, control of foreign exchange and allocation of resources and uncertainty regarding the enforceability and scope of protection for intellectual property rights. The laws, regulations and legal requirements in China are also subject to frequent changes. For example, the Chinese government has intensified enforcement of China's antitrust, data privacy and cybersecurity laws. These laws apply to impose onerous obligations on entities involved in the use, processing, storage and export of personal data. The exact obligations under and enforcement of laws and regulations in China are often subject to unpublished internal government interpretations and policies which makes it challenging to ascertain compliance with such laws.

***We use biological and hazardous materials that require considerable expertise and expense for handling, storage and disposal and may result in claims against us.***

We work with chemical and biological materials that could be hazardous to human health and safety or the environment. Our operations also produce hazardous and nonhazardous chemical and biological waste products, and we largely contract with third parties for the disposal of these products. Federal, state and local laws and regulations govern the use, generation, manufacture, storage, handling and disposal of these materials and wastes. Compliance with applicable environmental laws and regulations is expensive, and current or future environmental laws and regulations may restrict our operations. If we do not comply with applicable regulations, we may be subject to fines and penalties.

In addition, we cannot eliminate the risk of accidental injury or contamination from these materials or wastes, which could cause an interruption of our commercialization efforts, R&D programs and business operations, as well as environmental damage resulting in costly clean-up and liabilities under applicable laws and regulations, as well as potential reputational damage. In May 2021, a localized fire occurred at our chemistry lab in Emeryville, California. Although the physical damage to the facility was minimal and no serious injuries occurred in connection with this fire, a risk of a similar fire in the future is possible. Furthermore, environmental laws and regulations are complex, change frequently, and have tended to become more stringent. We cannot predict the impact of such changes and cannot be certain of our future compliance. While we do carry a pollution legal liability policy, this policy may not fully cover costs arising from contamination from hazardous and biological products and the resulting cleanup, or claims arising from the handling, storage or disposal of hazardous materials. Accordingly, in the event of fire, injury, or contamination, we could be liable for damages or penalized with fines in an amount exceeding our resources and our operations could be suspended or otherwise adversely affected.

***Unfavorable global economic or political conditions could adversely affect our business, financial condition or results of operations.***

Our business is susceptible to general conditions in the global economy and in the global financial markets. The global macroeconomic environment could be negatively affected by, among other things, instability in global economic markets, increased U.S. trade tariffs and trade disputes with other countries, inflation, instability in the global credit markets, supply chain weaknesses, the Ukraine War and other political tensions, and foreign governmental debt concerns. A global financial crisis or a global or regional political disruption, such as the Ukraine War, could cause extreme volatility in the capital and credit markets. A severe or prolonged economic downturn, including a recession or depression resulting from the current COVID-19 pandemic, inflation and other cost increases, including as a result of any tariffs or trade disputes, or political disruption could result in a variety of risks to our business, including weakened demand for our products and our ability to raise additional capital, when needed, on acceptable terms, or at all. A weak or declining economy, inflation and other cost increases, or political disruption could also strain our manufacturers or suppliers, possibly resulting in supply disruption or increased materials costs, or cause our future customers to delay making decisions to invest in our products or solutions or delaying payments for our potential products. Any of the foregoing could materially and adversely affect our business, financial condition, results of operations and prospects, and we cannot anticipate all of the ways in which the political or economic climate and financial market conditions could adversely impact our business.

***The COVID-19 pandemic has had, and is expected to continue to have, an impact on our business, results of operations and financial condition.***

The full impact of the continuing COVID-19 pandemic and related public health measures on our business will depend largely on future developments, including the duration and severity of the pandemic, which remains highly uncertain. On March 11, 2020, the World Health Organization declared the outbreak of COVID-19 caused by a novel strain of coronavirus as a pandemic, which continues to spread throughout the United States and around the world. Since then, extraordinary actions have been taken by international, federal, state and local public health and governmental authorities to contain and combat the outbreak and spread of COVID-19 throughout the world. These actions include travel bans, quarantines, “stay-at-home” orders and similar mandates for many individuals to substantially restrict daily activities and for many businesses to curtail or cease normal operations. Although these health and safety precautions were loosened in many jurisdictions in 2021, beginning in early July 2021 new variants of COVID-19, including the Delta and Omicron variants, emerged and caused surges in COVID-19 cases globally. The further impact of the Delta and Omicron variants, or any other variants that may emerge, cannot be predicted at this time, and could depend on numerous factors, including vaccination rates among the population, the effectiveness of COVID-19 vaccines against the applicable variant and the response by governmental bodies and regulators including whether those precautions previously loosened are reinstated.

The COVID-19 pandemic has had, and is expected to continue to have, an adverse impact on our operations, particularly as a result of preventive and precautionary measures that we, other businesses, and governments are taking including to the response to the outbreak of variants. For example, as part of these efforts and in accordance with applicable government directives, we initially reduced and then temporarily suspended on-site operations at our facilities in Emeryville and Boston in late March 2020. In addition, we began restricting non-essential travel and temporarily reduced salaries of our executives. As a result of the travel restrictions, we limited in-person sales and marketing activities and in-person visits to our partners, customers and manufacturers. We have continued to operate within the rules applicable to our business; however, a continuing implementation of these governmental mandates could further impact our ability to operate effectively and conduct ongoing R&D or other activities.

Governmental mandates related to COVID-19, other infectious diseases or public health crises, have impacted and we expect them to continue to impact, our personnel and personnel at third-party manufacturing facilities in the United States and other countries. The pandemic has caused substantial disruption in global supply chains. We have experienced shortages in some of our key supplies, including materials required in our labs. For example, we experienced delays at a key supplier of a raw material for both Hyaline and our ZYM0107 electronics film prior to our decision to discontinue those programs. In addition, the inability to travel delayed the establishment of our Hyaline manufacturing capacity and delayed the process of selecting and vetting CMOs for our insect repellent, ZYM0201, prior to our decision to discontinue those programs. As a result of the restrictions, we also experienced a partial suspension in servicing our R&D services contracts and the development of our own products. This occurred for the duration of the suspension of our on-site operations and for a period afterward as we ramped the operation back up and adopted the new work practices. This resulted in an approximate reduction in R&D services revenue of \$0.7 million from existing contracts, not recognized before the year ended December 31, 2020.

In addition, limitations on our ability to travel and restrictions on our ability to conduct site visits or conduct in-person meetings with our customers due to the COVID-19 pandemic may have contributed to issues we recently identified in the product qualification process for Hyaline. Although such challenges did not contribute to our recent determination to discontinue most of our electronics film programs, difficulties and delays such as those we have experienced and may

experience in the future have prevented and may in the future prevent us from meeting our operating and financial goals, both in general and within our targeted timelines, and may cause our revenues and operating results to fluctuate from period to period.

The COVID-19 pandemic also had an adverse effect on our ability to attract, recruit, interview and hire for key roles necessary to support our operations. To the extent that any governmental authority imposes additional regulatory requirements or changes existing laws, regulations and policies that apply to our business and operations, such as additional workplace safety measures, our product development plans may be delayed, and we may incur further costs in bringing our business and operations into compliance with changing or new laws, regulations and policies.

Further, the effect of the COVID-19 pandemic and mitigation efforts on our customers' and on consumer demand for their products could materially and adversely affect us, particularly to the extent our customers experience declines in demand for their goods that contain our products.

The COVID-19 pandemic has negatively impacted the global economy, disrupted global supply chains and created significant volatility and disruption of financial markets. The ultimate impact of the COVID-19 pandemic is highly uncertain and subject to sudden change, including as a result of the spread of the Delta, Omicron and other variants. We are following and plan to continue to follow, recommendations from federal, state and local governments regarding workplace policies, practices and procedures. We are continuing to monitor the potential impact of the pandemic, including on global supply chains for some of our lab materials and manufacturing capacity, but we cannot be certain what the overall impact will be on our business, financial condition, results of operations and prospects on a go-forward basis.

***Our revenue, results of operations, cash flows and reputation in the marketplace may suffer upon the loss of a significant customer.***

Substantially all of our revenue to date has been generated from R&D service contracts and collaboration arrangements. We have derived, and may continue to derive, a significant portion of our revenue from a limited number of large customers. In 2021, we had three customers that each represented 10% or greater of our total revenue, including two customers that each represented over 20% of our total revenue. In 2020, we had four customers that each represented 10% or greater of our total revenue, including one customer that represented 35% of our total revenue. In 2019, we had three customers that each represented 10% or greater of our total revenue. Due to the significant time required to develop and commercialize new pipeline products, or to acquire new customers, the loss of any one or more of these customers, or the loss of any other significant customer or a significant reduction in the amount of product ordered by a significant customer would adversely affect our revenue, results of operations, cash flows and reputation in the marketplace.

In addition, we generally do not have long-term contracts with our customers requiring them to purchase any specified quantities from us, and without such contracts our customers are not obligated to order or reorder our products. As a result, we cannot accurately predict our customers' decisions to reduce or cease purchasing our products. Even where we enter into contracts with our customers, there is no guarantee that such agreements will be negotiated on terms that are commercially favorable to us in the long-term. Our customers may buy less of our products depending on their own technological developments, end-user demand for our products and internal budget cycles. In addition, existing customers may choose to produce some or all of the products they purchase from us internally by using or developing manufacturing capabilities organically or by using capabilities from acquisitions of assets or entities from third parties with such capabilities. Therefore, if our customers were to substantially reduce their transaction volume or cease ordering products from us, this could materially and adversely affect our financial performance.

***Our pipeline products may cause undesirable side effects or environmental effects which may delay or prevent marketing approval, or, if approval is received, require them to be taken off the market, require them to include safety warnings or otherwise limit their sales.***

Undesirable side effects from our pipeline products or from drugs produced using our drug discovery platform could arise either during development or after product has been marketed. Similarly, undesired environmental effects from agricultural or other pipeline products could arise after a pipeline product is commercialized. The results of future safety or environmental studies may show that our pipeline products cause undesirable side effects or environmental harm, which could interrupt, delay or halt the development and commercialization of our products, resulting in delay of, or failure to obtain, marketing approval from applicable regulatory authorities.

If any of our pipeline products or drugs produced using our drug discovery platform cause undesirable side effects or environmental effects or suffer from quality control issues:

- regulatory authorities may impose a hold or risk evaluation and mitigation strategies which could result in substantial delays, significantly increase the cost of development and/or adversely impact our ability to continue development of the product;

- regulatory authorities may require the addition of statements, specific warnings, or contraindications to the product label;
- we may be required to conduct additional safety, or environmental studies;
- we may be required to implement a risk minimization action plan, which could result in substantial cost increases and have a negative impact on our ability to commercialize the product;
- we may be subject to limitations on how we promote the product;
- we may, voluntarily or involuntarily, initiate product recalls;
- sales of the product and interest in collaborations may decrease significantly;
- regulatory authorities may require us to take our product off the market;
- we may be subject to litigation or product liability claims; and
- our reputation may suffer.

Any of these events could prevent us from achieving or maintaining market acceptance of the affected pipeline products, cause injury to our reputation, or substantially increase commercialization costs and expenses, which in turn could delay or prevent us from generating significant revenue from the sale of our products.

***Our products, or the end products of which they are components, could have defects or errors, which may give rise to claims against us or delays in production and adversely affect our business, financial condition and results of operations.***

Some applications of our technology or pipeline products are components of end products and therefore our success is tied to the success of such end products. Material performance problems, defects, errors or delays could arise in our products or the end products in which they are components, and as we commercialize our products, these risks may increase. We expect to provide warranties that our products will meet performance expectations and will be free from defects. The costs incurred in correcting any defects or errors may be substantial and could adversely affect our operating margins.

In manufacturing our products, we depend upon third parties for the supply of our instruments and various components, many of which require a significant degree of technical expertise to produce. If our suppliers fail to produce our product components to specification or provide defective products to us and our quality control tests and procedures fail to detect such errors or defects, or if we or our suppliers use defective materials or workmanship in the manufacturing process, the reliability and performance of our products will be compromised.

If our products or the end products of which they are components contain defects or are delayed, we may experience:

- a failure to achieve market acceptance for our products or expansion of our products sales;
- the development of new technology rendering our products, or the end products of which they are components, obsolete;
- loss of customer orders and delay in order fulfillment;
- damage to our brand or reputation;
- increased warranty and customer service and support costs due to product repair or replacement;
- product recalls or replacements;
- inability to attract new customers and collaboration opportunities;
- diversion of resources from our manufacturing and R&D departments into our service department; and
- legal and regulatory claims against us, including product liability claims, which could be costly, time consuming to defend, result in substantial damages and result in reputational damage.

***We may become subject to lawsuits or indemnity claims in the ordinary course of business, which could materially and adversely affect our business and results of operations.***

From time to time, we may in the ordinary course of business be named as a defendant in lawsuits, indemnity claims and other legal proceedings. These actions may seek, among other things, compensation for alleged product liability, personal injury, employment discrimination, breach of contract, property damage and other losses or injunctive or declaratory relief. See the risk factors titled “—*Theft, loss, or misuse of personal data about our employees, customers, or other third parties could increase our expenses, damage our reputation, or result in legal or regulatory proceedings,*” and “—*Our use of open source software could adversely affect our platform or our automation business and subject us to possible litigation*” for a discussion of intellectual property infringement lawsuits.

The marketing, sale and use of our products and services could lead to the filing of product liability claims were someone to allege that our products or services failed to perform as designed or intended or caused injury or other harms. A product liability claim could result in substantial damages and be costly and time-consuming for us to defend.

Regardless of merit or eventual outcome, product liability claims may result in:

- decreased demand for any products that we have developed or may develop;
- loss of revenue;

- substantial monetary payments;
- significant time and costs to defend related litigation;
- the inability to commercialize any products that we have developed or may develop; and
- injury to our reputation and significant negative media attention.

In the event that such actions, claims or proceedings are ultimately resolved unfavorably to us at amounts exceeding our accrued liability, or at material amounts, the outcome could materially and adversely affect our business and results of operations. In addition, payments of significant amounts, even if reserved, could adversely affect our liquidity position. We maintain product liability insurance, but this insurance may not fully protect us from the financial impact of defending against product liability claims. Any product liability claim brought against us, with or without merit, could increase our insurance rates or prevent us from securing insurance coverage in the future. Additionally, any product liability lawsuit could cause current collaborators to terminate existing agreements or potential collaborators to seek other companies, any of which could impact our business and results of operations.

***We are involved in securities litigation and other related matters that are expensive and time-consuming. Such litigation and other related matters could harm our business.***

We are involved in securities litigation and we may continue to be a target for securities and shareholder lawsuits in the future. For example, on August 4, 2021, a putative securities class action was filed on behalf of purchasers of our common stock pursuant to or traceable to the registration statement for our IPO. On November 9, 2021, certain of our officers and directors were named in a shareholder derivative lawsuit purportedly brought on behalf of the Company, which is named as a nominal defendant. These and future litigation, including any related shareholder litigation or governmental or regulatory investigation, could have a material adverse effect on our business, results of operations, financial condition, reputation and cash flows, as well as on the market price of our common stock. Although the results of lawsuits and claims cannot be predicted with certainty, defending these claims is costly and can impose a significant burden on management and employees. Any litigation to which we are a party may result in an onerous or unfavorable judgment that may not be reversed on appeal, or we may decide to settle lawsuits on similarly unfavorable terms. Any such negative outcome could result in payments of substantial monetary damages or fines, or changes to our business practices, and accordingly our business could be seriously harmed.

***We may face risks relating to the use of our genetically modified organisms and microorganisms and if we are not able to secure regulatory approval or if we face material ethical, legal and social concerns about use of our GMO or GMM technology, our business could be adversely affected.***

Our technologies and products involve the use of genetically modified organisms (“GMOs”) and genetically modified microorganisms (“GMMs”). The use of GMOs and GMMs is subject to laws and regulations in many countries, some of which are new and some of which are still evolving. In the United States, the Food and Drug Administration (“FDA”), the Environmental Protection Agency (“EPA”) and the U.S. Department of Agriculture (“USDA”) are the primary agencies that regulate the use of GMOs, GMMs, as well as potential products or substances derived from GMOs or GMMs. If regulatory approval of the GMOs, GMMs, or resulting products or substances is not secured, our business operations, financial condition and our ability to grow as a business could be adversely affected. We expect to encounter GMO and GMM regulations in most if not all of the countries in which we may seek to establish production capabilities or sell our products and the scope and nature of these regulations will likely be different from country to country. Governmental authorities could, for safety, social or other purposes, impose limits on, or implement regulation of, the use of GMOs or GMMs. If we cannot meet the applicable requirements in other countries in which we intend to produce or sell our products, or if it takes longer than anticipated to obtain such approvals, our business could be adversely affected.

In addition, public attitudes about the safety and environmental hazards of and ethical concerns over genetic research, GMOs and GMMs could influence public acceptance of our technology and products. These concerns could result in increased expenses, regulatory scrutiny, delays or other impediments to our programs. The use of GMOs and GMMs has in the past received negative publicity, which could lead to greater regulation or restrictions on imports of our products. Such concerns or governmental restrictions could limit the use of GMOs or GMMs in our products, which could have a material adverse effect on our business, financial condition and results of operations.

***We may engage in strategic transactions, including acquisitions, that could disrupt our business, cause dilution to our stockholders, reduce our financial resources, or prove not to be successful.***

From time to time, we have entered, and may in the future enter, into strategic transactions, including, among others, transactions to acquire other businesses, products or technologies, and our ability to do so successfully cannot be ensured. In December 2017, we acquired Radiant Genomics, Inc. which allowed us to add desired technology and talent related to metagenomics and associated building of metagenomic libraries. In March 2020, we acquired EnEvolv, Inc., which allowed us to acquire desired technology and talent related to the development and use of biosensors in development of pipeline products. In May 2021, we acquired Lodo Therapeutics Corporation, a company that uses its proprietary bacterial metagenomics discovery platform to develop novel therapeutics from nature. Even if we identify suitable opportunities, we may not be able to make such acquisitions on favorable terms or at all. Any acquisitions we make may not strengthen our competitive position, and these transactions may be viewed negatively by customers or investors. We may decide to incur debt in connection with an acquisition or issue our common stock or other equity securities to the stockholders of the acquired company, which would reduce the percentage ownership of our existing stockholders. We could incur losses resulting from undiscovered liabilities of the acquired business that are not covered by any indemnification we may obtain from the seller. In addition, we may not be able to successfully integrate the acquired personnel, technologies and operations into our existing business in an effective, timely and non-disruptive manner. Acquisitions or other strategic transactions may also divert management attention from day-to-day responsibilities, increase our expenses and reduce our cash available for operations and other uses. In addition, we may not be able to fully recover the costs of such acquisitions or be successful in leveraging any such strategic transactions into increased business, revenue or profitability. We also cannot predict the number, timing or size of any future acquisitions or strategic transactions or the effect that any such transactions might have on our operating results.

Accordingly, although there can be no assurance that we will undertake or successfully complete any strategic transactions, any transactions that we do complete may be subject to the foregoing or other risks and have a material and adverse effect on our business, financial condition, results of operations and prospects. Conversely, any failure to pursue any acquisition or other strategic transaction that would be beneficial to us could delay the development and potential commercialization of our products.

***Our headquarters and other facilities are located in active earthquake and tsunami or in active hurricane or wildfire zones, and an earthquake, tsunami, hurricane, wildfire or other type of natural disaster affecting us or our suppliers could cause resource shortages, disrupt our business and harm our results of operations.***

We conduct our primary R&D operations in the San Francisco Bay Area in an active earthquake and tsunami zone, and certain of our suppliers conduct their operations in the same region or in other locations that are susceptible to natural disasters. In addition, California and some of the locations where certain of our suppliers and manufacturers are located have experienced shortages of water, electric power and natural gas from time to time. The occurrence of a natural or other disaster, such as an earthquake, tsunami, hurricane, drought, flood, fire, wildfire or any potential effects of climate change or localized extended outages of critical utilities or transportation systems, or any critical resource shortages, affecting us or, our suppliers or manufacturers could cause a significant interruption in our business, damage or destroy our facilities, production equipment or inventory or those of our suppliers and cause us to incur significant costs or result in limitations on the availability of our raw materials, any of which could harm our business, financial condition and results of operations. The insurance we maintain against fires, earthquakes and other natural disasters may not be adequate to cover our losses in any particular case. Accordingly, an earthquake or other disaster could materially and adversely harm our ability to conduct business.

***We depend on sophisticated information technology and equipment systems, and any failure of these systems could harm our business.***

We depend on various information technology and equipment systems, including services licensed, leased or purchased from third parties such as cloud computing infrastructure, operating systems and artificial intelligence platforms, for significant elements of our operations.

We use complex software processes to manage samples and evaluate sequencing result data. These software processes are subject to initial design challenges and may require ongoing modifications, each of which may result in unanticipated issues, leading to service disruptions or errors, resulting in liability. Our ability to maintain these processes depends on our ability to recruit and retain highly skilled employees in a competitive market and after recently reducing our workforce and, if we are successful in reducing our operating costs, on our ability to allocate sufficient resources to support the needs of this area. See the risk factor titled “—Our efforts to reduce our operating costs may not be successful.”

We have installed, and expect to expand, a number of enterprise software systems that affect a broad range of business processes and functional areas, including systems handling human resources, financial controls and reporting, contract management, regulatory compliance and other infrastructure operations. In addition to these business systems, we have installed, and intend to extend, the capabilities of both our preventative and detective security controls by augmenting the

monitoring and alerting functions and the network design of our technical systems. These information technology and telecommunications systems support a variety of functions, including data and cybersecurity, laboratory operations, quality control, R&D activities and general administrative activities. In addition, our third-party billing and collections provider depends upon technology and telecommunications systems provided by outside vendors.

Information technology and telecommunications systems are vulnerable to damage from a variety of sources, including telecommunications or network failures, malicious acts and natural disasters. In addition to traditional computer “hackers”, malicious code (such as viruses and worms), employee theft or misuse, and denial-of-service attacks, sophisticated nation-state and nation-state supported actors also now engage in attacks (including advanced persistent threat intrusions), each of which could impair our ability to prevent the theft or misappropriation of our intellectual property, know-how or technologies. In addition, in connection with heightened geopolitical tensions stemming from the Ukraine War, the risk of such attacks from nation-state and nation-state supported actors may increase. Moreover, despite network security and back-up measures, some of our servers are potentially vulnerable to physical or electronic break-ins, computer viruses and similar disruptive problems. Despite the precautionary measures we take to prevent unanticipated problems that could affect our information technology and telecommunications systems, failures or significant downtime of these systems or those used by our collaborators or subcontractors could prevent us from conducting our operations. Any disruption or loss of information technology or telecommunications software and systems on which critical aspects of our operations depend could have an adverse effect on our business, our reputation, and we may be unable to regain or repair our reputation in the future.

***Our use of open source software could adversely affect our platform or our automation business and subject us to possible litigation.***

We use open source software in connection with our platform and our automation business. Use of open source software may entail greater risks than use of third-party commercial software, as open source licensors generally do not provide support, updates, warranties, or other contractual protections regarding infringement claims or the quality of the code, and the wide availability of source code to components used in our products could expose us to security vulnerabilities. Furthermore, the terms of many open source licenses have not been interpreted by U.S. courts, and there is a risk that such licenses could be construed in a manner that imposes unanticipated conditions or restrictions on our ability to market or commercialize our products. As a result, we could be subject to lawsuits by parties claiming ownership of what we believe to be open source software or claiming noncompliance with open source licensing terms. Some open source software licenses require users who distribute software containing open source software to publicly disclose all or part of the source code to the licensee’s software that incorporates, links or uses such open source software, and make available to third parties for no cost, any derivative works of the open source code created by the licensee, which could include the licensee’s own valuable proprietary code. While we monitor our use of open source software and try to ensure that none is used in a manner that would require us to disclose our proprietary source code or that would otherwise breach the terms of an open source agreement, such use could inadvertently occur, or could be claimed to have occurred, in part because open source license terms are often ambiguous. There is little legal precedent in this area and any actual or claimed requirement to disclose our proprietary source code or pay damages for breach of contract could harm our business and could help third parties, including our competitors, develop technologies that are similar to or better than ours. Any of the foregoing could harm our business, financial condition, results of operations and prospects.

***If we are unable to raise additional capital to fund our operations, we will be required to significantly reduce our operating expenses and may not be able to continue as a going concern.***

The audit report with respect to our audited financial statements for the year ended December 31, 2020 included an explanatory paragraph stating that there are material uncertainties which caused substantial doubt about our ability to continue as a going concern, in the absence of additional financing and cost reduction or cost management measures. We are subject to various covenants related to the Perceptive Credit Agreement, and given the substantial doubt about our ability to continue as a going concern, there was a risk that we would not meet our covenants in the future. Following the issuance of our audited financial statements, we raised net proceeds of approximately \$529.9 million in our IPO. We have not yet generated revenue from product sales (except for nominal revenue related to the sale of samples) and expect product revenue to be immaterial in 2022. We expect to need to raise additional cash through debt, equity or other forms of financing to fund future operations, which may not be available on acceptable terms, or at all. If sufficient funds on acceptable terms are not available when needed, we will be required to significantly reduce our operating expenses. See the risk factor titled “—*We expect to need to raise additional capital to fund our operations, which we may not be able to obtain on favorable terms, or at all, and which, if obtained, may cause dilution to our stockholders or cause us to further limit our operations.*” Further, if at any time in the future we are unable to continue as a going concern, we may be forced to discontinue operations and liquidate our assets and may receive less than the value at which those assets are carried on our audited financial statements, which would cause our shareholders to lose some or all of their investment.

**We have pursued in the past and may pursue additional U.S. Government contracting and subcontracting opportunities in the future, and as a U.S. Government contractor and subcontractor, we would be subject to a number of procurement rules and regulations.**

We have entered into agreements with governmental entities and contractors in the past to serve as a U.S. Government contractor or subcontractor and may do so again in the future. U.S. Government procurement contractors and subcontractors must comply with specific procurement regulations and other requirements. These requirements, although customary in U.S. Government contracts, could impact our performance and compliance costs, including by limiting or delaying our ability to share information with business partners, customers and investors. The U.S. Government has in the past and may in the future demand contract terms that are less favorable than comparable arrangements with private sector customers and may have statutory, contractual, or other legal rights to terminate contracts with us for convenience or for other reasons. Any such termination may adversely affect our ability to contract with other government customers as well as our reputation, business, financial condition and results of operations. In addition, changes in U.S. Government budgetary priorities could lead to changes in the procurement environment, affecting availability of U.S. Government contracting, subcontracting or funding opportunities, which could lead to modification, reduction or termination of our U.S. Government contracts or subcontracts. If and to the extent such changes occur, they could impact our results and potential growth opportunities.

In addition, failure by us, our employees, representatives, contractors, channel partners, agents, intermediaries or other third parties to comply with these regulations and requirements could result in reductions of the value of contracts, contract modifications or termination, claims for damages, refund obligations, the assessment of civil or criminal penalties and fines, loss of exclusive rights in our intellectual property and temporary suspension or permanent debarment from government contracting, all of which could negatively impact our results of operations and financial condition. See the risk factor titled “—*We do not have exclusive rights to intellectual property we develop under U.S. federally funded research grants and contracts, including with DARPA, and we could ultimately share or lose the rights we do have under certain circumstances.*” Any such damages, penalties, disruptions or limitations in our ability to do business with the public sector could result in reduced sales of our products, reputational damage, penalties and other sanctions, any of which could harm our business, reputation and results of operations.

**We face risks related to cybersecurity threats and incidents, as well as significant disruptions of our information technology systems or data security incidents that could result in significant financial, legal, regulatory, business and reputational harm.**

We may face attempts by others to gain unauthorized access through the Internet or to introduce malicious software, to our IT systems. Additionally, individuals or organizations, including malicious hackers, state-sponsored organizations, insider threats including employees and third-party service providers or intruders into our physical facilities, may attempt to gain unauthorized access and try to steal our technology and data. In connection with heightened geopolitical tensions stemming from the Ukraine War, the risk of such attacks from nation-state and nation-state supported actors may increase. We are also a potential target of malicious attackers who attempt to gain access to our network or data centers or those of our customers or end users; steal proprietary information related to our business, products, employees and customers; interrupt our systems and services or those of our customers or others; or demand ransom to return control of such systems and services. Such attempts by malicious attackers in general are increasing in number and in technical sophistication, and if successful, expose us and the affected parties to risk of loss or misuse of proprietary or confidential information or disruptions of our business operations, including our technology operations. Furthermore, malicious online actors may employ false pretenses or technical measures in an attempt to induce our employees to use IT systems in a manner contrary to our benefit, such as, by authorizing payment of false bills or to run software that would encrypt our information in such a way that it cannot be used by us without paying ransom. While we have implemented security measures and employee training programs intended to protect our information technology systems and infrastructure, there can be no assurance that such measures will successfully prevent service interruptions or further security incidents. We have also outsourced elements of our operations (including elements of our information technology infrastructure) to third parties, and as a result, we manage a number of third-party vendors who may or could have access to our computer networks or our confidential information. Many of those third parties in turn subcontract or outsource some of their responsibilities to third parties. These providers can experience breaches of their systems and products that impact the security of our systems and our proprietary or confidential information.

Our information systems may also experience interruptions, delays, or cessations of service or produce errors in connection with system integration, software upgrades, or system migration work that takes place from time to time. While all information technology operations are inherently vulnerable to inadvertent or intentional security breaches, incidents, attacks and exposures, the size, complexity, accessibility and distributed nature of our information technology systems, and the large amounts of sensitive information stored on those systems, make such systems potentially vulnerable to unintentional or malicious, internal and external attacks on our technology environment. While we have implemented security measures intended to protect our information technology systems and infrastructure, there can be no assurance that such measures will successfully prevent service interruptions or further security incidents.

Should we fail to maintain required security qualifications, we may face regulatory concerns or be in breach of contract, which may trigger regulatory action, litigation and/or damages, reputational harm, or loss of certain contracts. While we actively work to manage our information security compliance program, we cannot guarantee that we will always meet the certification standard going forward.

We may encounter intrusions or unauthorized access to our network, services or infrastructure. Any such incidents, whether or not successful, could result in our incurring significant costs related to, for example, rebuilding internal systems, implementing additional threat protection measures, defending against litigation, responding to regulatory inquiries or actions, paying damages, providing customers with incentives to maintain the business relationship, or taking other remedial steps with respect to third parties, as well as reputational harm. In addition, these threats are constantly evolving, thereby increasing the difficulty of successfully defending against them or implementing adequate preventative measures. While we seek to detect and investigate all unauthorized attempts and attacks against our network, products and services and to prevent their recurrence where practicable through changes to our internal processes and tools and changes or updates to our products and services, we may not be successful in doing so and remain potentially vulnerable to additional known or unknown threats. In some instances, we, our customers and the users of our products and services can be unaware of an incident or its magnitude and effects.

While we maintain cyber liability insurance with coverage we believe adequate to cover our risk profile, we cannot guarantee that tail risks, should they occur, would not cause us to incur significant losses or liabilities resulting from data security incidents. Any litigation or regulatory review arising from these types of data security incidents could result in significant legal exposure to us. In addition, information technology system disruptions, whether from attacks on our technology environment or from computer viruses or malware, natural disasters, terrorism, war and telecommunication and electrical failures, could result in a material disruption of our facilities, R&D activities, manufacturing activities and general business operations. Any event that leads to unauthorized access to, use or disclosure of personal information could, among other consequences, disrupt our business, harm our reputation and/or compel us to comply with applicable federal and/or state breach notification laws and foreign law equivalents. In addition, failure to maintain effective internal accounting controls related to security breaches and cybersecurity in general could impact our ability to produce timely and accurate financial statements and subject us to regulatory scrutiny.

***Theft, loss, or misuse of personal data about our employees, customers, or other third parties could increase our expenses, damage our reputation, or result in legal or regulatory proceedings.***

The theft, loss, or misuse of personal data collected, used, stored or transferred by us to run our business could result in significantly increased business and security costs or costs related to defending legal claims or implementing remedial or punitive measures. Global privacy legislation, enforcement and policy activity in this area are rapidly expanding and creating a complex regulatory compliance environment. Costs to comply with and implement these privacy-related and data protection measures could be significant and noncompliance could expose us to significant monetary penalties, damage to our reputation, suspension of online services or sites in certain countries, mandatory changes in business processes and even criminal sanctions. Even our inadvertent failure to comply with federal, state, or international privacy-related or data-protection laws and regulations could result in audits, regulatory inquiries or proceedings against us by governmental entities or other third parties.

***Breaches of physical security systems and/or theft of physical materials could result in significant financial, legal, regulatory, business and reputational harm to us.***

We seek to preserve the integrity and confidentiality of our and our partners', suppliers' and customers' data, trade secrets, proprietary chemical and biological materials (e.g., genetically modified host microbes) by maintaining physical security of our premises, biological materials storage systems and information technology systems. While we have confidence in these physical security systems, they may in the future be breached. In addition, we use third party vendors for certain services (e.g., DNA synthesis and sequencing or archiving of samples of engineered organisms) that require us to send or receive physical samples of materials that may constitute or contain proprietary or confidential information, and such third-party vendors may experience breaches. We also exchange physical samples of materials that may constitute or contain proprietary or confidential information with our customers and business partners. In many cases, these customers, partners, and third-party vendors are located internationally, sometimes in areas that are particularly susceptible to malicious physical security breaches.

Any breach of our own physical security, or that of a third party supplier, customer, or business partner, could adversely affect our business operations and/or result in the loss, misappropriation and/or unauthorized access to, or use or disclosure of, confidential or proprietary information (including trade secrets), which could result in financial and reputational harm to us, significant legal exposure to us, and/or compel us to comply with applicable federal and/or state breach notification laws and foreign law equivalents.

See also the risk factor titled, “—We face risks related to cybersecurity threats and incidents, as well as significant disruptions of our information technology systems or data security incidents that could result in significant financial, legal, regulatory, business and reputational harm.”

## Risks Related to Our Intellectual Property

### ***Our proprietary rights may not adequately protect our technologies and pipeline products.***

Our commercial success will depend substantially on our ability to obtain patents and maintain adequate legal protection for the intellectual property we may own solely or jointly with, or license from, third parties, including our technologies and pipeline products in the United States and other countries. Our ability to protect our proprietary rights from unauthorized use by third parties relies on our ability to obtain and maintain valid and enforceable patents covering our proprietary technologies and future products and to maintain the confidentiality of information and technology that we maintain as either confidential or as trade secrets.

We apply for patents covering both our technologies and pipeline products, as we deem appropriate. However, filing, prosecuting, maintaining and defending patents in all countries throughout the world would be prohibitively expensive, and our intellectual property rights in some countries outside the United States are less robust than those in the United States. We may also fail to apply for patents on important technologies or pipeline products in a timely fashion, or at all. Our existing and future patents may not be sufficiently broad to prevent others from practicing our technologies or from designing products around our patents or otherwise developing competing products or technologies. In addition, the breadth of protections offered by patents is highly uncertain and involves complex legal and factual questions for which important legal principles remain unresolved. Additional uncertainty may result from legal decisions by the United States Federal Circuit and Supreme Court as they determine legal issues concerning the scope and construction of patent claims and inconsistent interpretation of patent laws or from new legislation enacted by the U.S. Congress. For instance, the availability of patent protection with respect to software and claims reciting abstract ideas, laws of nature, natural phenomena and/or natural products, regardless of whether the claimed subject matter is otherwise novel and inventive, is uncertain and subject to change. The patent situation outside of the United States is also changing and difficult to predict. As a result, the validity and enforceability of patents cannot be predicted with certainty.

We do not know whether any of our pending patent applications or any pending patent applications that we license from others will result in the issuance of any patents. Even if patents are issued, they may not be sufficient to protect our technology or pipeline products. The patents we own or take licenses to and those that may be issued in the future may be challenged, invalidated, rendered unenforceable or circumvented, and the rights granted under any issued patents may not provide us with proprietary protection or competitive advantages. Moreover, third parties could practice our inventions in territories where we do not have patent protection or in territories where they could obtain a compulsory license to our technology even when patented. Such third parties may then try to import products made using our inventions into the United States or other territories. Accordingly, we cannot ensure that any of our pending patent applications will result in issued patents, or even if issued, that we will be able to predict the breadth, validity and enforceability of the claims upheld in those patents.

If any of our confidential proprietary information were to be lawfully obtained or independently developed by a competitor or other third party, absent patent protection, we would have no right to prevent such competitor from using that technology or information to compete with us, which could harm our competitive position. If any of our confidential information or trade secrets were to be disclosed to or independently discovered by a competitor or other third party, it could harm our business, financial condition, results of operations and prospects.

If competitors are able to copy and use our technology, our ability to compete effectively could be harmed. Others may independently develop and obtain patents for technologies that are similar to, or superior to, our technologies. If that happens, their owners may demand that we take a license, or refuse to grant us a license on reasonable terms or an exclusive license, if at all, which could cause harm to our business.

### ***We rely in part on trade secrets to protect our products and technology, and our failure to obtain or maintain trade secret protection, or a competitor independently developing technology we protect through trade secrets, could adversely affect our competitive business position.***

Others may attempt to copy or otherwise improperly obtain and use our products or technology and trade secrets. We seek to preserve the integrity and confidentiality of our confidential proprietary information and trade secrets by maintaining physical security of our premises and physical and electronic security of our information technology systems, but it is possible that these security measures could be breached. Monitoring unauthorized access and use is difficult, and we cannot be certain that the steps we have taken will prevent that, particularly in certain foreign countries where the local laws may not protect our proprietary rights as fully as in the United States. Moreover, in some cases our ability to determine if our intellectual property is being unlawfully used by a competitor may be limited.

We rely heavily on confidentiality agreements and confidentiality terms in our other agreements to protect unpatented trade secrets, know-how and confidential technology, including parts of our platform, molecule identity and production organisms, in order to protect our competitive position. This is particularly relevant where patent protection may not be available, for example, aspects of our platform that are naturally occurring. We regularly enter into agreements to maintain and protect our intellectual property and proprietary technology, including confidentiality agreements, non-disclosure agreements with our employees, consultants, academic institutions, corporate partners and when needed, our advisers. However, we cannot be certain that such agreements have been entered into with all relevant parties, and we cannot be certain that our trade secrets and other confidential proprietary information will not be disclosed or that competitors will not otherwise gain access to our trade secrets or independently develop substantially equivalent information and techniques. For example, any of these parties may breach the agreements and disclose our proprietary information, including our trade secrets, and we may not be able to obtain adequate remedies for such breaches. Such agreements may not be enforceable or may not provide meaningful protection for our trade secrets or other proprietary information in the event of unauthorized use or disclosure or other breaches of the agreements, and we may not be able to prevent such unauthorized disclosure, which could adversely impact our ability to establish or maintain a competitive advantage in the market.

Trade secrets and know-how can be difficult to maintain and protect. Monitoring unauthorized disclosure is difficult, and despite the steps we have taken and the employee education we also conduct, we do not know whether the steps we have taken to prevent such disclosure are, or will be, adequate. If we were to enforce a claim that a third party had improperly obtained and was using our trade secrets, the lawsuit would be expensive and time-consuming, and the outcome would be unpredictable. In addition, courts outside the United States may be less willing to protect trade secrets.

***We may need to commence or defend litigation to enforce our intellectual property rights, which would divert resources and management's time and attention and the results of which would be uncertain.***

Any litigation arising from our enforcement of claims that a third party is infringing, misappropriating or otherwise violating our proprietary rights without permission or defending claims by a third party that we are infringing, misappropriating or otherwise violating their proprietary rights without permission would be expensive, time consuming and uncertain. There can be no assurances that we would prevail in any suit brought by us or against us by third parties, or successfully settle or otherwise resolve those claims. Significant litigation would have substantial costs, even if the eventual outcome is favorable to us, and would divert management's attention from our business objectives.

Parties making claims against us may be able to obtain injunctive or other relief, which could block our ability to develop, commercialize and sell products or use our technologies, and could result in the award of substantial damages against us, including treble damages, attorney's fees, costs and expenses if we are found to have willfully infringed. In the event of a successful claim against us, we may be required to pay damages and ongoing royalties, and obtain one or more licenses from third parties, or be prohibited from selling certain products or using certain technologies. We may not be able to obtain these licenses on acceptable or commercially reasonable terms, if at all. In addition, we could encounter delays in product or service introductions while we attempt to develop alternative or redesign existing products or technologies to avoid or resolve these claims. Our loss in any lawsuit or failure to obtain a license, could prevent us from commercializing the products or using the technologies (or, in the case of a suit we make against a third party, our failure to prevent their commercialization of product or use of technologies we believe to be in violation of our intellectual property rights) and the prohibition of sale of any of our products or use of technologies (or our failure to prohibit a third party's sales of competitive products or use of competing technologies) could materially affect our business, our ability to gain market acceptance for our products and our ability to use our technologies for the development of our pipeline products.

Furthermore, because of the substantial amount of discovery required in connection with intellectual property litigation, there is a risk that some of our confidential information could be compromised by disclosure during this type of litigation. In addition, during the course of this kind of litigation, there could be public announcements of the results of hearings, motions or other interim proceedings or developments. If securities analysts or investors perceive these results to be negative, it could have a substantial adverse effect on the price of our common stock.

In addition, our agreements with some of our customers, suppliers or other entities with whom we do business require us to defend or indemnify these parties if they become involved in infringement claims that target our products, services or technologies, including the types of claims described above. We could also voluntarily agree to defend or indemnify third parties even if we are not obligated to do so if we determine it would be important to our business relationships to do so. If we are required or agree to defend or indemnify third parties in connection with any infringement claims, we could incur significant costs and expenses that could adversely affect our business, operating results or financial condition.

Furthermore, the laws of some foreign countries do not protect intellectual property rights to the same extent as do the laws of the United States or apply differing rules concerning effective assignment of intellectual property rights. Many companies have encountered significant problems in protecting and defending intellectual property rights in certain foreign jurisdictions. We may encounter similar difficulties, particularly as we expand to work with foreign employees and contractors and expand sales into foreign markets. The legal systems of certain countries, particularly certain developing countries, do not favor the enforcement of patents by foreign holders and other intellectual property protection, particularly those relating to biotechnology and bioindustrial technologies. This could make it difficult for us to stop the infringement of our patents or misappropriation or other violation of our other intellectual property rights. Proceedings to enforce our patent rights in foreign jurisdictions could result in substantial costs and divert our efforts and attention from other aspects of our business.

***We do not have exclusive rights to intellectual property we develop under U.S. federally funded research grants and contracts, including with DARPA, and we could ultimately share or lose the rights we do have under certain circumstances.***

Some of our intellectual property has been or may be developed during the course of research funded by the U.S. government, including under our agreements with the U.S. Defense Advanced Research Projects Agency ("DARPA"). As a result, the U.S. government may have certain rights to intellectual property that we use in our current or future products pursuant to the Bayh-Dole Act of 1980, as amended (the "Bayh-Dole Act"). Under the Bayh-Dole Act, U.S. Government rights in certain "subject inventions" developed under a government-funded program include a nonexclusive, non-transferable and irrevocable worldwide license to use inventions for any governmental purpose. In addition, the U.S. government has the right to require us, or an assignee or exclusive licensee to such inventions, to grant licenses to any of these inventions to the government or a third party if the government determines that: (i) adequate steps have not been taken to commercialize the invention; (ii) government action is necessary to meet public health or safety needs; (iii) government action is necessary to meet requirements for public use under federal regulations; or (iv) the right to use or sell such inventions is exclusively licensed to an entity within the United States and substantially manufactured outside the United States without the U.S. government's prior approval. Additionally, we may be restricted from granting exclusive licenses for the right to use or sell our inventions created pursuant to such agreements unless the licensee agrees to comply with relevant Bayh-Dole Act restrictions (e.g., manufacturing substantially all of the invention in the United States) and reporting requirements. The U.S. government also has the right to take title to these inventions if we fail to disclose the invention to the government or fail to file an application to register for a patent for the intellectual property within specified time limits. In addition, the U.S. government may acquire title in any country in which a patent application is not filed. Certain technology and inventions are also subject to transfer restrictions during the term of these agreements with the U.S. government and for a period thereafter. These restrictions may limit sales of products or components, transfers to foreign subsidiaries for the purpose of the relevant agreements and transfers to certain foreign third parties. If any of our intellectual property becomes subject to any of the rights or remedies available to the U.S. government or third parties pursuant to the Bayh-Dole Act, this could impair the value of our intellectual property and could adversely affect our business.

***We use naturally occurring materials that are not patentable and changes to patent laws in the United States and other jurisdictions could diminish the value of patents in general, thereby impairing our ability to protect our products.***

Various courts, including the U.S. Supreme Court, have rendered decisions that impact the scope of patentability of certain inventions or discoveries relating to the life sciences. Specifically, these decisions stand for the proposition that patent claims that recite laws of nature, a natural phenomenon (for example a naturally occurring protein having the same amino acid sequence found in nature) or an abstract idea are not themselves patentable unless those patent claims have sufficient additional features that provide practical assurance that the processes are genuine inventive applications of those laws rather than patent drafting efforts designed to monopolize the law of nature itself. What constitutes a "sufficient" additional feature is uncertain. Furthermore, in view of these decisions, in December 2014 the USPTO, published revised guidelines for patent examiners to apply when examining process claims for patent eligibility. This guidance was updated by the USPTO in July 2015 and additional illustrative examples provided in May 2016. The USPTO provided additional guidance on examination procedures pertaining to subject matter eligibility in April 2018 and June 2018. The guidance indicates that claims directed to a law of nature, a natural phenomenon or an abstract idea that do not meet the eligibility requirements should be rejected as non-statutory, patent ineligible subject matter; however, method of treatment claims that practically apply natural relationships should be considered patent eligible. We cannot assure you that our patent portfolio will not be negatively impacted by the current uncertain state of the law, new court rulings or changes in guidance or procedures issued by the USPTO. From time to time, the U.S. Supreme Court, other federal courts, the U.S. Congress or the USPTO may change the standards of patentability and validity of patents within the life sciences and any such changes could have a negative impact on our business.

In addition, the patent positions of companies in the development and commercialization of software and biologics are particularly uncertain. Recent U.S. Supreme Court rulings have narrowed the scope of patent protection available in certain circumstances and weakened the rights of patent owners in certain situations. This combination of events has created uncertainty with respect to the validity and enforceability of patents once obtained. Depending on future actions by the U.S. Congress, the federal courts and the USPTO, the laws and regulations governing patents could change in unpredictable ways that could have a material adverse effect on our patent rights and our ability to protect, defend and enforce our patent rights in the future.

***Patent terms may be inadequate to protect our competitive position on our products and technologies for an adequate amount of time.***

Patents have a limited lifespan. In the United States, if all maintenance fees are timely paid, the natural expiration of a patent is generally 20 years from its earliest U.S. non-provisional filing date. Various extensions may be available, but the life of a patent and the protection it affords, is limited. Even if patents covering our products and technologies are obtained, once the patent life has expired, we may be open to competition from products leveraging the proprietary technologies described in our patents. Given the amount of time required for the development, testing and, in some cases, regulatory review of new products, patents protecting such products might expire before or shortly after such products are commercialized. As a result, our owned and licensed patent portfolio may not provide us with sufficient rights to exclude others from commercializing products, or using technologies, similar or identical to ours.

***We may be subject to claims by third parties asserting that our employees, consultants, or contractors have wrongfully used or disclosed confidential information of third parties, or we have wrongfully used or disclosed alleged trade secrets of their current or former employers or claims asserting we have misappropriated their intellectual property, or claiming ownership of what we regard as our own intellectual property.***

Certain of our employees, consultants and contractors were previously employed at universities or other software or biopharmaceutical companies, including our competitors or potential competitors. Although we try to ensure that our employees, consultants and contractors do not use the proprietary information or know-how of others in their work for us, we may be subject to claims that these individuals or we have used or disclosed intellectual property, including trade secrets or other proprietary information, of any such individual's current or former employer. Litigation may be necessary to defend against these claims.

In addition, while it is our policy to require that our employees, consultants and contractors who may be involved in the development of intellectual property, execute agreements assigning such intellectual property to us, we may be unsuccessful in executing such an agreement with each party who in fact develops intellectual property that we regard as our own. Our intellectual property assignment agreements with them may not be self-executing or may be breached, and we may be forced to bring claims against third parties, or defend claims they may bring against us, to determine the ownership of what we regard as our intellectual property. Such claims could have a material adverse effect on our business, financial condition, results of operations and prospects.

If we fail in prosecuting or defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights or personnel, which could have a material adverse effect on our competitive business position and prospects. Such intellectual property rights could be awarded to a third party, and we could be required to obtain a license from such third party to use or commercialize our technology or products, which license may not be available on commercially reasonable terms, or at all. Even if we are successful in prosecuting or defending against such claims, litigation could result in substantial costs and be a distraction to our management and employees.

## Risks Relating to Government Regulation and Tax Matters

*We may not be able to obtain, or may experience significant delays or costs in obtaining, regulatory approval for our products or their components and even if approvals are obtained, complying on an on-going basis with numerous regulatory requirements will be time-consuming and costly.*

The product development and manufacturing requirements of the EPA and FDA and other government bodies, and the criteria these authorities use to determine the safety and/or efficacy of pipeline products or their components, vary substantially according to the type, complexity, novelty, intended use and geographic market of said pipeline product or component. It is difficult to determine the time required or the financial costs to obtain regulatory approvals for our pipeline products or their components or how long it will take to commercialize our pipeline products, even if approved for marketing. In the United States, the EPA administers the Toxic Substances Control Act (“TSCA”), which regulates the commercial registration, distribution and use of many chemicals. Before an entity can manufacture or distribute a new chemical subject to TSCA, it must file a Pre-Manufacture Notice (“PMN”), to add the chemical to the TSCA Inventory. The EPA has 90 days to review the filing but may request additional data or time, which could significantly extend the timeline for approval. As a result, we may not receive EPA approval as expeditiously as we would like. Similar regulations exist in the European Union (“EU”), known as REACH, where regulatory authorization under this program may be delayed or require additional significant costs. Any future products for the healthcare market or our drug discovery business may be subject to regulation by the FDA, as well as similar agencies of states and foreign jurisdictions where these products are manufactured, sold or proposed to be sold. Pursuant to the Federal Food, Drug, and Cosmetic Act, the FDA is responsible for ensuring the safety, efficacy and security of drugs, biological products and medical devices by regulating the processing, formulation, safety, manufacture, packaging, labeling and distribution of these products.

We expect to encounter regulations in most, if not all, of the countries in which we may seek to produce, import, or sell our products, and we cannot guarantee that we will be able to obtain necessary approvals and third-party verifications in a timely manner or at all. If there are delays or failure to obtain, or unexpected costs in obtaining, the regulatory approval necessary in a particular country, then we may not be able to commercialize our products in such country and our business will be adversely affected. In addition, any enforcement action taken by regulators against us or our products for non-compliance could cause us to suffer adverse publicity, which could harm our reputation and our relationship with our customers and vendors.

In addition, many of our products are intended to be a component of our collaboration partners and/or customers’ (or their customers’) end-use products. Such end-use products may be subject to similar or other various regulations, including regulations promulgated by U.S. or EU regulatory agencies or authorities. If we or our collaboration partners and customers (or their customers) are not successful in obtaining any required regulatory approval or third-party verifications for their end-use products that incorporate our products, or fail to comply with any applicable regulations for such end-use products, whether due to our products or otherwise, demand for our products may decline and our revenue will be adversely affected.

*We may incur significant costs to comply with environmental laws and regulations, and failure to comply with these laws and regulations could expose us to significant liabilities.*

We use hazardous and nonhazardous chemicals and biological materials in our business and are subject to a variety of federal, state, local and international laws and regulations governing, among other matters, the use, generation, manufacture, transportation, storage, handling, disposal of and human and environmental exposure to these materials both in the United States and overseas, including regulation by governmental regulatory agencies, such as the Occupational Safety and Health Administration and the EPA. We have incurred and will continue to incur, capital and operating expenditures and other costs in the ordinary course of our business in complying with these laws and regulations.

Although we have implemented safety procedures for handling and disposing of these materials and waste products in an effort to comply with these laws and regulations, we cannot be sure that our safety measures will be compliant or capable of eliminating the risk of injury or contamination from the generation, manufacturing, use, storage, transportation, handling, disposal of and human and environmental exposure to hazardous materials. Failure to comply with environmental, health and safety laws could subject us to liability and resulting damages. There can be no assurance that violations of environmental, health and safety laws will not occur as a result of human error, accident, equipment failure, contamination or other causes. Compliance with applicable environmental laws and regulations may be expensive, and the failure to comply with past, present or future laws could result in the imposition of fines, regulatory oversight costs, third party property damage, product liability and personal injury claims, investigation and remediation costs, the suspension of production or a cessation of operations, and our liability may exceed our total assets. Liability under environmental laws, such as the Comprehensive Environmental Response Compensation and Liability Act in the United States can impose liability for the full amount of damages without regard to comparative fault for the investigation and cleanup of contamination and impacts to human health and for damages to natural resources. Contamination at properties we will own or operate and at properties to which we send materials, may result in liability for us under environmental laws and regulations.

Our business and operations may be affected by other new environmental, health and safety laws and regulations, which may require us to change our operations, or result in greater compliance costs and increasing risks and penalties associated with violations, which could impair our research, development or production efforts and harm our business.

***Our collection, use and disclosure of personal information, including health and employee information, is subject to U.S. state and federal privacy and security regulations, and our failure to comply with those regulations or to adequately secure the information we hold could result in significant liability or reputational harm.***

The privacy and security of personal information stored, maintained, received or transmitted, including electronically, is a major issue in the United States and abroad. Numerous federal and state laws and regulations govern the collection, dissemination, use and confidentiality of personal information, including genetic, biometric and health information, including state privacy, data security and breach notification laws, federal and state consumer protection and employment laws, the Health Insurance Portability and Accountability Act of 1996, as amended by the Health Information Technology for Economic and Clinical Health Act of 2009 and the Genetic Information Nondiscrimination Act of 2008. These laws and regulations are increasing in complexity and number, may change frequently and sometimes conflict. Penalties for violations of these laws vary, but can be severe. For example, California recently enacted the California Consumer Privacy Act ("CCPA"). The CCPA gives California residents expanded rights to access and delete their personal information, opt out of certain personal information sharing, and receive detailed information about how their personal information is used. The CCPA provides for civil penalties for violations, as well as a private right of action for data breaches that is expected to increase data breach litigation. Additionally, in November 2020, California voters passed the California Privacy Rights and Enforcement Act of 2020 (the "CPRA"), which further expands the CCPA with additional data privacy compliance requirements and establishes a regulatory agency dedicated to enforcing those requirements. The CCPA's and CPRA's enactment likely marks the beginning of a trend toward more stringent privacy legislation in the United States, which could increase our potential liability and adversely affect our business. Similar privacy legislation has been proposed in a number of states, including Virginia and Colorado, which passed new consumer privacy laws in 2021 that take effect in 2023.

While we strive to comply with all applicable privacy and security laws and regulations, including our own posted privacy policies, these laws and regulations continue to evolve and any failure or perceived failure to comply may result in proceedings or actions against us by government entities or others, or could cause us to lose customers, which could have a material adverse effect on our business. Recently, there has been an increase in public awareness of privacy issues in the wake of revelations about the data-collection activities of various government agencies and in the number of private privacy-related lawsuits filed against companies. Concerns about our practices with regard to the collection, use, retention, disclosure or security of personal information or other privacy-related matters, even if unfounded and even if we are in compliance with applicable laws, could damage our reputation and harm our business.

***Data collection outside of the United States may be governed by restrictive regulations governing the use, processing and cross-border transfer of personal information.***

In the event we decide to conduct business or grow our business in certain territories outside the United States, we may be subject to additional privacy restrictions. For example, the EU General Data Protection Regulation ("GDPR") regulates certain business activities involving the collection, use, storage, disclosure, transfer or other processing of personal data regarding individuals in the European Economic Area ("EEA"). The GDPR is wide-ranging in scope and imposes numerous requirements on companies that process personal data. If we expand our business activities involving the personal data of EEA residents, it may increase our cost of doing business or require us to change our business practices. Compliance with the GDPR and other similar laws and regulations will be a rigorous and time-intensive process that may increase our cost of doing business or require us to change our business practices, and despite those efforts, there is a risk that we may be subject to fines and penalties, litigation and reputational harm in connection with our activities outside the United States, including in the EEA.

**We are subject to certain U.S. and foreign anti-corruption, anti-bribery and anti-money laundering laws and regulations. We can face serious consequences for violations.**

We are subject to the U.S. Foreign Corrupt Practices Act of 1977, as amended (the “FCPA”), the U.S. domestic bribery statute contained in 18 U.S.C. § 201, the U.S. Travel Act, the U.K. Bribery Act and possibly other anti- corruption, anti-bribery and anti-money laundering laws and regulations in the jurisdictions in which we do business, both domestic and abroad. Anti-corruption and anti-bribery laws have been enforced aggressively in recent years and are interpreted broadly to generally prohibit companies, their employees, agents, representatives, business partners and third-party intermediaries from authorizing, offering, or providing, directly or indirectly, improper payments or offers of improper payments to government officials, political parties, or commercial partners for the purpose of obtaining or retaining business or securing an improper business advantage, or engaging in certain transactions involving criminally-derived property or the proceeds of criminal activity. We plan to engage third parties to conduct our business abroad, for example, for product trials and/or to obtain necessary permits, licenses, patent registrations and other regulatory approvals. We and our third-party business partners, representatives and agents may have direct or indirect interactions with officials and employees of government agencies or state-owned or affiliated universities or other entities, and we may be held liable for the corrupt or other illegal activities of our employees or such third parties even if we do not explicitly authorize such activities. We expect our non-U.S. activities to increase over time, which may also increase our exposure to these laws.

These laws also require that we keep accurate books and records and maintain internal controls and compliance procedures designed to prevent any such actions in violation of those laws. While we have policies and procedures to address compliance with such laws, we cannot assure you that none of our employees, agents, representatives, business partners or third-party intermediaries will take actions in violation of our policies and applicable law, for which we may be ultimately held responsible.

Any allegations or violation of the FCPA or other applicable anti-bribery, anti-corruption laws and anti-money laundering laws may result in whistleblower complaints, sanctions, settlements, investigations, prosecution, enforcement actions, substantial criminal fines and civil penalties, imprisonment, debarment, tax reassessments, breach of contract and fraud litigation, loss of export privileges, suspension or debarment from U.S. government contracts, adverse media coverage, reputational harm and other consequences, all of which may have an adverse effect on our reputation, business, results of operations and prospects. Responding to an investigation or action will likely result in a materially significant diversion of management’s attention and resources and significant defense costs and other professional fees.

***Governmental trade controls, including export and import controls, sanctions, customs requirements and related regimes, could subject us to liability or loss of contracting privileges or limit our ability to compete in certain markets.***

Our products and technologies are subject to U.S. and non-U.S. export controls. Export authorizations may be required for the products, technologies, or services to be exported outside of the United States, to a foreign person, or outside of a foreign jurisdiction. Our current or future products or technologies are, and may in the future, be subject to the Export Administration Regulations (“EAR”). If a product, technology, or service meets certain criteria for control under the EAR, then that product, technology, or service would be exportable outside the United States or to a foreign person or from one foreign jurisdiction to another foreign jurisdiction only if we obtain the applicable export license or other applicable authorization including qualifying for a license exception, if required. Compliance with the U.S. and foreign export laws and regulations and other applicable regulatory requirements regarding the sales, shipment and use of our products and technology may affect our ability to work with foreign partners, affect the speed at which we can introduce new products into non-U.S. markets, or limit our ability to sell products or services or license technologies into some countries.

Additionally, certain materials that we use in our development and production activities are subject to U.S. import controls. We currently have, and may in the course of business need to procure, certain import authorizations, for example, related to plant pests, chemicals, biological agents and other controlled materials, including from the USDA, EPA and U.S. Centers for Disease Control. Compliance with applicable regulatory requirements regarding the import of such materials may limit our access to materials critical to our development activities or affect the speed at which we can develop new products.

Our activities are also subject to the economic sanctions laws and regulations of the United States and other jurisdictions. Such controls prohibit certain transactions, potentially including financial transactions and the transfer of products, technologies and services, to sanctioned countries, governments and persons, without a license or other appropriate authorization. U.S. sanctions policy changes could affect our ability to interact, directly and indirectly, with targeted companies or companies in sanctioned countries, including Chinese companies and Russian companies. For example, in February and March 2022, in response to the Ukraine War, the United States and other countries imposed economic sanctions against Russia and Belarus, and the United States and other countries could impose further sanctions and take other actions should the conflict further escalate. Compliance with these and any further sanctions could limit our ability to interact with Russian companies.

While we take precautions to comply with U.S. and non-U.S. export control, import control and economic sanctions laws and regulations, we cannot guarantee that such precautions will prevent violations of such laws, including transfers to unauthorized persons or destinations, and including inadvertent violations as a result of a misclassification of a product, technology or service under export control laws. Violations could result in our business being subject to government investigations, denial of export or import privileges, significant fines or penalties, denial of government contracts and reputational harm. Any limitation on our ability to export our products, technology, or services, or import materials critical to our development activities would likely adversely affect our business and financial condition.

***We are party to a mitigation agreement with the Committee on Foreign Investment in the United States (“CFIUS”) and can face penalties or further restrictions if we fail to comply with that agreement. CFIUS may also condition, modify, delay or prevent our future acquisition or investment activities.***

Due to certain foreign ownership interests in our business, we operate pursuant to an agreement with CFIUS agencies that requires us to adhere to certain information and technology protection requirements. This agreement will remain in place until CFIUS agrees to terminate it, which CFIUS might do if it determines that the agreement is no longer necessary due to changed circumstances, including any changes to the ownership of our business. We have incurred and will continue to incur, incremental additional costs in implementing and complying with these standards, and those costs may increase as we continue to grow our business. If we fail to comply with our obligations under the agreement, we may be subject to penalties, injunctive action, additional mitigation conditions or other restrictions.

Further, subject to any future changes in the foreign ownership interest in our business, CFIUS may interpret its regulations as continuing to give it jurisdiction to review our acquisitions of, or investments in, other US businesses. If CFIUS conducts such a review, it could impose restrictions on the investments or to deny such transactions to address any national security concerns that it determines are posed by such transactions.

***Our ability to use our net operating loss carryforwards and certain other tax attributes may be limited.***

We have incurred net losses since our inception and we may never achieve or sustain profitability. Generally, for U.S. federal income tax purposes, net operating losses incurred will carry forward. However, net operating loss carryforwards generated prior to January 1, 2018 are subject to expiration for U.S. federal income tax purposes. As of December 31, 2021, we had federal net operating loss carryforwards of \$1.0 billion of which \$106.4 million will begin to expire in 2033 and \$936.0 million will carryforward indefinitely. As of December 31, 2021, we had a total state net operating loss carryforward of \$660.7 million, which will begin to expire in 2027. As of December 31, 2021, we also had federal and state R&D tax credit carryforwards of \$34.5 million and \$28.8 million, respectively, which may be available to offset future income tax liabilities. The federal R&D tax credit carryforwards would begin to expire in 2034. The state R&D tax credit carryforwards are not subject to expiration.

As of December 31, 2020, we had federal net operating loss carryforwards of approximately \$704.1 million of which \$99.3 million will begin to expire in 2033 and \$604.8 million, which will carryforward indefinitely. As of December 31, 2020, we had a total state net operating loss carryforward of \$515.6 million, which will begin to expire in 2027. As of December 31, 2020, we also had federal and state R&D tax credit carryforwards of approximately \$26.8 million and \$22.3 million, respectively, which may be available to offset future income tax liabilities. The federal R&D tax credit carryforwards would begin to expire in 2034. The state R&D tax credit carryforwards are not subject to expiration.

In addition, under Sections 382 and 383 of the Internal Revenue Code of 1986, as amended (“Code”), if a corporation undergoes an “ownership change,” generally defined as a greater than 50 percentage point change in its equity ownership by certain shareholders over a three-year period, the corporation’s ability to use its pre-ownership change net operating loss carryforwards and other pre-ownership change tax attributes, such as research tax credits, to offset its post-ownership change income or taxes may be limited. As a result, even if we attain profitability, we may be unable to use a material portion of our net operating loss carryforwards and other tax attributes, which could adversely affect our future cash flows. There is also a risk that due to regulatory changes, such as suspensions on the use of net operating losses or other unforeseen reasons, our existing net operating losses could expire or otherwise be unavailable to offset future U.S. federal and state taxable income. For these reasons, we may not be able to utilize some portion of our net operating losses even if we attain profitability.

We have not completed an ownership change analysis pursuant to the Code. If one or more ownership changes have occurred, our ability to use our net operating loss carryforwards and other tax attributes may be limited.

***Changes in U.S. and foreign tax laws could have a material adverse effect on our business, cash flow, results of operations or financial conditions.***

We are subject to tax laws, regulations and policies of the U.S. federal, state and local governments and of taxing authorities in foreign jurisdictions, including Japan, Spain, the Netherlands and Taiwan. Changes in tax laws, as well as other factors, could cause us to experience fluctuations in our tax obligations and otherwise adversely affect our tax positions and/or our tax liabilities. For example, the Organisation for Economic Co-operation and Development (OECD) has published proposals covering various international tax-related issues, including country- by-country reporting, permanent establishment rules, transfer pricing and tax treaties. Future tax reform resulting from this development may result in changes to long-standing tax principles, which could adversely affect our effective tax rate or result in higher cash tax liabilities in those countries or change the manner in which we operate our business. In addition, the Biden administration has proposed several corporate tax increases, including raising the U.S. corporate income tax rate and greater taxation of international income, which, if enacted, could adversely affect our tax liability. There can be no assurance that our tax payments, tax credits, or incentives will not be adversely affected by these or other initiatives.

**Risks Related to Ownership of Our Common Stock**

***The market price of our common stock may be volatile, which could result in substantial losses for investors in our common stock.***

The market price of our common stock is likely to be volatile and could be subject to fluctuations in response to the risk factors described in this report and others beyond our control. Some of the factors that may cause the market price of our common stock to fluctuate include:

- our ability to successfully commercialize or generate revenue from our products;
- our ability to execute on our new strategic plan successfully;
- the success of our efforts to reduce our operating costs to extend our runway;
- our ability to identify, recruit and retain skilled personnel, including a permanent Chief Executive Officer;
- the development of our products and the degree to which the timing of launch and commercialization thereof meets the expectations for securities analysts and investors and our ability to achieve market acceptance for our products;
- delays in timing of revenue from future product sales;
- commencement or termination of collaborations for our product development, drug discovery and research programs;
- failure or discontinuation of any of our product development and research programs;
- the success of existing or new competitive products, services or technologies;
- regulatory or legal developments in the United States and other countries;
- developments or disputes concerning patent applications, issued patents, other intellectual property or proprietary rights;
- the impact of COVID-19 on our business and on global economic conditions;
- the level of expenses related to any of our research programs or product development programs;
- actual or anticipated changes in our estimates as to our financial results or development timelines;
- whether our financial results, forecasts and development timelines meet the expectations of securities analysts or investors;
- announcement or expectation of additional financing efforts;
- sales of our common stock by us, our insiders, or other stockholders;
- variations in our financial results or those of companies that are perceived to be similar to us;
- changes in estimates or recommendations by securities analysts, if any, that cover our stock;
- developments with respect to our pending securities litigation and related matters;
- general economic, industry and market conditions, including the effects of inflation, war, geopolitical tensions and other political, social economic instability, such as instability stemming from the Ukraine War and related economic sanctions (and any retaliatory responses thereto); and
- the other factors described in this “Risk Factors” section.

For example, there was a significant decline in the market price for our common stock following our announcement on August 3, 2021, that we had become aware of issues with our commercial product pipeline that impact our product delivery timeline and revenue projections, no longer expect product revenue in 2021 and expect product revenue to be immaterial in 2022, and our stock price has continued to decline.

In recent years, stock markets in general and the market for technology companies (including biopharma companies) in particular have experienced significant price and volume fluctuations that have often been unrelated or disproportionate to changes in the operating performance of the companies whose stock is experiencing those price and volume fluctuations. Broad market and industry factors may seriously affect the market price of our common stock, regardless of our actual operating performance. Following periods of such volatility in the market price of a company's securities, securities class action litigation has often been brought against that company. For example, on August 4, 2021, following a significant decline in the market price for our common stock, we, certain of our officers and directors, and the underwriters of our IPO were named as defendants in a securities class action purportedly brought on behalf of purchasers of our common stock. Because of the volatility of our stock price, we expect to continue to be the target of securities litigation in the future. Securities litigation could result in substantial costs and divert management's attention and resources from our business.

***An active trading market for our common stock may not be sustained.***

Our common stock began trading on the Nasdaq Global Select Market ("Nasdaq") under the symbol "ZY" on April 22, 2021. However, we cannot assure you of the likelihood that an active trading market for our common stock will be maintained, the liquidity of any trading market, your ability to sell your shares of our common stock when desired or the prices that you may obtain for your shares.

***We do not expect to pay dividends in the foreseeable future.***

You should not rely on an investment in our common stock to provide dividend income. We do not anticipate paying any cash dividends to holders of our common stock in the foreseeable future. Instead, we plan to retain any earnings to maintain and expand our existing operations and continue to invest in commercializing our existing products, launching products in our pipeline and furthering the development of our platform and technology. In addition, the Perceptive Credit Agreement includes covenants that restrict our ability to pay cash dividends. Consequently, stockholders must rely on sales of their common stock after price appreciation, which may never occur, as the only way to realize any future gains on their investment. As a result, investors seeking cash dividends should not purchase our common stock.

***If securities or industry analysts publish negative reports about our business or cease publishing research or reports about our business, our share price and trading volume could decline.***

The trading market for our common stock depends in part on the research and reports that securities or industry analysts publish about us or our business. We do not have any control over whether analysts cover our company or for how long they cover our company. If one or more of the analysts who cover us downgrade our shares or change their opinion of our shares, our share price would likely decline. For example, several of the analysts who cover our company downgraded our shares following our announcement on August 3, 2021 that we had become aware of issues with our commercial product pipeline that impact our product delivery timeline and revenue projections, no longer expect product revenue in 2021 and expect product revenue to be immaterial in 2022. If one or more of these analysts cease coverage of our company or fail to regularly publish reports on us, we could lose visibility in the financial markets, which could cause our share price or trading volume to decline.

***Sales of a substantial number of shares of our common stock by our existing stockholders could cause the price of our common stock to decline.***

Sales of a substantial number of shares of our common stock in the public market could occur at any time. Such sales, or the perception in the market that the holders of a large number of shares of common stock intend to sell shares, could reduce the market price of our common stock.

The restrictions on transfer contained in the lock-up agreements and market standoff agreements that were in effect following our IPO have expired, and substantially all of the shares of our common stock outstanding, other than shares held by our affiliates that are subject to securities laws restrictions on resale, may be freely sold in the public market. In addition, shares issued upon the exercise or settlement of outstanding equity awards under our equity incentive plans or pursuant to future awards granted under those plans will be freely available for sale in the public market upon issuance and once vested, subject to volume limitations applicable to affiliates.

Moreover, holders of an aggregate of 68,115,459 shares of our common stock (calculated as of immediately prior to our IPO) have rights, subject to conditions, to require us to file registration statements with the SEC covering their shares or to include their shares in registration statements that we may file for ourselves or other stockholders. If any of these additional shares are sold, or if it is perceived that they will be sold, in the public market, the market price of our common stock could decline.

***We expect to need to raise additional capital to fund our operations, which we may not be able to obtain on favorable terms, or at all, and which, if obtained, may cause dilution to our stockholders or cause us to further limit our operations.***

Following our recent implementation of several cost reduction measures to better align our operating costs to our extended runway, we believe that we will have sufficient capital to support our operations to the middle of 2023. Until such time as we can generate significant revenue from product sales or other customer arrangements to fund operations, we expect to require additional capital to fund our operations, which may include seeking capital from the issuance of additional equity, debt financings or other capital-raising transactions. There can be no assurance that such additional funding will be available on terms attractive to us, or at all. Our ability to obtain additional funding will depend on variety of factors many of which are unpredictable and beyond our control, including general conditions in the global economy and in the global financial markets, which may be impacted by interruptions, delays and/or cost increases resulting from the ongoing COVID-19 pandemic, political instability or geopolitical tensions, such as the Ukraine War, economic weakness, inflationary pressures or other factors. If the equity and credit markets deteriorate, including as a result of economic weakness, a resurgence of COVID-19, political unrest or war, including the Ukraine War, or any other reason, it may make any necessary equity or debt financing more difficult to obtain in a timely manner and on favorable terms, if at all, and if obtained, it may be more costly or more dilutive. The various ways we could raise additional capital carry potential risks. If we raise funds by issuing equity securities, our shareholders would experience dilution. Any preferred equity securities issued also would likely provide for rights, preferences or privileges senior to those of holders of our common shares. If we raise funds by issuing debt or convertible debt securities, those securities would have rights, preferences and privileges senior to those of holders of our common shares. Debt and convertible debt financing and preferred equity financing, if available, would increase our fixed payment obligations and may also involve agreements that include covenants restricting our ability to take specific actions, such as incurring additional debt, selling or licensing our assets, making product acquisitions, making capital expenditures or declaring dividends. For example, the Perceptive Credit Agreement contains restrictions on our ability to purchase or dispose of assets and has other affirmative or negative covenants that impact how we run our business. If we raise funds through additional collaborations, strategic alliances or licensing arrangements with third parties, we may have to relinquish valuable rights to our intellectual property, future revenue streams, research programs or pipeline products or to grant licenses on terms that may not be favorable to us.

If we are unable to obtain adequate financing or financing on terms satisfactory to us, our ability to continue to pursue our business objectives and to respond to business opportunities, challenges or unforeseen circumstances could be significantly limited and could have a material adverse effect on our business, results of operations, prospects and financial condition.

In addition, because perceptions of our credit risk are an important factor influencing our ability to access capital and the terms of any new indebtedness, including covenants and interest rates, we could be adversely affected if our credit ratings or other third-party reports on our creditworthiness are negative, downgraded or weaker than those of our competitors. For example, certain third parties have issued negative reports regarding our business and financial risk, and any such reports or negative credit ratings could harm our ability to raise additional capital at acceptable cost and as a result adversely affect our business, prospects, results of operations and financial condition. Our existing and potential customers, partners and vendors may also consider our credit profile when considering whether to contract with us or negotiating contract terms, and if they develop a negative perception of our short- or long-term financial prospects, decide not to do business with us or change the terms on which they do business with us, it could have a further adverse effect on our business, prospects, results of operations and financial condition.

***Insiders have substantial influence over us, which could limit your ability to affect the outcome of key transactions, including a change of control.***

Our directors, executive officers, holders of more than 5% of our outstanding stock and their respective affiliates beneficially own a significant percentage of our outstanding voting stock. As a result, these stockholders, if they act together, will be able to influence our management and affairs and all matters requiring stockholder approval, including the election of directors and approval of significant corporate transactions. This concentration of ownership may have the effect of delaying or preventing a change in control of the Company and might affect the market price of our common stock.

**We are an “emerging growth company,” and the reduced disclosure requirements applicable to emerging growth companies may make our common stock less attractive to investors.**

We are an “emerging growth company” as defined in the Jumpstart Our Business Startups Act of 2012 (the “JOBS Act”). For so long as we remain an emerging growth company, we are permitted by SEC rules and plan to rely on exemptions from certain disclosure requirements that are applicable to other SEC-registered public companies that are not emerging growth companies. These exemptions include not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act of 2002, as amended, not being required to comply with the auditor requirements to communicate critical audit matters in the auditor’s report on the financial statements, reduced disclosure obligations regarding executive compensation and exemptions from the requirements of holding a nonbinding advisory vote on executive compensation and stockholder approval of any golden parachute payments not previously approved. As a result, the information we provide stockholders will be different than the information that is available with respect to other public companies. We cannot predict whether investors will find our common stock less attractive if we rely on these exemptions. If some investors find our common stock less attractive as a result, there may be a less active trading market for our common stock and our stock price may be more volatile.

In addition, the JOBS Act provides that an emerging growth company can take advantage of an extended transition period for complying with new or revised accounting standards. This allows an emerging growth company to delay the adoption of certain accounting standards until those standards would otherwise apply to private companies. We have elected to avail ourselves of the exemption regarding the timing of the adoption of accounting standards and, therefore, while we are an EGC we will not be subject to new or revised accounting standards at the same time that they become applicable to other public companies that are not EGCs.

***Delaware law and provisions in our amended and restated certificate of incorporation and bylaws might discourage, delay, or prevent a change in control of the Company or changes in our management and, therefore, depress the trading price of our common stock.***

Provisions in our amended and restated certificate of incorporation and bylaws may delay, deter or prevent a merger, acquisition or other change in control that stockholders may consider favorable, including transactions in which you might otherwise receive a premium for your shares of our common stock. These provisions may also prevent or frustrate attempts by our stockholders to replace or remove our management. Therefore, these provisions could adversely affect the price of our common stock. Among other things, our organizational documents:

- establish that our board of directors is divided into three classes, Class I, Class II and Class III, with each class serving staggered three-year terms;
- provide that our directors may be removed only for cause;
- provide that vacancies on our board of directors and any newly created directorship may be filled only by a majority of the remaining directors then in office, even though less than a quorum;
- eliminate cumulative voting in the election of directors;
- authorize our board of directors to issue shares of preferred stock and determine the price and other terms of those shares, including preferences and voting rights, without stockholder approval;
- permit stockholders to take actions only at a duly called annual or special meeting and not by unanimous written consent;
- prohibit stockholders from calling a special meeting of stockholders;
- certain litigation against us can only be brought in federal court or in Delaware and certain litigation in Delaware may require minimum ownership thresholds in order to file suit;
- require that stockholders give advance notice to nominate directors or submit proposals for consideration at stockholder meetings;
- authorize our board of directors, by a majority vote, to amend certain provisions of the bylaws; and
- require the affirmative vote of at least 66 2/3% or more of the outstanding shares of common stock entitled to vote generally in the election of directors, voting as a single class to amend many of the provisions described above.

In addition, Section 203 of the DGCL prohibits a publicly-held Delaware corporation from engaging in a “business combination” with an “interested stockholder,” which is generally a person who, together with its affiliates and associates, owns, or within the last three years has owned, 15% or more of our voting stock, for a period of three years after the date of the transaction in which the person became an interested stockholder, unless the business combination is approved in a prescribed manner. Generally, a “business combination” includes a merger, asset or stock sale or other transaction resulting in a financial benefit to the interested stockholder.

Any provision of our amended and restated certificate of incorporation, amended and restated bylaws or the DGCL that has the effect of delaying or preventing a change in control could limit the opportunity for our stockholders to receive a premium for their shares of our capital stock and could also affect the price that some investors are willing to pay for our common stock.

***Our certificate of incorporation designates the state courts in the State of Delaware as the sole and exclusive forum for certain types of actions and proceedings that may be initiated by our stockholders, which could limit stockholders' ability to obtain a favorable judicial forum for disputes with the Company and our directors, stockholders, officers and employees.***

Our amended and restated certificate of incorporation provides that the Court of Chancery of the State of Delaware will be the sole and exclusive forum for the following types of actions or proceedings under Delaware statutory or common law unless we otherwise consent in writing to an alternative forum: (i) any derivative action or proceeding brought on behalf of us; (ii) any action asserting a claim of breach of fiduciary duty owed by, or otherwise wrongdoing by, any director, stockholder, officer or other employee of our company to us or our stockholders; (iii) any action asserting a claim arising pursuant to any provision of the DGCL or our amended and restated certificate of incorporation and bylaws (as each may be amended from time to time); (iv) any action to interpret, apply, enforce or determine the validity of the Certificate of Incorporation or the Bylaws (as either may be amended from time to time); or (v) any action asserting an internal corporate claim (as defined in Section 115 of the DGCL) or a claim otherwise implicating our internal affairs (except for, as to each of (i) to (v) above, any claim as to which the Court of Chancery determines that it does not have subject matter jurisdiction or there is an indispensable party not subject to the personal jurisdiction of the Court of Chancery (and the indispensable party does not consent to the personal jurisdiction of the Court of Chancery within 10 days following such determination), or which is statutorily vested in the exclusive jurisdiction of a court other than the Court of Chancery. For the avoidance of doubt, this provision would not apply to any direct action brought to enforce a duty or liability created by the Securities Act of 1933, as amended, or any successor thereto (the "Securities Act") or the Securities Exchange Act of 1934, as amended (the "Exchange Act").

Furthermore, our amended and restated certificate of incorporation provides that unless we consent in writing to the selection of an alternative forum, the federal district courts of the United States shall be the exclusive forum for the resolution of any complaint asserting a cause of action arising under the Securities Act. Any person or entity purchasing or otherwise acquiring any interest in our shares of capital stock shall be deemed to have notice of and consented to the foregoing forum selection provisions.

Our exclusive forum provision will not relieve us of our duties to comply with the federal securities laws and the rules and regulations thereunder, and our stockholders will not be deemed to have waived our compliance with these laws, rules and regulations.

This choice of forum provision may limit a Company stockholder's ability to bring a claim in a judicial forum that stockholder finds favorable for disputes with the Company or any of our directors, officers, other employees or stockholders, which may discourage lawsuits with respect to such claims, although our stockholders will not be deemed to have waived our compliance with federal securities laws and the rules and regulations thereunder. The enforceability of similar federal court choice of forum provisions in other companies' certificates of incorporation has been challenged in legal proceedings, and it is possible that a court could find this type of provision to be inapplicable or unenforceable. If a court were to find either of the choice of forum provisions contained in our amended and restated certificate of incorporation or amended and restated bylaws to be inapplicable or unenforceable in an action, we may incur additional costs associated with resolving such action in other jurisdictions which could harm our business, results of operations and financial condition.

## Risks Related to being a Public Benefit Corporation

***Our status as a public benefit corporation may not result in the benefits that we anticipate.***

We are a public benefit corporation under the DGCL. As a public benefit corporation, we are required to have a purpose to produce a public benefit or benefits and to operate in a responsible and sustainable manner. Our public benefit, as provided in our certificate of incorporation, is: to displace the petrochemicals that pollute the Planet by designing, developing, and commercializing bio-based materials that deliver better performance than existing products, at attractive costs. We make products with broad applications and global reach that are safer for the people who manufacture them, healthier for the people who use them and better for the environment. Our directors and officers will be obligated to manage the Company in a manner that balances our stockholders' pecuniary interests, the best interests of those materially affected by our conduct and the public benefit or benefits identified in our amended and restated certificate of incorporation. There can be no assurance that we will achieve our public benefit purpose or that the expected positive impact from being a public benefit corporation will be realized, which could have a material adverse effect on our reputation, which may have a material adverse effect on our business, results of operations and financial condition.

As a public benefit corporation, we will be required to publicly disclose at least biennially a report on our overall public benefit performance and on our assessment of our success in achieving our specific public benefit purpose, including the objectives established and standards adopted by our Board of Directors and factual information based on the objectives and standards related to the promotion of the public benefits. If we are not timely or are unable to provide this report, if the report does not reflect a positive assessment based on the objectives and standards or if the report is not viewed favorably by parties doing business with us, employees, regulators or others reviewing our credentials, our reputation and status as a public benefit corporation may be harmed.

***As a public benefit corporation, our focus on a specific public benefit purpose and producing a positive effect for society may negatively influence our financial performance.***

Unlike traditional corporations, whose directors have a fiduciary duty to manage the business in a manner that focuses exclusively on maximizing stockholder value, our directors have a fiduciary duty to consider not only the stockholders' interests, but also our specific public benefit and the interests of other stakeholders affected by our actions. Therefore, we may take actions that we believe will further our specific public benefit or be in the best interests of those stakeholders materially affected by our conduct, even if those actions do not maximize our financial results or stockholder returns. While we intend for this public benefit designation and obligation to provide an overall net benefit to us and our business and stakeholders, including stockholders, it could instead cause us to make decisions and take actions without seeking to maximize the income generated from our business, and hence available for distribution to our stockholders. Our pursuit of longer-term or non-pecuniary benefits may not materialize within the timeframe we expect, or at all, and may have an immediate negative effect on any amounts available for distribution to our stockholders. Accordingly, being a public benefit corporation and complying with our related obligations could have a material adverse effect on our business, results of operations and financial condition, which in turn could cause our stock price to decline.

As a public benefit corporation, we may be less attractive as a takeover target than a traditional company would be and, therefore, your ability to realize your investment through an acquisition may be limited. Public benefit corporations may not be attractive targets for activists or hedge fund investors because new directors would still have to consider and give appropriate weight to the public benefit along with stockholder value and stockholders committed to the public benefit can enforce this through derivative suits. Further, by requiring that the board of directors of public benefit corporations consider additional constituencies other than maximizing stockholder value, Delaware public benefit corporation law could potentially make it easier for a board of directors to reject a hostile bid, even where the takeover would provide the greatest short-term financial yield to investors.

***Our directors have a fiduciary duty to consider not only our stockholders' interests, but also our specific public benefit and the interests of other stakeholders affected by our actions. If a conflict between such interests arises, there is no guarantee such a conflict would be resolved in favor of our stockholders.***

While directors of traditional corporations are required to make decisions they believe to be in the best interests of their stockholders, directors of a public benefit corporation have a fiduciary duty to consider not only the stockholders' interests, but also the specific public benefit and the interests of other stakeholders affected by the company's actions. Under the DGCL, directors are shielded from liability for breach of these obligations if they make informed and disinterested decisions that serve a rational purpose. Thus, unlike traditional corporations which must focus exclusively on stockholder value, our directors will not merely be permitted, but will be obligated, to consider our specific public benefit and the interests of other stakeholders. In the event of a conflict between the interests of our stockholders and the interests of our specific public benefit or our other stakeholders, our directors must only make informed and disinterested decisions that serve a rational purpose; thus, there is no guarantee such a conflict would be resolved in favor of our stockholders, which could have a material adverse effect on our business, results of operations and financial condition, which in turn could cause our stock price to decline.

***As a Delaware public benefit corporation, we may be subject to increased derivative litigation concerning our duty to balance stockholder and public benefit interest, the occurrence of which may have an adverse impact on our financial condition and results of operations.***

Stockholders of a Delaware public benefit corporation (if they, individually or collectively, own the lesser of 2% of our outstanding shares or \$2,000,000 in market value of our stock) are entitled to file a derivative lawsuit alleging directors failed to balance stockholder and public benefit interests. This potential liability does not exist for traditional corporations. Therefore, we may be subject to the possibility of increased derivative litigation, which would require the attention of our management, and, as a result, may adversely impact our management's ability to effectively execute our strategy. Additionally, any such derivative litigation may be costly to defend or increase director and officer liability insurance premiums, which may have an adverse impact on our financial condition and results of operations.

## General Risk Factors

***We have incurred and will continue to incur increased costs as a result of operating as a public company, and our management will be required to devote substantial time to new compliance initiatives and corporate governance practices.***

As a public company, we have incurred and, particularly after we are no longer an emerging growth company, will continue to incur significant legal, accounting and other expenses that we did not incur as a private company. Federal securities laws, including the Exchange Act, Sarbanes-Oxley Act of 2002, the Dodd-Frank Wall Street Reform and Consumer Protection Act and other applicable securities rules and regulations and the listing requirements of Nasdaq impose various requirements on public companies, including establishment and maintenance of effective disclosure and financial controls and corporate governance practices. Our management and other personnel are required to devote a substantial amount of time and resources to these compliance initiatives, potentially at the expense of other business concerns, which could harm our business, financial condition, results of operations and prospects. Moreover, these rules and regulations have increased, and may continue to increase, our legal and financial compliance costs, particularly as we have hired additional financial and accounting employees to meet public company internal control and financial reporting requirements and will make some activities more time-consuming and costly. For example, the costs of our director and officer liability insurance increased as a result of being a public company.

We continue to evaluate these rules and regulations and cannot predict or estimate the amount of additional costs we may incur or the timing of such costs. These rules and regulations are often subject to varying interpretations, in many cases due to their lack of specificity and, as a result, their application in practice may evolve over time as new guidance is provided by regulatory and governing bodies. This could result in continuing uncertainty regarding compliance matters and higher costs necessitated by ongoing revisions to disclosure and governance practices.

***As a public company, we must maintain proper and effective internal controls over financial reporting. Any failure to maintain the adequacy of these internal controls may adversely affect investor confidence in our company and, as a result, the value of our common stock.***

As a new public reporting company, we recently became subject to the rules and regulations established by the SEC and Nasdaq. These rules and regulations require, among other things, that we establish and periodically evaluate procedures with respect to our internal control over financial reporting. Reporting obligations as a public company are likely to place a considerable strain on our financial and management systems, processes and controls, as well as on our personnel, including senior management. In addition, as a public company, we will be required to document and test our internal control over financial reporting pursuant to Section 404 of the Sarbanes-Oxley Act so that our management can certify as to the effectiveness of our internal control over financial reporting. Management's initial certification under Section 404 of the Sarbanes-Oxley Act will be required with our annual report on Form 10-K for the year ending December 31, 2022. In support of such certifications, we will be required to document and make significant changes and enhancements, including potentially hiring additional personnel, to our internal control over financial reporting. Likewise, our independent registered public accounting firm will not be required to attest to the effectiveness of our internal control over financial reporting until our first annual report required to be filed with the SEC following the date we are no longer an EGC. At such time as we are required to obtain auditor attestation, if we then have a material weakness, we would receive an adverse opinion regarding our internal control over financial reporting from our independent registered accounting firm.

To achieve compliance with Section 404 within the prescribed period, we are engaged in a process to document and evaluate our internal control over financial reporting, which is both costly and challenging. In this regard, we will need to continue to dedicate internal resources, including through hiring additional financial and accounting personnel, engage outside consultants and adopt a detailed work plan to assess and document the adequacy of internal control over financial reporting, continue steps to improve control processes as appropriate, validate through testing that controls are functioning as documented and implement a continuous reporting and improvement process for internal control over financial reporting. During our evaluation of our internal control, if we identify one or more material weaknesses in our internal control over financial reporting, we will be unable to assert that our internal control over financial reporting is effective. We cannot assure you that there will not be material weaknesses or significant deficiencies in our internal control over financial reporting in the future. Any failure to maintain internal control over financial reporting could severely inhibit our ability to accurately report our financial condition, or results of operations. If we are unable to conclude that our internal control over financial reporting is effective or if our independent registered public accounting firm determines we have a material weakness or significant deficiency in our internal control over financial reporting, we could lose investor confidence in the accuracy and completeness of our financial reports, the market price of shares of our common stock could decline, and we could be subject to sanctions or investigations by Nasdaq, the SEC or other regulatory authorities. Failure to remedy any material weakness in our internal control over financial reporting or to implement or maintain other effective control systems required of public companies, could also restrict our future access to the capital markets.

***Our disclosure controls and procedures may not prevent or detect all errors or acts of fraud.***

We became a public company in April 2021 and are subject to the periodic reporting requirements of the Exchange Act. We designed our disclosure controls and procedures to reasonably assure that information we must disclose in reports we file or submit under the Exchange Act is accumulated and communicated to management and recorded, processed, summarized and reported within the time periods specified in the rules and forms of the SEC. We believe that any disclosure controls and procedures or internal controls and procedures, no matter how well-conceived and operated, can provide only reasonable, not absolute, assurance that the objectives of the control system are met. These inherent limitations include the realities that judgments in decision-making can be faulty and that breakdowns can occur because of simple error or mistake. Additionally, controls can be circumvented by the individual acts of some persons, by collusion of two or more people or by an unauthorized override of the controls. Accordingly, because of the inherent limitations in our control system, misstatements due to error or fraud may occur and not be detected.

***Our results of operations and financial condition could be materially adversely affected by changes in accounting principles.***

The accounting for our business is subject to change based on the evolution of our business model, interpretations of relevant accounting principles, enforcement of existing or new regulations and changes in policies, rules, regulations and interpretations of accounting and financial reporting requirements of the SEC or other regulatory agencies. Adoption of a change in accounting principles or interpretations could have a significant effect on our reported results of operations and could affect the reporting of transactions completed before the adoption of such change. For example, in February 2016, the Financial Accounting Standards Board issued ASU 2016-02, *Leases (Topic 842)*. We are still in the process of finalizing its evaluation of the effect of Topic 842 on our financial statements and disclosures. We estimate our total assets and total liabilities on the Consolidated Balance Sheets will increase by approximately \$150.0 million to \$155.0 million and \$187.0 million to \$192.0 million, respectively, due to the recognition of right-of-use assets and lease liabilities upon adoption, net of the impact of eliminating existing deferred rent liabilities related to its leasing arrangements. This estimated range is based on our current lease portfolio but could be impacted by changes to the lease portfolio, including the total number of leases, lease commencement and end dates and lease termination expectations, as well as changes in anticipated lease incremental borrowing rates. It is difficult to predict the impact of future changes to accounting principles and accounting policies over financial reporting, any of which could adversely affect our results of operations and financial condition and could require significant investment in systems and personnel.

**Item 1B. Unresolved Staff Comments**

None.

## Item 2. Properties

The following is a summary of our principal occupied facilities as of December 31, 2021. We lease or sublease all of our office, laboratory and warehouse facilities. These lease and sublease agreements expire at various dates between 2022 and 2033.

Location	Approximate Square Feet	Operations
Emeryville, CA	250,000	General office; laboratory; warehouse
Brisbane, CA	39,000	General office; laboratory
Cambridge and Medford, MA	33,000	General office; laboratory
New York, NY	12,000	General office; laboratory

In addition to the above-mentioned facilities, we have general office space in select U.S. and foreign locations.

We believe that our current facilities are suitable and adequate to meet our needs. However, to ensure that suitable additional space will be available to accommodate the foreseeable expansion of our operations, and further, to consolidate our Emeryville locations, we entered into a lease for new headquarters in Emeryville measuring approximately 303,000 square feet in 2019. By year-end 2022, we anticipate that only these new headquarters and one additional building will comprise our Emeryville footprint, for a total Emeryville campus of approximately 370,000 square feet. We anticipate that any leases or subleases for Emeryville locations other than these two buildings will expire by 2023 in accordance with their terms or be early terminated or subleased (subject to negotiation with our various landlords and potential subtenants).

## Item 3. Legal Proceedings

We are currently involved in and may, from time to time, become involved in legal proceedings arising in the ordinary course of our business. For example, on August 4, 2021, a putative securities class action was filed on behalf of purchasers of our common stock pursuant to or traceable to the registration statement for our IPO. The action is pending in the United States District Court for the Northern District of California, and is captioned *Shankar v. Zymergen Inc. et al.*, Case No. 3:21-cv-06028-JD. The action alleges violations of Sections 11 and 15 of the Securities Act of 1933, as amended, in connection with our IPO, names the Company, certain of our current and former officers and directors, our IPO underwriters, and certain stockholders as defendants and seeks damages in an unspecified amount, attorneys' fees, and other remedies. We intend to defend vigorously against such allegations.

On November 9, 2021, one of our purported shareholders filed a putative derivative lawsuit in the United States District Court for the Northern District of California that is captioned *Mellor v. Hoffman, et al.*, Case No. 4:21-cv-08723. The complaint names certain of our current and former officers and directors and the Company as nominal defendants based on allegations substantially similar to those in the securities class action. The complaint purports to assert claims on the Company's behalf for breach of fiduciary duty, unjust enrichment, abuse of control, gross mismanagement, corporate waste, and contribution under the federal securities laws and seeks corporate reforms, unspecified damages and restitution, and fees and costs.

In addition, certain government agencies, including the SEC, have requested information related to our August 3, 2021 disclosure. The Company is cooperating fully.

## Item 4. Mine Safety Disclosures

None.

## PART II

### **Item 5. Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities**

#### **Market Information**

Our common stock began trading on The NASDAQ Global Select Market on April 22, 2021 and trades under the symbol "ZY". Prior to such time, there was no public market for our common stock.

#### **Recent Sales of Unregistered Securities**

During the year ended December 31, 2021, we did not issue or sell any unregistered securities not previously disclosed in a Quarterly Report on Form 10-Q or in a Current Report on Form 8-K, except as described below.

- We issued to employees an aggregate of 16,810 shares upon vesting of non-vested stock issued as part of the acquisition of Radiant Genomics, Inc.
- We issued to employees and consultants an aggregate of 43,065 shares upon vesting of restricted stock units issued as part of the acquisition of Lodo Therapeutics Corporation.

#### **Use of Proceeds from Public Offering of Common Stock**

On April 21, 2021, our registration statement on Form S-1, as amended (Registration No. 333-254612), was declared effective in connection with our initial public offering. As of December 31, 2021, all of the proceeds from the initial public offering have been applied as described in our final prospectus filed with the SEC pursuant to Rule 424(b) of the Securities Act and other periodic reports previously filed with the SEC.

#### **Issuer Purchases of Equity Securities**

None.

#### **Holders of Common Stock**

As of March 18, 2022, there were 89 holders of record of 103,120,808 outstanding shares of our common stock. We believe that the number of beneficial owners of our common stock at that date was substantially greater.

#### **Securities Authorized for Issuance under Equity Compensation Plans**

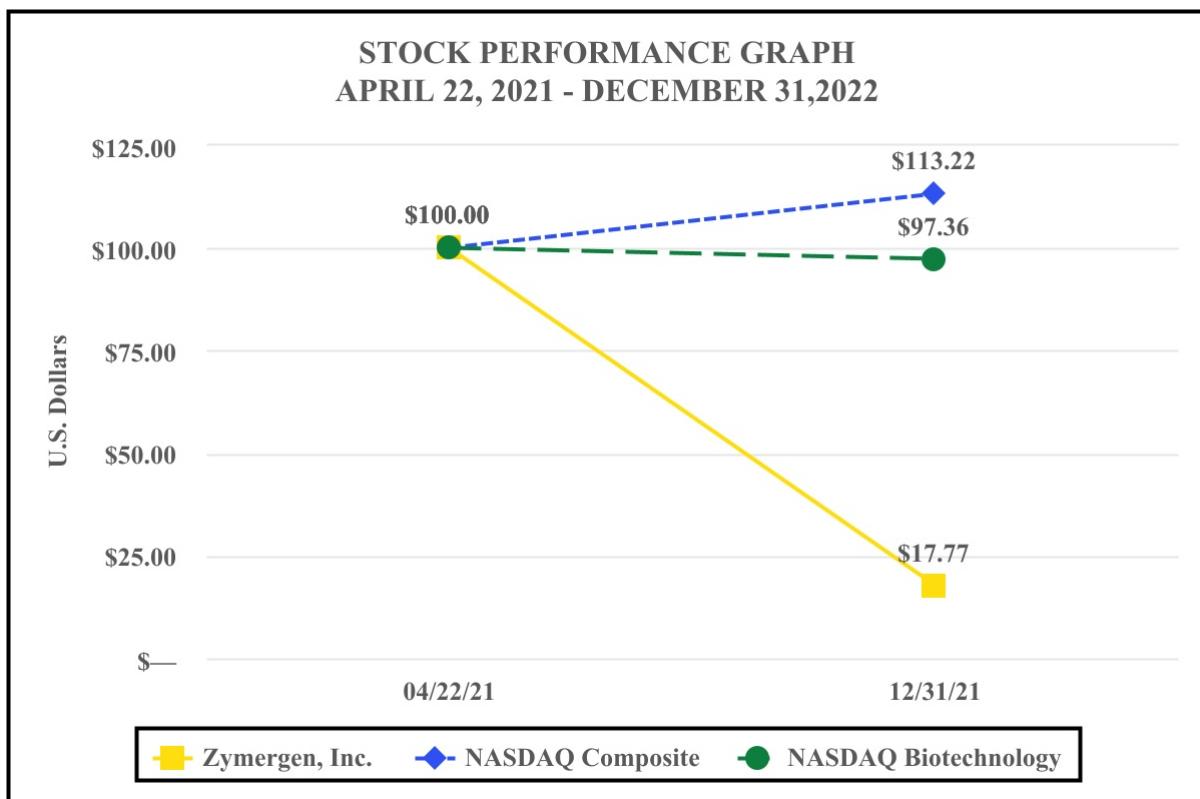
Information about our equity compensation plans is incorporated by reference to Item 12 of Part III of this Annual Report.

#### **Dividend Policy**

We have never declared or paid any cash dividends. We currently expect to retain all future earnings, if any, for use in the operation and expansion of our business, and therefore do not anticipate paying any cash dividends in the foreseeable future. In addition, the terms of the Perceptive Credit Agreement restrict our ability to pay dividends or make distributions on our common stock, and we may enter into credit agreements or other borrowing arrangements in the future that will restrict our ability to declare or pay cash dividends or make distributions on our capital stock. Any future determination regarding the declaration and payment of dividends, if any, will be at the discretion of our board of directors and will depend on then-existing conditions, including our financial condition, operating results, contractual restrictions, capital requirements, business prospects, and other factors our board of directors may deem relevant.

## Performance Graph

The following is not deemed “filed” with the Securities and Exchange Commission and is not to be incorporated by reference into any filing we make under the Securities Act of 1933, as amended, whether made before or after the date hereof and irrespective of any general incorporation by reference language in such filing. The graph below matches Zymergen Inc.’s cumulative total shareholder return on common stock from April 22, 2021 (the date our common stock commenced trading on the NASDAQ Global Select Market) through December 31, 2021, with the cumulative total returns of the NASDAQ Composite index and the NASDAQ Biotechnology index. The graph tracks the performance of a \$100 investment in our common stock and in each index (with the reinvestment of all dividends). The stock price performance in the graph is not intended to forecast or indicate future stock price performance.



## Item 6. [Reserved]

## Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations

You should read the following discussion and analysis of our financial condition and results of operations in conjunction with our Consolidated Financial Statements and related notes included in Part II, Item 8 of this Form 10-K. Discussion and analysis of our financial condition and results of operations for the years ended December 31, 2020 and 2019 can be found in the Company's Prospectus dated April 21, 2021, filed with the SEC on April 23, 2021 pursuant to Rule 424(b)(4) under the Securities Act of 1933, as amended.

In this section, the terms "we," "our," "ours," "us," and "the Company" refer collectively to Zymergen Inc. and its consolidated direct and indirect subsidiaries. This discussion contains forward-looking statements that involve risks and uncertainties reflecting our current expectations, estimates and assumptions concerning events and financial trends that may affect our future operating results or financial position. Factors that could cause or contribute to such difference include, but are not limited to, those identified below and those discussed in the section of this Form 10-K titled "Risk Factors". Forward-looking statements speak only as of the date they are made, and the Company assumes no duty to and does not undertake any obligation to update forward-looking statements. Actual results could differ materially from those anticipated in forward-looking statements and future results could differ materially from historical performance.

### Overview

We partner with Nature to design, develop and commercialize microbes, molecules, and materials for diverse end markets. Our goal is to create new products with our proprietary platform that unlocks the design and manufacturing efficiency of biological processes with technology's ability to rapidly iterate and control diverse functions. We believe our process will create better products, a better way, for a better world.

Our platform revolves around three key capabilities: our collection of accessible biomolecules, our software and data science technology and our data driven microbe optimization processes. We have one of the world's largest collections of accessible biomolecules. This physical and DNA sequence database has within it the potential to create hundreds of thousands of small molecules, millions of natural products and hundreds of millions of proteins. This provides novel starting points for the creation of interesting molecules, materials, enzymes, and potential therapeutics. Our software and data science platform informs, guides, and records our experiments forming the infrastructure for the virtuous learning cycle that continually enriches our processes. Once a promising biomolecule is selected, using our strain engineering capabilities we can work across organisms and employ numerous strategies to optimize performance, cost, and scalability to meet an unmet market need. Throughout our work, we power and scale the science with high-throughput automation.

Using our platform we are building three businesses focused on multiple markets:

1. **Advanced Materials.** Our advanced materials business seeks to employ bio-advantaged molecules or microbes to develop and deliver high performance products and is currently focused on four markets: agriculture, water repellency, advanced polymers, and healthcare. In agriculture, our most advanced product aims to improve crop nutrient uptake for significant markets, including corn, wheat, and sorghum. In the water repellency program, we are developing a family of molecules that improve the water repellency characteristics of cellulosic substrates. Our advanced polymers products include our ZYM0101 electronics film, which is being developed in partnership with Sumitomo, and use of our ZYM0102 polymer (the basis for Hyaline, which we have discontinued) for 3D printing applications. Finally, in healthcare materials, our first products are two enzymes that are critical to produce mRNA vaccines, namely 2'-O-MT and VCE.
2. **Drug Discovery.** Our drug discovery business leverages our differentiated access to natural products as a source of diverse chemical matter provided by our unified metagenomics database ("UMDB").
3. **Automation.** Our automation business offers proven automation technology to organizations interested in improving the throughput, efficiency, and reliability of their lab operations.

Our products are in various stages of development ranging from concept to pilot stage. We have not yet generated revenue from product sales (except for nominal revenue related to the sale of samples). However, most of these programs leverage data and learnings from our earlier work, which we believe enables our teams to move more quickly and precisely with each new program, and ultimately helps power our platform and make it more robust over time. For example, as part of our review of our product pipeline we researched market adjacencies for molecules we have already developed, including molecules that were the basis for Hyaline. Stemming from those efforts, we identified opportunities for using ZYM0102 polymer in high-performance 3D printing applications.

With our platform and building blocks derived from Nature, we believe we can design, develop, and manufacture high-performance products more cleanly and with less waste than traditional chemicals and materials companies. Our goal is to utilize our proprietary platform to make products that will not clog our waterways or pollute our oceans. Consumers, regulators and customers are all demanding solutions to these problems. We believe that by partnering with Nature we can make better products, a better way, for a better world.

### ***Restructure***

Since our business update on August 3, 2021, we have made significant progress on our previously announced Portfolio Review and the development of our new strategic plan. We have reorganized the company with a focus on creating a more efficient organization by eliminating leadership layers and consolidating distributed functions. As part of those efforts, we eliminated approximately 220 positions. We also established new operating systems and processes across the company, including more rigorous annual strategic planning and product development processes. Additionally, we reviewed our potential market opportunities and the related project portfolio, using a standardized evaluation process applied to current and potential market segments. This included a review of market size, addressable market, competitive profiles, product development cost, cost of goods of the final offering, cost of customer acquisition, time to market, margin profile, and development risk. As a result of our Portfolio Review, we determined to focus on a smaller number of programs that we believe capitalize on our capabilities and provide commercial opportunities. To that end, we discontinued our electronics film programs, other than ZYM0101, which is being developed in partnership with Sumitomo Chemical, because emerging data on the market segment we were targeting with Hyaline and other electronics films indicated a smaller near-term opportunity than previously expected. We also discontinued our consumer care programs, including our insect repellent, ZYM0201, because we determined through our Portfolio Review that the costs of customer acquisition with a direct-to-consumer model would have been prohibitive and, in the case of ZYM0201, it could not be produced and distributed at a price point competitive with incumbent products.

With our focus on a smaller number of programs and reduced cost structure, and with the benefit of the analyses and evaluations that we conducted through the Portfolio Review, we developed a 3-year strategic plan which details clear milestones and goals. Our plan has a multiple component framework. Our investments will prioritize near-term revenue and build a pipeline of new opportunities by investing in research. We believe this will fuel the creation of distinctive high-performing products. We have refocused our research team to work on rapid cycles of innovation and are now working across multiple categories of opportunities.

We also restructured some of our expenses, including lease expenses. We recorded restructuring costs of \$28.8 million in 2021, including \$8.7 million in severance and employee-related restructuring costs and an impairment charge of \$11.8 million with respect to certain manufacturing equipment. The restructuring activities were substantially complete as of December 31, 2021. We expect to incur additional restructuring costs which are currently estimable of approximately \$0.5 million in 2022. However, certain activities, such as lease restructuring, will extend into the first half of 2022. With this downsizing and restructuring we believe that we will have sufficient operating capital to continue to fund our operations to the middle of 2023.

## **Components of Results of Operations**

### **Revenue**

***Research and Development Service Agreements Revenue.*** To date, we have earned revenue by engaging in R&D services primarily to help our customers develop bio-based products. In addition, the R&D services provided to our customers test and validate our platform. We account for R&D service contracts when we have approval and commitment from both parties, the rights of the parties are identified, payment terms are identified, the contract has commercial substance and collectability of consideration is probable. The research term of the contracts spans typically over several quarters and the contract term for revenue recognition purposes is determined based on the customer's rights to terminate the contract for convenience. Over the longer-term, as and to the extent we grow our product sales and commercialize products, we expect revenue from R&D services to represent a smaller component of our total revenue.

***Collaboration and Other Revenue.*** Our collaboration and other revenue relates primarily to our collaboration agreement with Sumitomo Chemical. Our agreement with Sumitomo Chemical includes provision of R&D services by us through the joint innovation of certain materials and applications of strategic interest to Sumitomo Chemical. Under this arrangement R&D costs are shared equally between the parties with settlement of such amounts on a quarterly basis. Amounts received for those services are classified as collaboration revenue as those services are being rendered because those services are considered to be part of our ongoing major operations.

## **Cost of Service Revenue**

Cost of service revenue represents costs we incur to service our contract research efforts pursuant to our R&D service contracts, as well as certain costs allocable to our Sumitomo Chemical collaboration arrangement. Costs include both internal and third party fixed and variable costs including labor, materials and supplies, facilities and other overhead costs.

## **Operating Expenses**

Our operating expenses are classified in the following categories: research and development, sales and marketing and general and administrative. For each of these categories, the largest component is personnel costs, which includes salaries, employee benefit costs, bonuses and stock-based compensation expenses. We have recently implemented several measures designed to reduce our cost structure with a goal to extend our cash runway.

**Research and development.** Uncertainties inherent in the research and development of customer products preclude us from capitalizing such costs. Research and development expenses include personnel costs, the cost of consultants, materials and supplies associated with research and development projects as well as various laboratory studies. Indirect research and development costs include depreciation, amortization and other indirect overhead expenses.

**Sales and marketing.** Sales and marketing expenses consist primarily of personnel costs, costs of general marketing activities and promotional activities, travel-related expenses and other indirect overhead costs.

**General and administrative.** Our general and administrative expenses consist primarily of personnel costs for our executive, finance, corporate and other administrative functions, intellectual property and patent costs, facilities and other allocated expenses, other expenses for outside professional services, including legal, human resources, audit and accounting services and insurance costs.

**Restructuring charges.** Our restructuring charges consist primarily of costs associated with employee termination benefits, contract terminations, restructuring-related consulting fees and long-lived asset impairments.

## **Interest income**

Interest income consists of income earned from our cash, cash equivalents and short-term investments.

## **Interest expense**

Interest expense consists of interest incurred from our term loan along with the amortization of loan initiation fees, accretion of end-of-term payment and lender warrant expense.

## **Change in fair value of warrant liability**

The change in the fair value of the warrant liability is due to the change in the value of the underlying shares of Series C Preferred Stock. The change in value reflects the change in fair value of the underlying shares of Series C Preferred Stock during the applicable period.

## **Other expense, net**

Other expense, net relates to miscellaneous other income and expense and foreign currency gains and losses.

## **Provision for Income Taxes**

Provision for income taxes consists primarily of minimum tax payments at the state level and income taxes paid outside of the United States for our overseas subsidiaries. The factors that most significantly impact our effective tax rate include realizability of deferred tax assets, changes in tax laws, variability in the allocation of our taxable earnings among multiple jurisdictions, the amount and characterization of our research and development expenses, the levels of certain deductions and credits, acquisitions and licensing transactions.

We have various federal and state net operating loss carryforwards as well as federal and state research and development tax credit carryforwards. Utilization of some of the federal and state net operating loss and research and development tax credit carryforwards are subject to annual limitations due to the “change in ownership” provisions of the Internal Revenue Code of 1986 and similar state provisions. The annual limitations may result in the expiration of net operating losses and credits before utilization.

### Results of Operations for the Years Ended December 31, 2021 and 2020

The following table sets forth our results of operations for the periods (in thousands):

	Year ended December 31,		Change	
	2021	2020	\$	%
Revenues from research and development service agreements	\$ 12,414	\$ 9,788	\$ 2,626	26.8 %
Collaboration and other revenue	4,329	3,496	833	23.8 %
Total revenues	16,743	13,284	3,459	26.0 %
Cost and operating expenses:				
Cost of service revenue	69,721	84,818	(15,097)	(17.8)%
Research and development	159,120	90,852	68,268	75.1 %
Sales and marketing	23,648	18,627	5,021	27.0 %
General and administrative	83,009	60,076	22,933	38.2 %
Restructuring charges	28,808	—	28,808	n.m.
Total cost and operating expenses	364,306	254,373	109,933	43.2 %
Operating loss	(347,563)	(241,089)	(106,474)	44.2 %
Other income (expense):				
Interest income	64	492	(428)	(87.0)%
Interest expense	(14,705)	(10,960)	(3,745)	34.2 %
Gain (loss) on change in fair value of warrant liabilities	1,849	(10,229)	12,078	(118.1)%
Other expense, net	(1,379)	(457)	(922)	201.8 %
Total other expense	(14,171)	(21,154)	6,983	(33.0)%
Loss before income taxes	(361,734)	(262,243)	(99,491)	37.9 %
(Provision for) benefit from income taxes	(51)	49	(100)	(204.1)%
Net loss	<u>\$ (361,785)</u>	<u>\$ (262,194)</u>	<u>\$ (99,591)</u>	38.0 %

n.m.: Not meaningful

#### Revenue

Revenue from research and development service agreements increased by \$2.6 million, or 27%, for the year ended December 31, 2021 compared to the prior year. This increase was primarily due to the following:

- a \$3.2 million increase in revenue recognized at a point in time due to contract milestones;
- a \$1.9 million increase due to higher activity on contracts spanning 2020 and 2021;
- a \$1.4 million increase from new and acquired contracts; and
- a \$0.5 million increase as a result of temporary lab closures in 2020 due to the COVID-19 pandemic, which temporarily limited our ability to deliver R&D services to our customers.

This was offset by:

- a \$2.2 million decrease in revenue from contracts ending in 2020;
- a \$1.7 million decrease from revenue recognized at a point in time due to contract milestones in 2020; and
- a \$0.5 million decrease from contracts ending in 2021.

Collaboration and other revenue increased by \$0.8 million, or 24%, for the year ended December 31, 2021 compared to the prior year. This increase was primarily due to the increased research activity under the partnership agreement with Sumitomo Chemical.

## Cost of Revenue

Cost of service revenue decreased by \$15.1 million, or 18%, in the year ended December 31, 2021 compared to the prior year. This was primarily due to the following:

- a \$16.2 million decrease in labor costs associated with a reduction in headcount and a shift of resources from performing research and development activities for third parties to performing research and development activities on our own products. Additional decreases were driven by the reversal of accrued performance bonuses resulting from our conclusion that we would not meet certain 2021 corporate objectives established for payment of performance bonuses. These decreases were offset by the impact of salary increases that went into effect in 2021 to reflect current market trends and the impact of the acquisition of Lodo Therapeutics;
- a decrease of approximately \$2.5 million in lab consumables, mainly due to the ending of certain customer contracts in 2021. This reversed the trend observed through the nine-month period ended September 30, 2021, which had higher lab consumables in the 2021 periods compared to the corresponding 2020 periods due to the impact in 2020 of COVID-19 and resultant lab closures; and
- a decrease of approximately \$2.0 million in depreciation and software costs due to a shift of resources from performing research and development activities for third parties to performing research and development activities on our own products.

This was offset by:

- an increase of approximately \$2.3 million in allocated rent due to an expansion of our real estate footprint, including the addition of a new company headquarters, which is currently under development;
- an increase in the use of contract research resources of \$1.4 million due mainly to the engagement of contract research resources to accelerate early stage development work for a client;
- an increase of approximately \$1.3 million in stock-based compensation, partly due an increase in the fair value of the shares underlying options with service-based vesting conditions, restricted stock units (“RSUs”) issued in relation to the Lodo Therapeutics acquisition for post-acquisition services, the issuance of RSUs in connection with a retention program, and the vesting of awards under our Employee Stock Purchase Plan (the “ESPP”); and
- an increase of approximately \$0.6 million in other expenses, primarily due to an increase in insurance expenses.

## Operating Expenses

### *Research and development*

Research and development expense increased by \$68.3 million, or 75%, in the year ended December 31, 2021 compared to the prior year. The overall increase was primarily due to:

- the increase in resources allocated to our own product development from customer research and development activities, including product development work on Hyaline, our insect repellent, ZYM0201, and other products in our product pipeline. Development of Hyaline and our insect repellent, ZYM0201 were discontinued in the third quarter of 2021; and
- expenses incurred after the acquisition of Lodo Therapeutics, primarily relating to personnel and consumables;

This resulted in:

- a \$23.8 million increase in manufacturing and lab consumables and subcontractors, largely attributable to the development of ZYM0101 (optical film) and early development spend on other products as well as the development of Hyaline, ZYM0107 (optical film), and ZYM0201 (insect repellent) prior to the determination to discontinue development of those products;
- a \$15.8 million increase in labor costs due to an expansion of resources focused on research and development activities (including the Lodo personnel), and the impact of salary increases that went into effect in 2021 to reflect current market trends. This was partially offset by a reversal of accrued performance bonuses, resulting from the conclusion that we would not meet certain 2021 corporate objectives established for payment of performance bonuses; and
- a \$13.5 million increase in allocated rent due to an expansion of our real estate footprint, including the addition of a new company headquarters, which is currently under development.

In addition, there was:

- a \$7.8 million increase in depreciation attributable to new equipment and leasehold improvements that were entered into service throughout 2020 and 2021;

- an increase of approximately \$7.7 million in stock-based compensation, partly due to an increase in the fair value of the shares underlying options with service-based vesting conditions, the impact of the issuance of options with market-based vesting conditions, the vesting of awards under the ESPP, the issuance of RSUs in connection with a retention program and the impact of the RSUs issued in relation to the Lodo Therapeutics acquisition for post-acquisition services; and
- an increase of approximately \$3.9 million in other expenses, of which approximately \$2.3 million was due to an increase in insurance expenses.

This was offset by:

- a decrease in the use of contract research and manufacturing resources of \$4.2 million due mainly to the discontinuation of the development of Hyaline.

### **Sales and marketing**

Sales and marketing expense increased by \$5.0 million, or 27%, in the year ended December 31, 2021 compared to the prior year. This increase was primarily due to:

- a \$1.9 million increase in expense related to subcontractors. This was largely due to an increase in customer and brand marketing activities;
- a \$1.3 million increase in allocated rent due to an expansion of our real estate footprint, including the addition of a new company headquarters, which is currently under development;
- an increase of approximately \$1.0 million in stock-based compensation, partly due to an increase in the fair value of the shares underlying options with service-based vesting conditions, the vesting of awards under the ESPP and the issuance of RSUs in connection with a retention program;
- a \$0.5 million increase in labor costs due to the impact of salary increases that went into effect in 2021 to reflect current market trends. This was partially offset by a reversal of accrued performance bonuses, resulting from the conclusion that we would not meet certain 2021 corporate objectives established for payment of performance bonuses; and
- a \$0.3 million increase in depreciation allocations due to the addition of property and equipment.

### **General and administrative**

General and administrative expense increased by \$22.9 million or 38%, in the year ended December 31, 2021 compared to the prior year. The increase in general and administrative expenses was primarily attributable to the following:

- a \$8.8 million increase in legal, strategy, investor relations and accounting services, mainly associated with becoming and being a public company, as well as services associated with the acquisition of Lodo Therapeutics and pending litigation;
- an increase of approximately \$6.5 million in stock-based compensation, partly due to an increase in the fair value of the shares underlying options with service-based vesting conditions, an option grant made to the Acting CEO based on his assumption of that role, the issuance of RSUs in connection with a retention program and the vesting of awards under the ESPP;
- a \$6.0 million increase in rent and facilities costs. This was largely driven by an expansion of our real estate footprint, including the addition of a new company headquarters, which is currently under development;
- a \$2.2 million increase in labor costs due to hiring additional personnel to meet the requirements of being a public company and the impact of salary increases that went into effect in 2021 to reflect current market trends. This was partially offset by a reversal of accrued performance bonuses, resulting from our conclusion that we would not meet certain 2021 corporate objectives established for payment of performance bonuses and a reduction of allocation of headcount to general and administrative expense as a result of the end of temporary lab closures in 2020 due to the COVID-19 pandemic; and
- an increase of approximately \$0.9 million in other expenses, primarily due to an increase in insurance expenses.

This was offset by:

- a decrease of approximately \$1.0 million in depreciation and software costs and a decrease of approximately \$0.5 million in consumables, this was mainly due to a reduction of allocation of headcount to general and administrative expense as a result of the end of temporary lab closures in 2020 due to the COVID-19 pandemic.

### **Restructuring charges**

We recorded restructuring charges of \$28.8 million in the year ended December 31, 2021 and did not record any restructuring charges in the corresponding prior year. The restructuring charges resulted from one-time termination benefits of \$8.7 million incurred in connection with our September 2021 and October 2021 reductions in force, contract termination costs in the amount of \$3.7 million, long-lived asset impairments of \$11.8 million and restructuring-related consulting fees of \$4.6 million.

### **Interest income (expense)**

Interest income decreased by \$0.4 million, or 87%, in the year ended December 31, 2021 compared to the prior year. This decrease was primarily due to a reduction in the principal balance held in certain money market funds and in overnight deposits.

Interest expense increased by \$3.7 million or 34%, in the year ended December 31, 2021 compared to the prior year. This increase was primarily due to the October 2021 amendment of our term loan which resulted in the accretion of an end-of-term payment, additional discount amortization and acceleration of debt discount amortization.

### **Gain (loss) on change in fair value of warrant liability**

A gain on change in fair value of warrant liability of \$1.8 million was recorded in the year ended December 31, 2021, compared to a loss of \$10.2 million in the same period of the prior year, resulting from a change in the fair value of warrant liability of \$12.1 million.

The gain in the fair value of the warrant liability in the year ended December 31, 2021, was primarily due to the assumption used in the valuation of the warrants which as of March 31, 2021, used a weighted average value derived from a Black-Scholes-Merton (“BSM”) option model with a term consistent with the time to the expected IPO date as of March 31, 2021 based on the expectation that the warrant would be exercised at the IPO (conditioned upon the consummation of a public offering of our common stock on or prior to June 30, 2021) and the value derived from the option pricing model with a term consistent with the remaining term until a future liquidity event, other than the IPO scenario described above. This change in assumption led to a gain on change in fair value of warrant liability of \$2.3 million in the quarter ended March 31, 2021. In the subsequent quarter ending June 30, 2021, there was a partial reversal of the gain of \$0.4 million when the warrants were exercised in connection with the IPO in April 2021 and were at that time remeasured to their intrinsic value.

Throughout 2020, the warrant value was influenced by the change in the value of the underlying shares of Series C preferred stock which increased significantly during the year ending December 31, 2020, with the expectation, and completion, of Series D preferred stock financing, which provided a better runway for the Company to achieve its product goals. The increase in fair value of the warrant liability resulted in a loss of \$10.2 million in that period.

### **Other expense, net**

Other expense, net increased by \$0.9 million in the year ended December 31, 2021 compared to the prior year. This increase was primarily due to an unrealized loss on a currency balance following a strengthening of the U.S. Dollar primarily against the Japanese Yen.

### **Income Taxes**

Income taxes increased by \$0.1 million in the year ended December 31, 2021 compared to the prior year, this was due to the impact of the deferred tax liabilities acquired in our acquisition of enEvolv in the first quarter of 2020.

### **Liquidity, Capital Resources and Plan of Operations**

From our inception through December 31, 2021 we have incurred significant operating losses and negative cash flows from our operations as we developed our platform and products.

We have not yet generated revenue from product sales (except for nominal revenue related to the sale of samples) and expect product revenue to be immaterial in 2022. We have implemented measures to reduce our costs to extend our cash runway, including conducting two reductions in force eliminating approximately 220 positions and working to potentially restructure some of our expenses, including lease expenses. As a result of these activities we believe that we will have sufficient cash to continue to fund our operations to the middle of 2023. We expect we will need additional funds to meet operational needs and capital requirements for product development and commercialization.

## TABLE OF CONTENTS

To date, we have financed our operations primarily with proceeds from the sale of shares through our initial public offering, the sale of convertible preferred stock, proceeds from debt arrangements and revenue from R&D service and collaboration and other arrangements. We had unrestricted cash and cash equivalents as of December 31, 2021 of \$386.1 million.

Capital expenditures were \$33.4 million in the year ended December 31, 2021 and were related primarily to the purchases of laboratory equipment and facilities improvements. We expect capital expenditures to increase on an absolute dollar basis in the short term as we continue to build out our new headquarters in Emeryville, CA.

Our primary uses of capital are, and we expect will continue to be for the near future, personnel costs, product pipeline development and commercialization costs, platform development costs, laboratory and related supplies, legal, patent and other regulatory expenses and general overhead costs. We may also pursue acquisitions, investments, joint ventures and other strategic transactions.

We expect to need substantial additional funding to pursue our growth strategy and support continuing operations. Until such time as we can generate significant revenue from product sales or other customer or collaboration arrangements to fund operations, we expect to require additional capital to fund our operations, which may include capital from the issuance of additional equity, debt financings or other capital-raising transactions. We may be unable to increase our revenue, raise additional funds or enter into such other agreements or arrangements when needed on favorable terms, or at all. Our ability to obtain additional funding will depend on variety of factors many of which are unpredictable and beyond our control, including general conditions in the global economy and in the global financial markets, which may be impacted by interruptions, delays and/or cost increases resulting from the ongoing COVID-19 pandemic, political instability or geopolitical tensions, such as the Ukraine War, economic weakness, inflationary pressures, or other factors. If the equity and credit markets deteriorate, including as a result of economic weakness, a resurgence of COVID-19, political unrest or war, including the Ukraine War, or any other reason, it may make any necessary equity or debt financing more difficult to obtain in a timely manner and on favorable terms, if at all, and if obtained, it may be more costly or more dilutive. If we are unable to raise capital when needed, we will need to delay, reduce or terminate planned activities to reduce costs. Doing so will likely harm our ability to execute our business plans.

We are party to a credit and guaranty agreement with Perceptive Credit Holdings II, LP and PCOF EQ AIV II, LP (the “Perceptive Credit Agreement”), which was amended and restated in February 2021 and further amended in October 2021 (the “October 2021 Amendment”), pursuant to which the secured lender agreed to provide us with a \$100 million credit facility. As of December 31, 2021, our debt under this credit facility totaled \$50.0 million in principal amount outstanding. The Perceptive Credit Agreement carries a variable interest rate which is the sum of 9.25% plus the greater of the one-month LIBOR and 2.25%. Pursuant to the terms of the October 2021 Amendment: (i) upon execution, we paid \$41.0 million, which included \$35.0 million in principal and \$6.0 million of accrued interest and the applicable prepayment premium, (ii) we placed \$63.0 million into an account at the sole control of the lender that represents the remaining obligations under the credit agreement, including any further prepayment premium, which was released in November 2021 upon the lender's approval of our planned cash usage through final maturity, (iii) eliminated the minimum revenue covenant and increased the minimum liquidity covenant and (iv) modified the final maturity to be June 30, 2022. Upon final maturity the remaining outstanding principal and applicable prepayment premium will be due. We will be required to utilize cash that would otherwise be available to support our operations to repay this indebtedness when it becomes due, and any required repayment of our indebtedness as a result of acceleration or otherwise would lower our current cash on hand such that we would not have those funds available for use in our business or for payment of other outstanding indebtedness.

We are subject to various affirmative and negative covenants pursuant to the Perceptive Credit Agreement, and our borrowings are secured by liens on substantially all of our assets. See “*Risk Factors—The Perceptive Credit Agreement provides our secured lender with liens on substantially all of our assets, including our intellectual property, contains financial covenants and other restrictions on our actions, which may cause significant risks to our stockholders and may impact our ability to pursue certain transactions and operate our business, and provides that a material adverse change constitutes an event of default.*” As of December 31, 2021, we were in compliance with our covenants under the Perceptive Credit Agreement.

## Cash Flows

The following table summarizes our cash flows for the periods presented (in thousands):

	Year ended December 31,	
	2021	2020
Net cash used in operating activities	\$ (302,465)	\$ (223,198)
Net cash used in investing activities	\$ (32,202)	\$ (17,048)
Net cash provided by financing activities	\$ 513,756	\$ 297,014

## **Net Cash Used in Operating Activities**

The cash used in operating activities resulted primarily from our net losses adjusted for non-cash charges and changes in components of operating assets and liabilities, which are generally attributable to timing of payments, and the related effect on certain account balances, operational and strategic decisions and contracts to which we may be a party.

Net cash used in operating activities for the year ended December 31, 2021 of \$302.5 million primarily related to our net loss of \$361.8 million, adjusted for non-cash charges of \$58.4 million and net cash inflows of \$0.9 million due to changes in our operating assets and liabilities. Non-cash charges primarily consisted of depreciation and amortization of property and equipment, stock-based compensation, impairment of long-lived assets, and gain on fair value change of warrant liability. The main drivers of the changes in operating assets and liabilities were an increase of \$27.0 million in deferred rent, largely as a result of the straight-line impact of leases, particularly for the new company headquarters, along with tenant improvement allowances received in the period, and a decrease in net other assets and liabilities of \$0.5 million. These changes resulted in a cash inflow and were partially offset by cash outflows resulting from an \$23.4 million decrease in accounts payable, accrued expenses and other liabilities, an increase in inventories of \$1.1 million, mainly to address supply chain issues, a decrease in deferred revenue of \$0.9 million, an increase in prepaid expenses of \$0.7 million, mainly due to insurance costs related to being a public company, and an increase in accounts receivable (billed and unbilled) of \$0.6 million.

Net cash used in operating activities for the year ended December 31, 2020 of \$223.2 million primarily related to our net loss of \$262.2 million, adjusted for non-cash charges of \$35.0 million and net cash inflows of \$4.0 million provided by changes in our operating assets and liabilities. Non-cash charges primarily consisted of depreciation and amortization of property and equipment, stock-based compensation, and loss on fair value change of warrant liability. The main drivers of the changes in operating assets and liabilities were a \$5.9 million inflow resulting from an increase in the deferred rent balance resulting from the straight-line impact of leases, a decrease in net other assets and liabilities of \$1.5 million, a \$1.1 million increase in accounts payable, accrued expenses and other liabilities, and a \$0.6 million increase in deferred revenue. These changes resulted in a cash inflow and were partially offset by cash outflows resulting from an increase in inventories of \$2.7 million mainly to address supply chain issues, a \$1.8 million increase in prepaid expenses and an increase of \$0.5 million in accounts receivable (billed and unbilled) resulting primarily from timing differences in customer billings and cash receipts.

## **Net Cash Used in Investing Activities**

Net cash used in investing activities was \$32.2 million for the year ended December 31, 2021 and related to the purchase of property and equipment, which related to purchases of laboratory equipment and facilities improvements, and the acquisition of Lodo Therapeutics.

Net cash used in investing activities was \$17.0 million for year ended December 31, 2020 and related to the purchase of property and equipment, of which a substantial majority related to purchases of laboratory equipment and facilities improvements.

## **Net Cash Provided by Financing Activities**

Net cash provided by financing activities was \$513.8 million for year ended December 31, 2021, which consisted primarily of \$529.9 million in net proceeds from the initial public offering, \$15.0 million from the exercise of warrants to purchase shares of Series C preferred stock, \$6.7 million from the exercise of common stock options and purchases of common stock under the ESPP and \$1.9 million in proceeds from the repayment of non-recourse loans. This was partially offset by a \$41.0 million payment resulting from the October 2021 Amendment, as discussed under “*Liquidity, Capital Resources and Plan of Operations*.”

Net cash provided by financing activities was \$297.0 million for the year ended December 31, 2020, which consisted of \$294.1 million in net proceeds from the Series D preferred stock offering and \$2.9 million from the exercise of common stock options.

## **Off Balance Sheet Arrangements**

As of December 31, 2021 and 2020, we did not have any relationships with any entities or financial partnerships, such as structured finance or special purpose entities that would have been established for the purpose of facilitating off balance sheet arrangements or other purposes.

## Critical Accounting Policies and Estimates

We have prepared our financial statements in accordance with GAAP. Our preparation of these financial statements requires us to make estimates, assumptions, and judgments that affect the reported amounts of assets, liabilities, expenses, and related disclosures at the date of the financial statements, as well as revenue and expenses recorded during the reporting periods. We evaluate our estimates and judgments on an ongoing basis. We base our estimates on historical experience and on various other factors that we believe are reasonable under the circumstances, the results of which form the basis for making judgments about the carrying value of assets and liabilities that are not readily apparent from other sources. Actual results could therefore differ materially from these estimates under different assumptions or conditions.

### Revenue Recognition

Our revenue consists primarily of research and development service agreement revenue and collaboration revenue.

*Research and Development Service Agreement Revenue.* We earn revenue by engaging in R&D service contracts to help our customers improve the economics of their bio-based products. Our R&D service contracts generally consist of either fixed-fee multi-phase research terms with concurrent value-share and/or performance bonus payments based on developing an improved microbe, or milestone and royalty based payments with an upfront non-refundable fixed-fee.. Each customer may have specific requirements for end-of-phase or milestone acceptance.

We account for R&D service contracts when the contract has approval and commitment from both parties, the rights of the parties and, payment terms are identified, the contract has commercial substance and collectability of consideration is probable. R&D service contracts with customers are generally in the written form of an agreement or a binding term sheet, which outline the services we will perform to our customers, the intellectual property rights (“IP”) resulting from our services, other terms and conditions and the agreed upon price. We assess collectability based on a number of factors, including past transaction history with the same customer and creditworthiness based on qualitative and quantitative public information. We do not offer concessions or other discounts that would impact the assessment. The research term of the contracts typically spans over several quarters and the contract term for revenue recognition purposes is determined based on the customer’s rights to terminate the contract for convenience. The determination whether the termination penalty is substantial is a matter of significant judgment and directly impacts the length of the contract term and the consideration to be potentially included in the transaction price. This judgement considers the quantitative magnitude of the termination penalty and qualitative factors such as our understanding of the customer’s objectives in contracting for the R&D service.

In R&D service agreements, the customer contracts for a best effort multi-phase or milestone-based service, where we, through the services performed, create the IP which will be licensed back to the customer through the delivery of an improved microbe or natural product. Due to the substantial modification of the IP through the R&D services and the mutual interdependence between the two, R&D service agreements often result in the identification of a single combined performance obligation that is comprised of a series of distinct R&D activities that move the R&D forward in order to meet the agreement’s commercial objective.

The transaction price in a contract reflects the amount of consideration to which we expect to be entitled in exchange for goods or services transferred. R&D service agreements generally have fixed fees associated with the services provided that are earned through the initiation of another period of R&D services outlined in the customer agreement. At the start of an agreement, the transaction price usually consists of only the fixed service fees applicable to the contract term determined. Other payment types, typically consisting of performance bonuses, milestone payments or value share payments, are constrained until those payments become probable or are earned, using estimates discussed below. For contracts with acceptance clauses, we evaluate the constraint on variable consideration and do not recognize revenue for any efforts expended during the contract term until the related uncertainty of customer’s evaluation is resolved, which generally is when acceptance is received from the customer. The total transaction price is reassessed at each reporting period to determine if additional payments should be included in the transaction price.

Performance bonuses, milestone payments and value share payments are the most common type of variable consideration. Performance bonuses are paid when an improved microbe reaches a predefined performance level and can be a fixed amount or a range of payments dependent on the level of improvement in the microbe. We recognize performance bonuses either using the most likely amount or the expected value method depending on the structure of the performance bonus. We include the performance bonus payment in the transaction price once it is probable that the performance level will be achieved. Most often, we do not consider the performance bonus payments probable until the customer confirms the performance level of the microbe. This determination is usually based on a customer specific measurement. Milestones payments are generally paid upon the achievement of a contract-specific objectives. As these contract-specific objectives generally require customer acceptance, we do not consider the milestone payments probable until such acceptance is received. Value share payments are evaluated whether they meet the definition of a royalty payment. We recognize royalty revenue at the later of (a) when the related sales occur, or (b) when the performance to which some or all of the royalty has been allocated has been satisfied. If the value share payment does not meet the definition of a royalty payment, it is included in the transaction price when it becomes probable and is estimated using the expected value method.

Customers transfer licenses to us for use to perform the R&D services. As these licenses are limited in use for the research project, we do not deem them to be noncash consideration which would need to be measured at fair value and included in the transaction price. We have not adjusted the transaction price for significant financing components since the time period between the transfer of services and payment is less than one year.

Our R&D service agreements often include a single combined performance obligation; therefore, fixed fees are allocated to the single identified performance obligation. If the series guidance is applicable, we allocate variable consideration to the distinct service period that forms part of the single performance obligation identified, which is generally the corresponding time period in which the R&D services for such modified microbe were completed. If a performance obligation does not consist of distinct services but is delivered over a distinct service period, the Company will include in its transaction price the variable consideration when constraint no longer exists.

We recognize revenue over time or at a point in time. Substantially all of our revenue related to current research and development performance obligations is recognized over time, because control transfers continuously to our customers. In most R&D service agreements the customer simultaneously receives and consumes the benefits provided by our performance and we receive payment from the customer quarterly. The performance of the services enhances the value of the IP and advance development as the work is being performed. The licensing obligations requires us to convey the results of the work to the customer as the work is being performed. We recognize revenue related to these services based on the progress toward complete satisfaction of the performance obligation and measure this progress under an input method, which generally is recognized over time using time elapsed as our level of work is reasonably consistent over the determined contract term and the value of the output can vary based on the ultimate success of the R&D efforts regardless of the amount of effort towards satisfaction of the obligation we expended for any given piece of output. Under this method, progress is measured based on passage of time fulfilling the obligation (i.e., obligation to deliver a series of days of similar activities that last throughout the enforceable term). The enforceable term ranges from a quarter to several quarters (equivalent to an enforceable phase of the arrangement). When acceptance clauses are present in an agreement, we recognize the R&D service revenue at a point in time when the R&D services provided have been accepted by the customer and we have a present right for payment and no refunds are permitted.

We are often entitled to bill our customers and receive payment in advance of our obligation to provide services. In these instances, we include the amounts in deferred revenue on the Consolidated Balance Sheets.

## **Collaboration Agreements**

We have certain partnership agreements that are within the scope of ASC 808, Collaborative Arrangements, which provides guidance on the presentation and disclosure of collaborative arrangements. Generally, the classification of the transactions under the collaborative arrangements is determined based on the nature of contractual terms of the arrangement, along with the nature of the operations of the participants. Our collaborative agreements generally include provision of R&D services to develop novel materials to be commercialized by the collaborative partner and us. Amounts received for those services are classified as Collaboration revenue in the Consolidated Statement of Operations and Comprehensive Loss as those services are being rendered because those services are considered to be part of our ongoing major operations.

## **Stock-Based Compensation**

Our stock-based compensation is accounted for in accordance with the provisions issued by the Accounting Standard Codification principles for stock compensation and share-based arrangements. Under the fair value recognition provisions of this statement, stock-based compensation expense is estimated at the grant date based on the fair value of the award and is recognized as an expense ratably over the requisite service period of the award, taking into consideration actual forfeitures. Determining the appropriate fair value and calculating the fair value of stock-based awards requires judgment, including estimating stock price volatility, risk free interest rates, expected dividends and expected life. We estimate the fair value of stock options with service-based vesting conditions and employee stock purchase plan purchases on the date of grant using the Black-Scholes-Merton option-valuation model. The grant-date fair value of option awards is based upon the fair value of our common stock as of the date of grant, as well as estimates of the expected term of the awards, expected common stock price volatility over the expected term of the option awards, risk-free interest rates and expected dividend yield. RSUs granted are valued at the market price of our common stock on the date of grant.

### ***Options with Market-based Vesting Conditions***

We estimate the fair value of stock options with a market-based vesting condition on the date of grant using a model based on multiple stock price paths developed through the use of a Monte Carlo simulation that incorporates into the valuation the possibility that the market condition may not be satisfied. The assumptions for stock price volatility, contractual term, dividend yield, and stock price used in the Monte Carlo simulations are determined using the same methodology as described above. The exception is that with respect to the stock price volatility used for the Monte Carlo simulations, we took into consideration the capital structure of each comparable company comprising the benchmark to isolate each comparable company's equity volatility without the effect of leverage and then re-levered using our capital structure. Additionally, we utilized an assumption for cost of capital in the Monte Carlo simulation that relied on market data due to the lack of our own publicly traded stock price history. The Monte Carlo simulation also calculates a derived service period for each of the vesting tranches, which is the measure of the expected time to achieve the market conditions. We recognize the cost of these options by accounting for each tranche as a discrete award and recognizing the cost over the requisite service period with respect to each award using the accelerated attribution method, regardless of whether the market conditions are achieved. We determine the requisite service period by comparing the derived service period to achieve the market-based condition and the implicit service-based condition, if any, using the longer of the two service periods as the requisite service period.

### ***Determination of the fair value of common stock on grant dates***

The estimated fair values of the shares of our common stock underlying options granted prior to the date of our IPO were determined by members of our board of directors as of the grant date, with input from management, considering our most recently available independent third-party valuation of our common stock and our directors' assessment of additional objective and subjective factors that it believed were relevant and which may have changed between the effective date of the most recent valuation and the date of the grant. Following the consummation of the IPO, the fair market value of our common stock is determined based on the quoted market price of our common stock. Prior to the IPO independent third-party valuations have generally been performed quarterly in accordance with the guidance outlined in the AICPA Practice Aid, Valuation of Privately-Held Company Equity Securities Issued as Compensation or AICPA's Practice Aid. In conducting the valuations, the independent third-party valuation specialist considered all objective and subjective factors that it believed to be relevant for each valuation conducted in accordance with AICPA's Practice Aid, including management's best estimate of our business condition, prospects and operating performance at each valuation date. Other significant factors included:

- the rights, preferences and privileges of our preferred stock as compared to those of our common stock, including the liquidation preferences of our preferred stock;
- our results of operations, financial position and the status of R&D efforts;
- arms-length transactions involving recent rounds of preferred stock financings;
- the composition of, and changes to, our management team and board of directors;
- the lack of liquidity of our common stock;
- our stage of development and business strategy and the material risks related to our business and industry;
- the valuation of publicly traded companies in relevant industry sectors, as well as recently completed mergers and acquisitions of peer companies;
- any external market conditions affecting relevant industry sectors;
- the likelihood of achieving a liquidity event, such as an initial public offering, or IPO, or a sale of our company, given prevailing market conditions; and
- the state of the IPO market for similarly situated privately held comparable companies.

In valuing our common stock, the fair value of our business was determined using various valuation methods, including combinations of income approach (discounted cash flow method) and market approach (public company market multiple method) with input from management. We also used the option pricing model to backsolve the value of the security from our most recent round of financing, which implies a total equity value as well as a per share common stock value, when applicable for the valuation date. The income approach involves applying an appropriate risk-adjusted discount rate to projected cash flows based on forecasted revenues and costs. The market approach estimates value based on a comparison of the subject company to comparable public companies in a similar line of business. From the comparable companies, a representative market value multiple was determined, which was applied to our operating results to estimate the enterprise value of our company.

Once the enterprise value was determined under the market approach, we used the option pricing model to allocate that value among the various classes of securities to arrive at the fair value of the common stock.

In addition, we also considered any secondary transactions involving our capital stock. In our evaluation of those transactions, we considered the facts and circumstances of each transaction to determine the extent to which they represented a fair value exchange. Factors considered include transaction volume, timing, whether the transactions occurred among willing and unrelated parties and whether the transactions involved investors with access to our financial information.

### **Accruals and Estimates**

As part of the process of preparing our Consolidated Financial Statements, we accrue expenses as of each balance sheet date. This process involves communicating with our personnel to identify services that have been performed on our behalf and estimating the level of service performed and the associated cost incurred for the service when we have not yet been invoiced or otherwise notified of the actual cost. We make estimates of our accrued expenses as of each balance sheet date based on facts and circumstances known to us at that time. The estimates in our accrued research and development expenses include the costs incurred for services performed by our vendors in connection with R&D activities for which we have not yet been invoiced. We periodically confirm the accuracy of our estimates with the service providers and adjust if necessary.

In accruing service fees, we estimate the time period over which services will be performed and the level of effort to be expended in each period. If the actual timing of the performance of services or the level of effort varies from our estimate, we adjust the accrual or prepaid expense accordingly. Advance payments for goods and services that will be used in future R&D activities are expensed when the activity has been performed or when the goods have been received rather than when the payment is made.

Although we do not expect our estimates to be materially different from amounts actually incurred, if our estimates of the status and timing of services performed differ from the actual status and timing of services performed, it could result in us reporting amounts that are too high or too low in any particular period. To date, there have been no material differences between our estimates of such expenses and the amounts actually incurred.

### **Goodwill and Acquired Intangible Assets**

Goodwill is not amortized, but is evaluated for impairment annually, or whenever events or changes in circumstances indicate that the carrying value may not be recoverable. We perform a goodwill impairment test annually in the fourth quarter. We have determined that there is a single reporting unit for the purpose of conducting this goodwill impairment assessment. Goodwill impairment is recognized when the carrying value of goodwill exceeds the implied fair value of the Company. For the year ended December 31, 2021, no impairment losses were recorded.

Intangible assets acquired in a business combination are recorded at their estimated fair values at the date of acquisition. We amortize acquired definite-lived intangible assets over their estimated useful lives based on the pattern of consumption of the economic benefits or, if that pattern cannot be readily determined, on a straight-line basis.

### **Business Combinations**

We utilize the acquisition method of accounting for business combinations and allocate the purchase price of an acquisition to the various tangible and intangible assets acquired and liabilities assumed based on their estimated fair values. We primarily establish fair value using the income approach based upon a discounted cash flow model. The income approach requires the use of many assumptions and estimates including future revenue and expenses, as well as discount factors and income tax rates. Other estimates include:

- Estimated step-ups or write-downs for fixed assets;
- Estimated fair values of intangible assets; and
- Estimated liabilities assumed from the target

While we use our best estimates and assumptions as part of the purchase price allocation process to accurately value assets acquired and liabilities assumed at the business acquisition date, these estimates and assumptions are inherently uncertain and subject to refinement. As a result, during the purchase price allocation period, which is generally no more than one year from the business acquisition date, we may record adjustments to the assets acquired and liabilities assumed, with the corresponding offset to goodwill. Business combinations also require us to estimate the useful life of certain intangible assets that we acquire, and this estimate requires significant judgment.

### **JOBS Act Accounting Election**

In April 2012, the Jumpstart Our Business Startups Act, or the JOBS Act, was enacted. As an emerging growth company, or EGC, under the JOBS Act, we may delay the adoption of certain accounting standards until such time as those standards apply to private companies. Other exemptions and reduced reporting requirements under the JOBS Act for EGCs include an exemption from the requirement to provide an auditor's report on internal controls over financial reporting pursuant to Section 404(b) of the Sarbanes-Oxley Act of 2002, an exemption from any requirement that may be adopted by the Public Company Accounting Oversight Board regarding mandatory audit firm rotation and less extensive disclosure about our executive compensation arrangements. We have elected to avail ourselves of the exemption regarding the timing of the adoption of accounting standards and, therefore, while we are an emerging growth company we will not be subject to new or revised accounting standards at the same time that they become applicable to other public companies that are not EGCs.

### **Recently Issued Accounting Pronouncements**

Refer to Note 2 of our Consolidated Financial Statements and related notes included in Part II, Item 8 of this Form 10-K for recently adopted accounting pronouncements and new accounting pronouncements not yet adopted.

## **Item 7A. Quantitative and Qualitative Disclosures About Market Risk**

### **Interest Rate Risk**

We are exposed to market risk related to changes in interest rates. Our primary exposure to market risk is interest rate sensitivity, which is affected by changes in the general level of U.S. interest rates, particularly because our cash equivalents are primarily invested in short-term U.S. Treasury obligations, and our term loan bears interest at a variable rate.

Our term loan bears a variable interest rate which is the sum of 9.25% plus the greater of the one-month LIBOR and 2.25%. Accordingly, increases in LIBOR could increase our interest payments under the term loan. An increase of 100 basis points in the interest rate of the term loan would not have a material impact on our financial position or results of operations.

### **Foreign Currency Risk**

We are not currently exposed to significant market risk related to changes in foreign currency exchange rates; however, we have contracted with and may continue to contract with foreign vendors and hold cash balances in certain foreign currencies. Our operations may be subject to fluctuations in foreign currency exchange rates in the future.

**Item 8. Financial Statements and Supplementary Data**

	<b>Page</b>
<a href="#"><u>Report of Independent Registered Public Accounting Firm</u></a> (PCAOB ID: 42)	88
<a href="#"><u>Consolidated Balance Sheets</u></a>	89
<a href="#"><u>Consolidated Statements of Operations and Comprehensive Loss</u></a>	90
<a href="#"><u>Consolidated Statements of Changes in Convertible Preferred Stock and Stockholders' Equity (Deficit)</u></a>	91
<a href="#"><u>Consolidated Statements of Cash Flows</u></a>	92
<a href="#"><u>Notes to Consolidated Financial Statements</u></a>	94
<a href="#"><u>1. Nature of Operations</u></a>	94
<a href="#"><u>2. Summary of Significant Accounting Policies</u></a>	95
<a href="#"><u>3. Business Combinations</u></a>	104
<a href="#"><u>4. Restructuring</u></a>	105
<a href="#"><u>5. Goodwill and Intangible Assets</u></a>	106
<a href="#"><u>6. Fair Value Measurements of Financial Instruments</u></a>	107
<a href="#"><u>7. Balance Sheet Components</u></a>	108
<a href="#"><u>8. Term Loans</u></a>	109
<a href="#"><u>9. Preferred Stock</u></a>	110
<a href="#"><u>10. Common Stock</u></a>	111
<a href="#"><u>11. Income Taxes</u></a>	115
<a href="#"><u>12. Net Loss Per Share</u></a>	117
<a href="#"><u>13. Revenue, Credit Concentrations and Geographic Information</u></a>	118
<a href="#"><u>14. Collaborative Agreement</u></a>	120
<a href="#"><u>15. Commitments and Contingencies</u></a>	120
<a href="#"><u>16. Subsequent Events</u></a>	121

## **Report of Independent Registered Public Accounting Firm**

To the Stockholders and the Board of Directors of Zymergen Inc.

### **Opinion on the Financial Statements**

We have audited the accompanying consolidated balance sheets of Zymergen Inc. (the Company) as of December 31, 2021 and 2020, the related consolidated statements of operations and comprehensive loss, changes in convertible preferred stock and stockholders' equity (deficit) and cash flows for each of the three years in the period ended December 31, 2021, and the related notes (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2021 and 2020, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2021, in conformity with U.S. generally accepted accounting principles.

### **Basis for Opinion**

These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's financial statements based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. As part of our audits we are required to obtain an understanding of internal control over financial reporting but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion.

Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ Ernst & Young LLP

We have served as the Company's auditor since 2015.

Redwood City, California

March 29, 2022

**ZYMERGEN INC.**  
**CONSOLIDATED BALANCE SHEETS**  
*(in thousands, except share and per share data)*

	As of December 31, 2021	As of December 31, 2020
<b>ASSETS</b>		
Current assets:		
Cash and cash equivalents	\$ 386,105	\$ 210,205
Accounts receivable	520	2,516
Accounts receivable, unbilled	2,565	1,659
Prepaid expenses	7,818	7,024
Inventories	6,035	4,969
Restricted cash, current	2,105	—
Other current assets	2,201	2,201
Total current assets	407,349	228,574
Restricted cash	9,849	9,605
Property and equipment, net	53,799	48,718
Goodwill	40,645	11,604
Intangible assets, net	8,529	4,790
Other long-term assets	2,225	1,630
Total assets	<u>\$ 522,396</u>	<u>\$ 304,921</u>
<b>LIABILITIES AND CONVERTIBLE PREFERRED STOCK AND STOCKHOLDERS' EQUITY (DEFICIT)</b>		
Current liabilities:		
Accounts payable	\$ 5,418	\$ 12,097
Accrued and other liabilities	17,496	26,888
Short-term debt, net	43,953	79,331
Short-term deferred rent	2,218	494
Deferred revenue	4,468	2,648
Total current liabilities	73,553	121,458
Long-term deferred rent	35,390	9,916
Warrant liabilities	—	14,231
Other long-term liabilities	4,967	2,254
Total liabilities	<u>113,910</u>	<u>147,859</u>
Commitments and contingencies		
Convertible preferred stock, \$0.001 par value, no shares authorized as of December 31, 2021 and 214,181,024 shares authorized as of December 31, 2020, respectively; no shares issued and outstanding as of December 31, 2021 and 68,093,280 shares issued and outstanding as of December 31, 2020	—	900,798
Stockholders' equity (deficit)		
Preferred stock, \$0.001 par value, 170,000,000 authorized as of December 31, 2021 and no shares authorized as of December 31, 2020, respectively; no shares issued and outstanding as of December 31, 2021 and December 31, 2020, respectively	—	—
Common stock, \$0.001 par value, 1,500,000,000 and 286,477,669 shares authorized as of December 31, 2021 and December 31, 2020, respectively; 103,045,299 and 12,812,109 shares issued and outstanding as of December 31, 2021 and December 31, 2020, respectively	103	13
Additional paid-in capital	1,543,908	29,991
Accumulated deficit	(1,135,525)	(773,740)
Total stockholders' equity (deficit)	408,486	(743,736)
Total liabilities and convertible preferred stock and stockholders' equity (deficit)	<u>\$ 522,396</u>	<u>\$ 304,921</u>

The accompanying notes are an integral part of these Consolidated Financial Statements.

**ZYMERGEN INC.**  
**CONSOLIDATED STATEMENTS OF OPERATIONS AND**  
**COMPREHENSIVE LOSS**  
*(in thousands, except share and per share data)*

	Year ended December 31,		
	2021	2020	2019
Revenues from research and development service agreements	\$ 12,414	\$ 9,788	\$ 13,234
Collaboration and other revenue	4,329	3,496	2,185
Total revenues	16,743	13,284	15,419
Cost and operating expenses:			
Cost of service revenue	69,721	84,818	102,640
Research and development	159,120	90,852	50,717
Sales and marketing	23,648	18,627	24,138
General and administrative	83,009	60,076	61,247
Restructuring charges	28,808	—	—
Loss on lease termination	—	—	13,790
Total cost and operating expenses	364,306	254,373	252,532
Operating loss	(347,563)	(241,089)	(237,113)
Other income (expense):			
Interest income	64	492	4,921
Interest expense	(14,705)	(10,960)	(2,943)
Gain (loss) on change in fair value of warrant liabilities	1,849	(10,229)	—
Loss on extinguishment of debt	—	—	(1,810)
Other income (expense), net	(1,379)	(457)	150
Total other expense	(14,171)	(21,154)	318
Loss before income taxes	(361,734)	(262,243)	(236,795)
(Provision for) benefit from income taxes	(51)	49	(8)
Net loss and comprehensive loss	\$ (361,785)	\$ (262,194)	\$ (236,803)
Net loss per share attributable to common stockholders, basic	\$ (4.87)	\$ (21.46)	\$ (21.94)
Net loss per share attributable to common stockholders, diluted	\$ (4.89)	\$ (21.46)	\$ (21.94)
Weighted average shares used in computing net loss per share to common stockholders, basic	74,226,964	12,217,889	10,791,734
Weighted average shares used in computing net loss per share to common stockholders, diluted	74,305,802	12,217,889	10,791,734

The accompanying notes are an integral part of these Consolidated Financial Statements.

**ZYMERGEN INC.**  
**CONSOLIDATED STATEMENTS OF CHANGES IN CONVERTIBLE PREFERRED STOCK AND STOCKHOLDERS'**  
**EQUITY (DEFICIT)**  
*(in thousands, except share data)*

	Convertible Preferred Stock		Common Stock		Additional Paid-in Capital	Accumulated Deficit	Total Stockholders' Equity (Deficit)
	Shares	Amount	Shares	Amount			
Balance, December 31, 2018	54,068,726	\$ 591,330	10,592,060	\$ 11	\$ 7,058	\$ (274,743)	\$ (267,674)
Issuance of Series C Preferred Stock, net of issuance costs of \$67	765,443	12,933	—	—	—	—	—
Vesting of Series C Preferred Stock issued for services	—	3,500	—	—	—	—	—
Vesting of restricted common stock	—	—	67,241	—	—	—	—
Issuance of common stock upon exercise of options	—	—	371,515	—	999	—	999
Stock-based compensation expense	—	—	—	—	4,012	—	4,012
Interest on non-recourse loan to employees	—	—	—	—	(112)	—	(112)
Net loss	—	—	—	—	—	(236,803)	(236,803)
Balance, December 31, 2019	54,834,169	\$ 607,763	11,030,816	\$ 11	\$ 11,957	\$ (511,546)	\$ (499,578)
Issuance of Series D preferred stock, net of issuance costs of \$3,000	13,259,111	293,035	—	—	—	—	—
Issuance of common stock in business acquisition	—	—	1,082,747	1	10,394	—	10,395
Vesting of restricted common stock	—	—	67,240	—	—	—	—
Issuance of common stock upon exercise of options	—	—	631,306	1	2,926	—	2,927
Stock-based compensation expense	—	—	—	—	4,829	—	4,829
Interest on non-recourse loan to employees	—	—	—	—	(115)	—	(115)
Net loss	—	—	—	—	—	(262,194)	(262,194)
Balance, December 31, 2020	68,093,280	\$ 900,798	12,812,109	\$ 13	\$ 29,991	\$ (773,740)	\$ (743,736)
Issuance of common stock upon initial public offering, net of commission and issuance costs of \$45,138	—	—	18,549,500	19	529,878	—	529,897
Issuance of preferred stock upon exercise of Series C Preferred Stock warrants	883,332	27,384	—	—	—	—	—
Conversion of preferred stock into common stock	(68,976,612)	(928,182)	68,998,791	69	928,113	—	928,182
Issuance of common stock upon exercise of warrants	—	—	226,880	—	—	—	—
Issuance of common stock in business acquisition	—	—	774,402	1	24,808	—	24,809
Share settlement of non-recourse loan to employee	—	—	(67,050)	—	—	—	—
Cash settlement of non-recourse loan to employee	—	—	—	—	1,946	—	1,946
Vesting of restricted common stock	—	—	67,240	—	—	—	—
Vesting of restricted stock units, net	—	—	51,065	—	(20)	—	(20)
Issuance of common stock upon exercise of options	—	—	1,483,560	1	6,676	—	6,677
Stock-based compensation expense	—	—	—	—	21,311	—	21,311
Issuance of common stock pursuant to ESPP purchases	—	—	148,802	—	1,254	—	1,254
Other	—	—	—	—	(49)	—	(49)
Net loss	—	—	—	—	—	(361,785)	(361,785)
Balance, December 31, 2021	—	\$ —	103,045,299	\$ 103	\$ 1,543,908	\$ (1,135,525)	\$ 408,486

The accompanying notes are an integral part of these Consolidated Financial Statements.

**ZYMERGEN INC.**  
**CONSOLIDATED STATEMENTS OF CASH FLOWS**  
*(in thousands)*

	Year ended December 31,		
	2021	2020	2019
<b>Operating activities</b>			
Net loss	\$ (361,785)	\$ (262,194)	\$ (236,803)
Adjustments to reconcile net loss to net cash used in operating activities:			
Depreciation and amortization expense	20,695	18,707	15,199
Stock-based compensation expense	21,311	4,829	4,012
Non-cash interest expense	5,622	1,021	1,054
Loss on lease termination	—	—	13,790
Impairment of long-lived assets	11,815	—	—
Issuance of preferred stock for services rendered	—	—	3,500
Loss on debt extinguishment	—	—	1,810
(Gain) loss on change in fair value of warrant liabilities	(1,849)	10,229	—
Unrealized foreign exchange loss	886	—	—
Benefit from income tax	(11)	(49)	—
Other	(65)	250	(175)
Changes in operating assets and liabilities:			
Accounts receivable	1,098	504	2,173
Accounts receivable, unbilled	(1,723)	(1,042)	(107)
Prepaid expenses	(650)	(1,819)	(2,273)
Inventories	(1,066)	(2,741)	(907)
Other current assets	320	(387)	(906)
Other long-term assets	18	12	309
Accounts payable	(8,726)	(4,442)	344
Accrued and other liabilities	(14,688)	5,565	668
Deferred revenue	(883)	601	(376)
Deferred rent	27,044	5,870	3,130
Other long-term liabilities	172	1,888	—
Net cash used in operating activities	<u>(302,465)</u>	<u>(223,198)</u>	<u>(195,558)</u>
<b>Investing activities</b>			
Purchases of property and equipment	(33,440)	(17,166)	(22,852)
Proceeds from sale of property and equipment	—	38	—
Business acquisition, net of cash acquired	1,238	80	—
Net cash used in investing activities	<u>(32,202)</u>	<u>(17,048)</u>	<u>(22,852)</u>
<b>Financing activities</b>			
Proceeds from initial public offering, net of commission and issuance cost	529,897	—	—
Proceeds from exercise of Series C warrants	15,002	—	—
Proceeds from repayment of non-recourse loan to employee	1,946	—	—
Proceeds from Series C preferred stock offering, net of issuance cost	—	—	12,933
Proceeds from Series D preferred stock offering, net of issuance cost	—	294,087	—
Proceeds from long-term debt, net of offering cost	—	—	82,242
Proceeds from exercise of common stock options, net of repurchases	6,677	2,927	999
Proceeds from ESPP	1,254	—	—
Tax withholding for net share settlements of RSUs	(20)	—	—
Payments on debt	(41,000)	—	(45,349)
Payments on build-to-suit property obligations	—	—	(13,224)
Net cash provided by financing activities	513,756	297,014	37,601
Effect of exchange rate changes on cash	<u>(840)</u>	<u>—</u>	<u>—</u>
Change in cash and cash equivalents	178,249	56,768	(180,809)
Cash, cash equivalents, and restricted cash at beginning of the period	219,810	163,042	343,851
Cash, cash equivalents, and restricted cash at end of the period	<u>\$ 398,059</u>	<u>\$ 219,810</u>	<u>\$ 163,042</u>
Cash and cash equivalents	\$ 386,105	\$ 210,205	\$ 143,589
Restricted cash, current	2,105	—	10,105
Restricted cash, non-current	9,849	9,605	9,348
Total cash, cash equivalents, and restricted cash shown in the statement of cash flows	<u>\$ 398,059</u>	<u>\$ 219,810</u>	<u>\$ 163,042</u>

The accompanying notes are an integral part of these Consolidated Financial Statements.



**ZYMERGEN INC.**  
**CONSOLIDATED STATEMENTS OF CASH FLOWS**  
*(in thousands)*

	Year ended December 31,		
	2021	2020	2019
Supplemental disclosure of cash flow information:			
Cash paid during the period for interest	\$ 9,925	\$ 9,449	\$ 1,680
Supplemental disclosure of non-cash investing and financing activities:			
Conversion of preferred shares to common stock	\$ 928,182	\$ —	\$ —
Exercise of warrant liability into preferred stock	\$ 12,382	\$ —	\$ —
Share settlement of non-recourse loan to employee	\$ 1,946	\$ —	\$ —
Issuance of common stock upon cashless exercise of warrants	\$ 749	\$ —	\$ —
Issuance of common stock in business combination	\$ 24,769	\$ 10,395	\$ —
Acquisitions of property and equipment under accounts payable and accrued and other liabilities	\$ 5,196	\$ 4,129	\$ 5,590
Deferred offering costs related to initial public offering under accounts payable and accrued and other liabilities	\$ —	\$ 509	\$ —
Deferred offering costs related to Series D preferred stock under accounts payable and accrued and other liabilities	\$ —	\$ 1,052	\$ —
Warrants issued in connection with debt	\$ —	\$ —	\$ 4,002

The accompanying notes are an integral part of these Consolidated Financial Statements.

**ZYMERGEN INC.**  
**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

## **1. Nature of Operations**

Zymergen (the “Company”) integrates computational and manufacturing technologies to design, develop, and commercialize bio-based breakthrough products in a broad range of industries. The Company has developed a platform based on its collection of accessible biomolecules, its software and data science technology and its data driven microbe optimization processes. In addition, the Company’s platform is used to discover novel molecules used to enable unique material properties. Utilizing its platform Zymergen is building three businesses focused on advanced materials, drug discovery and automation. The Company was incorporated in Delaware on April 24, 2013.

### ***Initial Public Offering***

In April 2021, the Company completed the initial public offering (“IPO”) of its common stock. The Company sold an aggregate of 18,549,500 shares of its common stock (inclusive of 2,419,500 shares pursuant to the underwriters’ option to purchase additional shares) at a price of \$31.00 per share for aggregate cash proceeds of approximately \$529.9 million, net of underwriting discounts, commissions, and offering costs. The sale of 16,130,000 shares in the IPO and the sale of 2,419,500 shares pursuant to the underwriters’ option closed on April 26, 2021. On April 26, 2021, immediately prior to the closing of the IPO, all outstanding shares of convertible preferred stock converted into 68,115,459 shares of common stock. On April 26, 2021, immediately prior to the closing of the IPO, all warrants to purchase preferred stock were exercised into preferred stock and then converted into 883,332 shares of common stock.

### ***Need for Additional Capital***

The Company has sustained operating losses and expects to continue to generate operating losses for the foreseeable future. The Company had unrestricted cash and cash equivalents of \$386.1 million as of December 31, 2021. Since inception through December 31, 2021, the Company has incurred cumulative net losses of \$1.1 billion.

While the Company has signed a number of initial customer R&D services and collaboration contracts, revenues have been insufficient to fund operations. Accordingly, the Company has funded the portion of operating costs exceeding revenues through a combination of proceeds raised from equity and debt issuances (including from its recent IPO). The Company’s operating costs include the cost of developing and commercializing products, costs associated with restructuring (Note 4), as well as providing research and development services. As a consequence, the Company expects it will need to raise additional equity or debt financing to fund future operations. The Company’s ability to obtain additional funding will depend on variety of factors many of which are unpredictable and beyond the Company’s control, including general conditions in the global economy and in the global financial markets, which may be impacted by interruptions, delays and/or cost increases resulting from the ongoing COVID-19 pandemic, political instability or geopolitical tensions, such as the Ukraine War, economic weakness or inflationary pressures. As a result of these, or any other circumstances, if the equity and credit markets deteriorate, it may make any necessary equity or debt financing more difficult to obtain in a timely manner and on favorable terms, if at all, and if obtained, it may be more costly or more dilutive. The Company expects that its cash and cash equivalents will be sufficient to fund its operations for a period of at least one year from the date the accompanying Consolidated Financial Statements are filed with the Securities and Exchange Commission (“SEC”).

### ***Impact of COVID-19***

The Company cannot at this time predict the specific extent, duration, or full impact that the ongoing COVID-19 pandemic will have on its financial condition and operations. The impact of the COVID-19 pandemic on the financial performance of the Company will depend on future developments, including the duration and spread of the pandemic and related governmental advisories and restrictions. These developments and the continuing impact of the COVID-19 pandemic on the financial markets and the overall economy are highly uncertain. If business conditions, financial markets and/or the overall economy continue to be impacted, the Company’s results may be adversely affected.

### ***Reverse Split***

In April 2021, the Company’s Board of Directors approved a 3-for-1 reverse split (“Reverse Split”) of its common stock and convertible preferred stock. This became effective on April 13, 2021 with the filing of the Company’s amended and restated certificate of incorporation. The par value of the common stock and convertible preferred stock was not adjusted as the result of the Reverse Split. All share and per share information has been retroactively adjusted to reflect the Reverse Split for all periods presented.

**ZYMERGEN INC.**  
**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

## **2. Summary of Significant Accounting Policies**

### ***Basis of Presentation***

The accompanying Consolidated Financial Statements have been prepared in accordance with accounting principles generally accepted in the United States of America (“U.S. GAAP”). The Company has reclassified certain prior year amounts to conform with current period presentation.

### ***Principles of Consolidation***

These Consolidated Financial Statements include the accounts of the Company and its wholly-owned subsidiaries. All intercompany balances and transactions have been eliminated upon consolidation.

### ***Fiscal Year***

The Company’s fiscal year ends on December 31. References to fiscal 2021, for example, refer to the fiscal year ended December 31, 2021.

### ***Use of Estimates***

The presentation of financial statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenue and expenses during the reporting period. These estimates include, but are not limited to, standalone selling price (“SSP”) of performance obligations for contracts with multiple performance obligations, estimate of variable consideration from revenue contracts, useful life of property and equipment, fair value of property and equipment of which the carrying value may not be recoverable, allowance for doubtful accounts, net realizable value of inventories, the valuation of intangible assets, and the valuation of common and preferred stock used in the valuation of options to purchase common stock and warrants to purchase common stock or preferred stock, prior to being a publicly traded company. Actual results could differ from those estimates.

### ***Segment Information***

Operating segments are identified as components of an enterprise about which discrete financial information is available for evaluation by the chief operating decision-maker (“CODM”) in deciding resource allocation and assessing performance. The Company’s Acting Chief Executive Officer is its CODM. The Company’s CODM reviews financial information presented on a consolidated basis for the purposes of making operating decisions, allocating resources and evaluating financial performance. Consequently, the Company has determined it operates and manages its business in one operating and one reportable segment. Substantially all of the Company’s assets are located in the U.S. See Note 13 for the Company’s revenue by country.

### ***Foreign Currency***

For the Company and its subsidiaries, the functional currency has been determined to be the U.S. Dollar (USD). Monetary assets and liabilities denominated in foreign currency are remeasured at period-end exchange rates. Non-monetary assets and liabilities denominated in foreign currencies are remeasured at historical rates. Foreign currency transaction gains and losses resulting from remeasurement are recognized in Other income (expense), net in the Consolidated Statements of Operations and Comprehensive Loss.

### ***Cash, Cash Equivalents, and Restricted Cash***

The Company considers all highly liquid investments with an original maturity of three months or less at the time of purchase and all money market funds with a nominally stable value per share to be cash equivalents. Cash equivalents are carried at cost, which approximates their fair value. Restricted cash is generally related to certain lease agreements, in which the Company entered into letters of credit. Cash deposits held by our financial institution as collateral for our letters of credit under these agreements are included in restricted cash on the Consolidated Balance Sheets. This balance is not legally restricted as to their withdrawal but rather serve as a compensating balance arrangement for the aforementioned letters of credit and as such their withdrawal would be a violation of the terms of the letters of credit provided by the financial institution. The Company had restricted cash of \$12.0 million and \$9.6 million as of December 31, 2021 and 2020, respectively.

**ZYMERGEN INC.**  
**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

***Accounts Receivable***

Accounts receivable represent amounts billed to customers for revenue that has not yet been collected. Accounts receivable are presented net of allowances for doubtful accounts. The Company performs ongoing credit evaluations of its customers' financial condition and does not require collateral from them. Receivables considered uncollectible are charged against the allowance account in the year they are deemed uncollectible. Management does not believe that an allowance for doubtful accounts is needed as of December 31, 2021 and 2020 based on review of credit worthiness of the customers and their payment histories. Unbilled receivables represent the revenue for work performed which has not yet been invoiced to the customer and includes the estimates for variable consideration earned.

***Inventories***

Inventories, which consist of various types of lab supplies, are stated at the lower of cost or net realizable value using the weighted average cost method. The Company assesses the valuation of its inventories and reduces the carrying value of those inventories that are obsolete or in excess of the Company's forecasted usage to their estimated net realizable value. If the Company determines that the cost of inventories exceeds its estimated net realizable value, the Company records a write-down equal to the difference between the cost of inventories and the estimated net realizable value. If the future demand for the Company's services and products is less favorable than the Company's forecasts, the value of the inventories may be required to be reduced, which could result in additional expense to the Company and affect its results of operations.

***Property and Equipment***

Property and equipment are recorded at cost and are depreciated over their estimated useful lives. Major additions and betterments are charged to property and equipment accounts while maintenance and repairs are charged to operations as incurred. When assets are retired or otherwise disposed of, the cost and accumulated depreciation and amortization are removed from the balance sheet and any resulting gains and losses are included as a component of Total costs and operating expenses in the Statements of Operations in the year of disposal. Interest related to the construction of assets is capitalized when the financial statement effect is material and interest is being incurred. Interest capitalization ends at the earlier of the asset being substantially complete and ready for its intended use or when interest costs are no longer being incurred.

Depreciation on property and equipment is recorded using the straight-line method over estimated useful lives as follows:

	Life (in years)
Computers and software	2 to 3
Furniture and office equipment	4
Machinery and equipment	4 to 5
Leasehold improvements	Shorter of term of lease or useful life
Construction in progress	Not applicable

***Business Combinations***

Business combinations are accounted for using the acquisition method of accounting. Under the acquisition method, assets acquired, including intangible assets, and liabilities assumed are recorded at their respective fair values as of the acquisition date in our Consolidated Financial Statements. The excess of the fair value of consideration transferred over the fair value of the net assets acquired is recorded as goodwill.

***Goodwill and Acquired Intangible Assets***

Goodwill is not amortized, but is evaluated for impairment annually, or whenever events or changes in circumstances indicate that the carrying value may not be recoverable. The Company performs a goodwill impairment test annually in the fourth quarter. The Company has determined that there is a single reporting unit for the purpose of conducting this goodwill impairment assessment. Goodwill impairment is recognized for the amount that the carrying value of the reporting unit, including goodwill, exceeds the reporting unit's fair value. The loss recognized cannot exceed the total amount of goodwill allocated to the reporting unit. For the years ended December 31, 2021, 2020, and 2019, respectively, no impairment losses were recorded.

**ZYMERGEN INC.**  
**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

Intangible assets acquired in a business combination are recorded at their estimated fair values at the date of acquisition. The Company amortizes acquired definite-lived intangible assets over their estimated useful lives based on the pattern of consumption of the economic benefits or, if that pattern cannot be readily determined, on a straight-line basis. For the years ended December 31, 2021, 2020, and 2019, respectively, no impairment losses were recorded.

#### ***Impairment of Long-Lived Assets***

The Company evaluates its long-lived assets for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. Recoverability of assets to be held and used is assessed by a comparison of the carrying amount of an asset to future net undiscounted cash flows expected to be generated by the asset. If such assets are considered to be impaired, the impairment to be recognized is measured as the amount by which the carrying amount of the assets exceeds the fair value of the assets. For the year ended December 31, 2021 the Company recorded an impairment loss of \$11.8 million related to certain machinery and equipment (Note 7). For the years ended December 31, 2020 and 2019, no impairment losses were recorded.

#### ***Deferred Offering Cost***

The Company capitalizes certain legal, professional accounting and other third-party fees that are directly associated with in-process financings as deferred offering costs, until such financings are consummated. After consummation of an equity financing, these costs are recorded as a reduction of the proceeds from the offering, either as a reduction to the carrying value of the preferred stock or in stockholder's deficit as a reduction of additional paid-in capital generated as a result of the offering. Should the in-process equity financing be abandoned, the deferred offering costs will be expensed immediately as a charge to Operating expenses in the Consolidated Statements of Operations and Comprehensive Loss. The Company had no deferred offering costs recorded as of December 31, 2021 and \$0.5 million as of December 31, 2020.

#### ***Revenue Recognition***

##### ***Revenues from research and development service agreements***

The Company primarily earns revenue by engaging in R&D service contracts to help its customers improve the economics of their bio-based products and through collaborative arrangements with partners to develop novel materials to be commercialized by the collaborative partner and the Company. The Company's R&D service contracts generally consist of either fixed-fee multi-phase research terms with concurrent value-share and/or performance bonus payments based on developing an improved microbial strain, or milestone and royalty based payments with an upfront non-refundable fixed-fee. Each customer may have specific requirements for end-of-phase or milestone acceptance.

The Company accounts for R&D service contracts when it has approval and commitment from both parties, the rights of the parties and payment terms are identified, the contract has commercial substance and collectability of consideration is probable. R&D service contracts with customers are generally in the written form of an agreement or a binding term sheet, which outline the services the Company will perform to its customers, the intellectual property rights ("IP") resulting from the Company's services, other terms and conditions and the agreed upon price. The Company assesses collectability based on a number of factors, including past transaction history with the same customer and creditworthiness based on qualitative and quantitative public information. The Company does not offer concessions or other discounts that would impact the assessment. The research term of the contracts typically spans several quarters and the contract term for revenue recognition purposes is determined based on the customer's rights to terminate the contract for convenience.

In R&D service agreements, the customer contracts for best effort services to be delivered generally over one to four phases, where the Company through the services performed creates the IP which will be licensed back to the customer through the delivery of an improved microbial strain or natural product. Due to the substantial modification of the IP through the R&D services and the mutual interdependence between the two, most R&D service agreements result in the identification of single combined performance obligation that is comprised of distinct R&D activities that move the R&D forward in order to meet the agreement's commercial objective. A majority of the contracts have short term phases that result in a "go" or "no go" decision for continuation to the next phase. That decision is based on the results of the R&D from that respective phase. The Company evaluates whether the services delivered are subject to the series guidance. If applicable, progress is measured based on passage of time fulfilling the obligation to deliver the services through a series of similar daily activities throughout each phase. The transaction price includes fixed-fee payments only for the phase in which the Company is operating.

**ZYMERGEN INC.**  
**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

Other payment types, typically consisting of performance bonuses, milestone payments or value share payments, are constrained until those payments become probable or are earned, using estimates discussed below. For contracts with acceptance clauses, the Company evaluates the constraint on variable consideration and do not recognize revenue for any efforts expended during the contract term until the related uncertainty of customer's evaluation is resolved, which generally is when acceptance is received from the customer. The total transaction price is reassessed at each reporting period to determine if additional payments should be included in the transaction price.

Performance bonuses, milestone payments and value share payments are the most common type of variable consideration. Performance bonuses are paid when an improved microbial strain reaches a predefined performance level and can be a fixed amount, or a range of payments dependent on the level of improvement in the strain. The Company recognizes performance bonuses either using the most likely amount or the expected value method depending on the structure of the performance bonus. The Company includes the performance bonus payment in the transaction price once it is probable that the performance level will be achieved. Most often, the Company does not consider the performance bonus payments probable until the customer confirms the performance level of the microbe. This determination is usually based on customer specific measurement. Milestones payments are generally paid upon the achievement of a contract-specific objectives. As these contract-specific objectives generally require customer acceptance, the Company does not consider the milestone payments probable until such acceptance is received. Value share payments are evaluated whether they meet the definition of a royalty payment. The Company recognizes royalty revenue at the later of (a) when the related sales occur, or (b) when the performance to which some or all of the royalty has been allocated has been satisfied. If the value share payment does not meet the definition of a royalty payment, it is included in the transaction price when it becomes probable and is estimated using the expected value method.

Customers transfer licenses to the Company for use to perform the R&D services. As these licenses are limited in use for the research project, the Company does not deem them to be noncash consideration which would need to be measured at fair value and included in the transaction price. The Company has not adjusted the transaction price for significant financing components since the time period between the transfer of services and payment is less than one year.

Most R&D service agreements include a single combined performance obligation; therefore, fixed fees are allocated to the single identified performance obligation. If the series guidance is applicable, the Company allocates variable consideration to the distinct service period that forms part of the single performance obligation identified, which is generally the corresponding time period in which the R&D Services for such modified strain were completed. If a performance obligation does not consist of distinct services but is delivered over a distinct service period, the Company will include in its transaction price the variable consideration when constraint no longer exists.

The Company recognizes revenue over time or at a point in time. Substantially all of the Company's revenue related to current research and development performance obligations is recognized over time, because control transfers continuously to our customers. In most R&D service agreements the customer simultaneously receives and consumes the benefits provided by the Company's performance and the Company receives payment from the customer quarterly. The performance of the services enhances the value of the IP and advances its development as the work is being performed. Licensing obligations require the Company to convey the results of the work to the customer as the work is being performed. The Company recognizes revenue related to these services based on the progress toward complete satisfaction of the performance obligation and measures this progress under an input method, which generally is recognized over time using time elapsed as the Company's level of work is reasonably consistent over the determined contract term and the value of the output can vary based on the ultimate success of the R&D efforts regardless of the amount of effort towards satisfaction of the obligation the Company expended.

When acceptance clauses are present in an agreement, the Company recognizes the R&D service revenue at a point in time when the R&D services provided have been accepted by the customer and the Company has a present right for payment and no refunds are permitted.

The Company is often entitled to bill its customers and receive payment in advance of its obligation to provide services. In these instances, the Company includes the amounts in deferred revenue on the Consolidated Balance Sheets.

**ZYMERGEN INC.**  
**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

### ***Collaboration Agreements***

The Company has certain partnership agreements that are within the scope of Financial Accounting Standards Board ("FASB") Accounting Standards Codification ("ASC") 808, Collaborative Arrangements, which provides guidance on the presentation and disclosure of collaborative arrangements. Generally, the classification of the transactions under the collaborative arrangements is determined based on the nature of contractual terms of the arrangement, along with the nature of the operations of the participants. Our collaborative agreements generally include provision of research and development services by the Company. Amounts received for those services are classified as collaboration revenue in the Consolidated Statements of Operations and Comprehensive Loss as those services are being rendered because those services are considered to be part of the Company's ongoing major operations.

### ***Cost of Service Revenue***

Research and development expenses related to the Company's research and development agreements represent costs incurred by the Company to service its contract research efforts. Costs include both internal and third party fixed and variable costs including materials and supplies, labor, facilities, and other overhead costs.

### ***Research and Development Expenses***

Uncertainties inherent in the research and development of customer products preclude the Company from capitalizing such costs. Research and development expenses include salaries and related costs of research and development personnel, including stock-based compensation expense, and the cost of consultants, materials and supplies associated with research and development projects as well as various laboratory studies. Indirect research and development costs include depreciation, amortization, and other indirect overhead expenses.

### ***Income Taxes***

We account for income taxes under the assets and liability method; under this method, deferred tax assets and liabilities are determined based on differences between financial reporting and tax reporting bases of assets and liabilities and are measured using enacted tax rates and laws that are expected to be in effect when the differences are expected to reverse. Realization of deferred tax assets is dependent upon future earnings, the timing and amount of which are uncertain. Deferred income tax assets are reduced, as necessary, by a valuation allowance when we determine it is more likely than not that some or all of the tax benefits will not be realized. The Company considers all available evidence, both positive and negative, including historical levels of income, expectations and risks associated with estimates of future taxable income and ongoing tax planning strategies in assessing the need for a valuation allowance.

We utilize a two-step approach to recognize and measure uncertain tax positions. The first step is to evaluate the tax position for recognition by determining if the weight of available evidence indicates that it is more likely than not that the position will be sustained upon tax authority examination, including resolution of related appeals or litigation processes, if any. The second step is to measure the tax benefit as the largest amount that is more than 50% likely of being realized upon ultimate settlement. Although the Company believes that it has adequately reserved for its uncertain tax positions (including net interest and penalties), it can provide no assurance that the final tax outcome of these matters will not be materially different. The Company makes adjustments to these reserves when facts and circumstances change, such as the closing of a tax audit or the refinement of an estimate. To the extent that the final tax outcome of these matters is different from the amounts recorded, such differences will affect the provision for income taxes in the period in which such determination is made and could have a material impact on its financial position, results of operations, and cash flows.

### ***Comprehensive Loss***

U.S. GAAP establishes standards for the reporting and disclosure of comprehensive loss and its components in the accompanying financial statements. For the years ended December 31, 2021, 2020, and 2019, respectively, the Company had no items of comprehensive loss and, therefore, has not included a separate statement of comprehensive loss in the accompanying financial statements.

**ZYMERGEN INC.**  
**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

***Net Loss per Share***

Basic net income or loss per share attributable to common stockholders is presented in conformity with the two-class method required for participating securities. Basic earnings per share is calculated as income (loss) available to common stockholders, divided by the weighted average number of common shares outstanding during the period. If the effect is dilutive, participating securities are included in the computation of basic earnings per share. The Company considered all series of its convertible preferred stock to be participating securities as they were entitled to receive noncumulative dividends prior and in preference to any dividends on shares of common stock. Due to the Company's net losses, there was no impact on the loss per share calculation in applying the two-class method since the participating securities had no legal obligation to share in any losses. The Company analyzes the potential dilutive effect of stock options, non-vested stock, RSUs, stock issuable under the ESPP, and warrants under the treasury stock method (as applicable), during periods of income, or during periods in which income is recognized related to changes in fair value of its liability-classified securities.

***Leases***

At the inception of a lease, the Company evaluates the lease agreement to determine whether the lease is an operating, capital or build-to-suit lease using the criteria in ASC 840, Leases.

Certain lease agreements also require the Company to make additional payments for taxes, insurance, and other operating expenses incurred during the lease period, which are expensed as incurred.

***Operating Leases***

For operating leases, the Company recognizes rent expense on a straight-line basis over the lease term and records the difference between cash rent payments and the recognition of rent expense as a deferred liability. Where lease agreements contain rent escalation clauses, rent abatements and/or concessions, such as rent holidays, the Company applies them on a straight-line basis over the lease term. Tenant improvement allowances are recorded as a deferred rent liability and are amortized over the term of the lease as a reduction to rent expense.

***Build-to-Suit Leases***

In certain lease arrangements, the Company is involved in the construction of the building. To the extent the Company is involved with the structural improvements of the construction project or takes construction risk prior to the commencement of a lease, ASC 840-40, Leases – *Sale-Leaseback Transactions* (Subsection 05-5), requires the Company to be considered the owner for accounting purposes of these types of projects during the construction period. Therefore, the Company records an asset in Property and equipment, net on the Consolidated Balance Sheets, including capitalized interest costs, for the replacement cost of the pre-existing building plus the amount of estimated construction costs and tenant improvements incurred by the landlord and the Company as of the balance sheet date. The Company records a corresponding build-to-suit lease obligation on its Consolidated Balance Sheets representing the amounts paid by the lessor.

Once construction is completed, the Company considers the requirements for sale-leaseback accounting treatment, including evaluating whether all risks of ownership have been transferred back to the landlord, as evidenced by a lack of continuing involvement in the leased property. If the arrangement does not qualify for sale-leaseback accounting treatment, the building asset remains on the Company's Consolidated Balance Sheets at its historical cost, and such asset is depreciated over its estimated useful life. The Company bifurcates its lease payments into a portion allocated to the building and a portion allocated to the parcel of land on which the building has been built. The portion of the lease payments allocated to the land is treated for accounting purposes as operating lease payments, and therefore is recorded as rent expense in the Consolidated Statements of Operations and Comprehensive Loss. The interest rate used for the build-to-suit lease obligation represents the Company's estimated incremental borrowing rate at inception of the lease. The initial recording of these assets and liabilities is classified as non-cash investing activity, for purposes of the Consolidated Statements of Cash Flows.

***Concentration of Credit Risk***

The Company maintains cash balances at one financial institution. Funds are insured by the Federal Deposit Insurance Corporation ("FDIC") up to \$250 thousand. The Company maintains cash balances in excess of amounts insured by the FDIC and concentrated within a limited number of financial institutions. The Company has not experienced any losses related to these balances, and management believes its risk to be minimal. See Note 13 for the Company's concentrations of revenue and billed accounts receivable by customer.

**ZYMERGEN INC.**  
**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

**Costs Associated with Exit Activities**

We account for employee termination benefits that represent a one-time benefit in accordance with FASB ASC 420, Exit or Disposal Cost Obligations (Topic 420). We record such costs into expense over the employee's future service period, if any. Other costs associated with exit activities may include contract termination costs, impairments of long-lived assets, and consulting fees, if applicable. These costs are expensed in accordance with FASB ASC Topic 420 and FASB ASC Topic 360, Property, Plant, and Equipment and are included in Restructuring charges in the Consolidated Statements of Operations and Comprehensive Loss.

**Stock-Based Compensation**

The Company's stock-based compensation for employees and non-employees is accounted for in accordance with the provisions issued by the Accounting Standard Codification principles for stock compensation and share-based arrangements. Under the fair value recognition provisions of this statement, stock-based compensation expense is estimated at the grant date based on the fair value of the award and is recognized as an expense ratably over the requisite service period of the award, taking into consideration actual forfeitures. Determining the appropriate fair value and calculating the fair value of stock-based awards requires judgment, including estimating stock price volatility, risk free interest rates, expected dividends, and expected life.

The Company estimates the fair value of stock options with a service-based vesting condition and employee stock purchase plan purchases on the date of grant using the Black-Scholes-Merton ("BSM") option-valuation model. The Company estimates the fair value of stock options with a market-based vesting condition on the date of grant using a Monte Carlo simulation model. The grant-date fair value of option awards is based upon the fair value of our common stock as of the date of grant, as well as estimates of the expected term of the awards using the simplified method for service-based vesting awards or the implied term for the market-based awards, expected common stock price volatility over the expected term of the option awards, risk-free interest rates and expected dividend yield. Restricted Stock Units ("RSUs") granted are valued at the market price of our common stock on the date of grant.

**Contingencies**

The Company is subject to various litigation and arbitration claims that arise in the ordinary course of business, including but not limited to those related to employee matters. Some of these proceedings involve claims that are subject to substantial uncertainties and unascertainable damages. The Company makes a provision for a liability when it is both probable that a liability has been incurred and the amount of the loss can be reasonably estimated. The Company has determined that no provision for liability nor disclosure is required related to any claim against the Company when: (a) there is not a reasonable possibility that a loss exceeding amounts already recognized (if any) may be incurred with respect to such claim; (b) a reasonably possible loss or range of loss cannot be estimated; or (c) such estimate is immaterial.

**CARES Act**

On March 27, 2020, the U.S. government enacted the Coronavirus Aid, Relief and Economic Security (CARES) Act which, among other things, permits the deferral of the employer's portion of social security tax payments between March 27, 2020 and December 31, 2020. As of December 31, 2021 and December 31, 2020, respectively, approximately \$3.7 million of employer payroll tax payments were deferred with 50% settled in January 2022 and the remaining 50% due by December 31, 2022. Additionally, the CARES Act provides an employee retention credit ("CARES Employee Retention credit"), which is a refundable tax credit against certain employment taxes of up to \$5,000 per employee for eligible employers. The tax credit is equal to 50% of qualified wages paid to employees during a quarter, capped at \$10,000 of qualified wages per employee through year end. The Company qualifies for the tax credit and adopted a policy to recognize the CARES Employee Retention credit when earned and to offset the credit against the related expenditure. Accordingly, during the fiscal year ended December 31, 2020, the Company recorded \$1.3 million related to the CARES Employee Retention credit in the Company's Consolidated Statement of Operations and Comprehensive Loss.

**ZYMERGEN INC.**  
**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

***Accounting Pronouncements Adopted***

In August 2018, the FASB issued ASU 2018-15, *Customer's Accounting for Implementation Costs Incurred in a Cloud Computing Arrangement That Is a Service Contract*, an amendment to the accounting guidance on cloud computing service arrangements that changes the accounting for implementation costs incurred in a cloud computing arrangement that is a service contract. The update aligns the requirements for capitalizing implementation costs incurred in a hosting arrangement that is a service contract with the requirements for capitalizing implementation costs incurred to develop or obtain internal-use software. The guidance also requires an entity to expense the capitalized implementation costs of a hosting arrangement that is a service contract over the term of the hosting arrangement. This guidance is effective for the Company for fiscal years beginning after December 15, 2020, and interim periods within annual periods beginning after December 14, 2021. The Company adopted the new standard effective January 1, 2021 using a prospective transition method. The adoption did not have a material impact on the Consolidated Financial Statements.

In November 2018, the FASB issued ASU 2018-18, *Collaborative Arrangements (Topic 808)*, which discusses the interaction between Topic 808, Collaborative Arrangements and Topic 606, Revenue from Contracts with Customers, including clarification around certain transactions between collaborative arrangement participants, adding unit-of-account guidance to Topic 808 and require that transactions in a collaborative arrangement where the participant is not a customer not be presented together with revenue recognized under Topic 606. This standard is effective for the Company for annual periods beginning after December 15, 2020, and interim periods within fiscal years beginning after December 15, 2021. Early adoption is permitted but an entity may not adopt the amendments earlier than its adoption date of Topic 606. The Company adopted the new standard effective January 1, 2021 using a retrospective transition method. The adoption did not have a material impact on the Consolidated Financial Statements.

In October 2021, the FASB issued ASU 2021-08, *Business Combinations (Topic 805): Accounting for Contract Assets and Contract Liabilities from Contracts with Customers*, requires the Company to recognize and measure contract assets and contract liabilities acquired in a business combinations in accordance with Topic 606 as if it had originated the contracts. The amendments of ASU 2021-08 are effective for the Company for fiscal years beginning after December 15, 2023 with early adoption permitted, including adoption in an interim period. The Company adopted ASU 2021-08 in the fourth quarter of 2021, with a retrospective application to the beginning of 2021. Adoption of this guidance, as applied to the acquisition of Lodo Therapeutics Corporation on May 16, 2021, resulted in the recognition of (i) approximately \$6.9 million in additional deferred revenue in its Consolidated Balance Sheets, with a corresponding increase in Goodwill as of the acquisition date, (ii) and approximately \$0.8 million of additional revenues from Research and development service agreements in its Consolidated Statements of Operations for the fiscal year 2021.

**ZYMERGEN INC.**  
**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

**Recent Accounting Pronouncements Not Yet Adopted**

In February 2016, the FASB issued ASU 2016-02, Leases (Topic 842), ("ASU 2016-02"). Under ASU 2016-02, a lessee will be required to recognize assets and liabilities for leases with lease terms of more than twelve months. Recognition, measurement, and presentation of expenses and cash flows arising from a lease by a lessee primarily will depend on its classification as a finance or operating lease. ASU 2016-02 will require both types of leases to be recognized on the balance sheet. The ASU also will require disclosures to help investors and other financial statement users better understand the amount, timing, and uncertainty of cash flows arising from leases. These disclosures include qualitative and quantitative requirements, providing additional information about the amounts recorded in the financial statements.

The Company has completed its initial assessment of the impact of Topic 842 on the Company's financial statements, including its evaluation of key policy elections. The Company intends to implement Topic 842 on January 1, 2022 using the modified retrospective approach with the cumulative effect of adoption recognized to retained earnings on January 1, 2022. Under this method, the Company is allowed to record a cumulative-effect adjustment to the opening balance of retained earnings in the period of adoption and not restate prior periods. Additionally, the Company expects to elect the transitional practical expedients such that the Company will not reassess whether contracts are leases and will retain lease classification and initial direct costs for leases existing prior to the adoption of the new standard. The Company also expects to make the following transitional practical expedients elections: (1) elect the short term lease exception, (2) not elect hindsight and (3) elect to not separate its nonlease components for its real estate leases. The Company is still in the process of finalizing its evaluation of the effect of Topic 842 on the Company's financial statements and disclosures. The Company estimates its total assets and total liabilities on the Consolidated Balance Sheets will increase by approximately \$150.0 million to \$155.0 million and \$187.0 million to \$192.0 million, respectively, due to the recognition of right-of-use assets and lease liabilities upon adoption, net of the impact of eliminating existing deferred rent liabilities related to its leasing arrangements. This estimated range is based on the Company's current lease portfolio but could be impacted by changes to the lease portfolio, including the total number of leases, lease commencement and end dates and lease termination expectations, as well as changes in anticipated lease incremental borrowing rates. The Company does not expect the adoption of ASU 2016-02, as amended, to have a material impact to the Company's Consolidated Statements of Operations or Consolidated Statements of Cash Flows.

In June 2016, the FASB issued ASU 2016-13, *Credit losses (Topic 326)*, subsequently amended by ASU 2019-10, which sets forth a "current expected credit loss" model which requires the Company to measure all expected credit losses for financial instruments held at the reporting date based on historical experience, current conditions, and reasonable supportable forecasts. This replaces the existing incurred loss model and is applicable to the measurement of credit losses on financial assets measured at amortized cost. The standard will become effective for the Company for fiscal years beginning after December 15, 2022. Early adoption is permitted. The Company is currently evaluating the impact the adoption of this standard will have on its financial statements and related disclosures.

In December 2019, the FASB issued ASU 2019-12, *Income Taxes (Topic 740): Simplifying the Accounting for Income Taxes*, which is intended to simplify various aspects related to accounting for income taxes. ASU 2019-12 removes certain exceptions to the general principles in Topic 740 and clarifies and amends existing guidance to improve consistent application. This pronouncement is effective for the Company for fiscal years beginning after December 15, 2021, and for interim periods within fiscal years beginning after December 15, 2022, with early adoption permitted. The Company is evaluating the effect of adopting this new accounting guidance but does not expect adoption will have a material impact on its financial statements and related disclosures.

In March 2020, the FASB issued ASU 2020-04, *Reference Rate Reform (Topic 848): Facilitation of the Effects of Reference Rate Reform on Financial Reporting*, which provides optional expedients and exceptions for applying U.S. GAAP to contracts, hedging relationships, and other transactions that reference LIBOR or another reference rate expected to be discontinued because of reference rate reform. The amendments of ASU 2020-04 are effective for all entities as of March 12, 2020 through December 31, 2022 and do not apply to contract modifications made after December 31, 2022. The Company is evaluating the effect of this guidance and has not yet determined the impact to its financial statements and related disclosures.

**ZYMERGEN INC.**  
**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

### 3. Business Combinations

#### *Lodo Therapeutics Corporation*

On May 16, 2021, the Company completed a nontaxable acquisition of 100% of the equity interests of Lodo Therapeutics Corporation ("Lodo"), a privately-held company which uses its proprietary bacterial metagenomics discovery platform to develop novel therapeutics from nature. The acquisition was accounted for as a business combination. The purchase price for the acquisition was \$25.3 million, substantially all of which was non-cash consideration. The non-cash consideration consisted of 774,402 shares of the Company's common stock. The intangible assets acquired consisted primarily of \$29.0 million of goodwill and Lodo's developed technology of \$5.4 million. Goodwill recognized is primarily a measure of the expected synergies from combining the operations of Lodo and the Company's developed technologies.

The Company granted RSUs to certain employees and consultants of Lodo in connection with the acquisition that generally vest in three installments over a period of up to two years, subject to their continued service with the Company.

The following table represents the allocation of the purchase consideration, including the non-cash consideration, based on fair value (in thousands):

Cash and cash equivalents	\$ 1,778
Other current assets	464
Property, plant and equipment	948
Other non-current assets	305
Developed technology	5,400
Customer relationship intangible asset	420
Total identifiable assets acquired	\$ 9,315
Accounts payable and accrued expenses	\$ 4,683
Other liabilities	8,353
Deferred tax liability	11
Total liabilities assumed	\$ 13,047
Net identifiable assets acquired	\$ (3,732)
Goodwill	29,041
Net assets acquired	<u><u>\$ 25,309</u></u>

The Company's purchase price allocation for the acquisition is preliminary and subject to revision as additional information about the fair value of the assets and liabilities becomes available. The fair values assigned to tangible and intangible assets acquired and liabilities assumed are based on management's estimates and assumptions and may be subject to change as additional information is received. Primary areas that are not yet finalized are related to acquired intangible assets including goodwill. Additional information that existed as of the closing date but not known at the time of this filing may become known to the Company during the remainder of the measurement period, a period not to exceed 12 months from the closing date. The Company adopted ASU 2021-08 in the fourth quarter of 2021, with a retrospective application to the beginning of 2021. Adoption of this guidance, as applied to the acquisition of Lodo Therapeutics Corporation on May 16, 2021, resulted in the recognition of approximately \$6.9 million in additional deferred revenue in its Consolidated Balance Sheets, with a corresponding increase in Goodwill as of the acquisition date (Note 2).

As a result of the business combination the Company incurred \$0.9 million of acquisition related costs for its benefit which are not accounted for as part of consideration transferred. Acquisition related costs related primarily to legal services, accounting, tax, valuation, and due diligence and are recognized in General and administrative expenses on the Consolidated Statements of Operations and Comprehensive Loss. Pro forma results of operations will not be presented because the effects of this acquisition were not material to the Company's Consolidated Financial Statements.

**ZYMERGEN INC.**  
**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

***enEvolv, Inc.***

On March 10, 2020, the Company completed a nontaxable acquisition of 100% of the equity of enEvolv, Inc., which has developed an enzyme and strain development platform that is built on diverse strain libraries and ultra-high throughput screening that utilizes molecular sensor systems. The acquisition was accounted for as a business combination. The purchase price for the acquisition was \$10.7 million, of which \$10.6 million was non-cash consideration. The non-cash consideration primarily consisted of 1,082,747 shares of the Company's common stock. The intangible assets acquired consisted primarily of \$7.9 million of goodwill and enEvolv's developed technology of \$2.6 million. Goodwill recognized is primarily a measure of the expected synergies from combining the operations of enEvolv and the Company's developed technologies.

The following table represents the allocation of the purchase consideration, including the non-cash consideration, based on fair value (in thousands):

Cash and cash equivalents	\$ 141
Accounts receivable	589
Other current assets	195
Property, plant and equipment	292
Other non-current assets	150
Developed technology	2,600
Customer relationship intangible asset	600
Total identifiable assets acquired	<u>\$ 4,567</u>
Accounts payable and accrued expenses	\$ 1,021
Other current liabilities	653
Deferred tax liability	107
Total liabilities assumed	\$ 1,781
Net identifiable assets acquired	\$ 2,786
Goodwill	7,871
Net assets acquired	<u>\$ 10,657</u>

As a result of the business combination the Company incurred \$0.4 million of acquisition related costs for its benefit and were not accounted for as part of consideration transferred. Acquisition related costs related primarily to legal services, accounting, tax, valuation, due diligence, and escrow fees and are recognized in General and administrative expenses on the Consolidated Statements of Operations and Comprehensive Loss. Prior to the close of the transaction, the Company and enEvolv were unrelated parties that entered into a Research Agreement, whereby enEvolv provided services to the Company. As of the transaction date, the Company had \$0.2 million prepaid services which were effectively settled through the business combination. Pro forma results of operations have not been presented because the effects of this acquisition were not material to the Company's Consolidated Financial Statements.

#### **4. Restructuring**

In August 2021, the Company released a business update regarding its commercial product pipeline and financial forecast. Since that business update the Company conducted an assessment of its target markets and the fit of the products in its pipeline to those markets (the "Portfolio Review") and developed a plan to reduce its costs. In September 2021, the Company's management implemented a reduction in force that represented a preliminary phase of the Company's plan to reduce its costs (the "2021 Restructuring"). In October 2021, the Company executed a second and final reduction in force under the 2021 Restructuring. In connection with the Portfolio Review and the 2021 Restructuring, the Company has determined to focus on a smaller number of programs that it believes capitalize on its capabilities and provide clear commercial opportunities. The 2021 Restructuring was substantially complete as of December 31, 2021. The Company expects to incur additional restructuring costs which are currently estimable of approximately approximately \$0.5 million in 2022. However, certain activities, such as lease restructuring, will extend into the first half of 2022.

The Company expects the 2021 Restructuring to result in total pre-tax charges of approximately \$29.3 million and approximately \$17.4 million of these charges are estimated to result in cash outlays, of which the Company has made payments of \$14.6 million through December 31, 2021. The Company has recorded costs of \$28.8 million from the inception of the initiative through December 31, 2021.

**ZYMERGEN INC.**  
**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

The following table provides a summary of our costs incurred from the inception of the initiative through December 31, 2021, and cost estimates associated with the 2021 Restructuring, by major type of cost (in thousands):

	Total amount incurred since inception through December 31, 2021	Total estimated amount expected to be incurred
<b>Restructuring charges:</b>		
Termination benefits	\$ 8,653	\$ 8,653
Impairment of long-lived assets (Note 7)	11,815	11,815
Contract terminations	3,749	4,200
Other <sup>(1)</sup>	4,591	4,591
Total	<u>\$ 28,808</u>	<u>\$ 29,259</u>

(1) Comprised of other costs directly related to the 2021 Restructuring, including consulting fees in relation to portfolio review, realignment of organizational resources to strategic priorities and organization redesign in order to achieve reduced operating costs.

The following table provides a reconciliation of the beginning and ending balances for the restructuring liabilities, which are reported as a component of Accrued and other liabilities in the accompanying Consolidated Balance Sheets (in thousands):

	Termination Benefits	Contract Terminations	Other	Total
Balance at January 1, 2021	\$ —	\$ —	\$ —	\$ —
Charges	8,530	3,758	4,573	16,861
Adjustments	123	(9)	18	132
Cash Payments	(7,705)	(2,299)	(4,591)	(14,595)
Balance at December 31, 2021	<u>\$ 948</u>	<u>\$ 1,450</u>	<u>\$ —</u>	<u>\$ 2,398</u>

## 5. Goodwill and Intangible Assets

The following table summarizes goodwill (in thousands):

	December 31, 2021	December 31, 2020
Goodwill	<u>\$ 40,645</u>	<u>\$ 11,604</u>

The \$29.0 million increase in goodwill from December 31, 2020 to December 31, 2021 is due to the acquisition of Lodo on May 16, 2021 (Note 3).

The following table summarizes the net book value of the finite-lived intangible assets (in thousands):

	Cost		Accumulated Amortization		Intangible Assets, Net	
	December 31, 2021	December 31, 2020	December 31, 2021	December 31, 2020	December 31, 2021	December 31, 2020
Developed technology	\$ 12,300	\$ 6,900	\$ (4,110)	\$ (2,460)	\$ 8,190	\$ 4,440
Customer relationships	1,400	980	(1,061)	(630)	339	350
Net carrying value	<u>\$ 13,700</u>	<u>\$ 7,880</u>	<u>\$ (5,171)</u>	<u>\$ (3,090)</u>	<u>\$ 8,529</u>	<u>\$ 4,790</u>

As a result of the acquisition of Lodo, the Company acquired intangible assets consisting of \$5.4 million in developed technology and \$0.4 million in customer relationships, which are amortized over an estimated useful life of six and two years, respectively. The Company recognized \$2.1 million, \$1.3 million, and \$0.9 million in amortization expense for the years ended December 31, 2021, 2020, and 2019, respectively.

**ZYMERGEN INC.**  
**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

Future amortization of intangible assets is as follows (in thousands):

2022	\$ 2,248
2023	2,067
2024	1,271
2025	1,271
2026	1,271
Thereafter	401
	\$ 8,529

## 6. Fair Value Measurements of Financial Instruments

GAAP defines fair value, establishes a framework for measuring fair value, and requires certain disclosures about fair value measurements. GAAP permits an entity to choose to measure many financial instruments and certain other items at fair value and contains financial statement presentation and disclosure requirements for assets and liabilities for which the fair value option is elected.

The hierarchy of fair value valuation techniques under GAAP provides for three levels: Level 1 provides the most reliable measure of fair value, whereas Level 3, if applicable, generally would require significant management judgment. The three levels for categorizing assets and liabilities under GAAP's fair value measurement requirements are as follows:

*Level 1* – Fair value of the asset or liability is determined using unadjusted quoted prices in active markets for identical assets or liabilities.

*Level 2* – Fair value of the asset or liability is determined using inputs other than quoted prices that are observable for the applicable asset or liability, either directly or indirectly, such as quoted prices for similar (as opposed to identical) assets or liabilities in active markets and quoted prices for identical or similar assets or liabilities in markets that are not active.

*Level 3* – Fair value of the asset or liability is determined using unobservable inputs that are significant to the fair value measurement and reflect management's own assumptions regarding the applicable asset or liability.

There were no transfers between the levels during the periods presented. As of December 31, 2021 and December 31, 2020, respectively, the Company's financial assets and financial liabilities measured at fair value on a recurring basis were classified within the fair value hierarchy as follows (in thousands):

	Level 1	Level 2	Level 3	Balance as of December 31, 2021
<b>Financial Assets</b>				
Cash equivalents	\$ 1,667	\$ —	\$ —	\$ 1,667
Total financial assets	<u>\$ 1,667</u>	<u>\$ —</u>	<u>\$ —</u>	<u>\$ 1,667</u>
<b>Financial Assets</b>				
Cash equivalents	\$ 205,873	\$ —	\$ —	\$ 205,873
Total financial assets	<u>\$ 205,873</u>	<u>\$ —</u>	<u>\$ —</u>	<u>\$ 205,873</u>
<b>Financial Liabilities</b>				
Warrant derivative liability	\$ —	\$ —	\$ 14,231	\$ 14,231
Total financial liabilities	<u>\$ —</u>	<u>\$ —</u>	<u>\$ 14,231</u>	<u>\$ 14,231</u>

Financial instruments consist principally of cash equivalents, accounts receivables, accounts payable, accrued liabilities, debt, and warrant derivative liability.

**TABLE OF CONTENTS**

**ZYMERGEN INC.**  
**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

The following table provides a reconciliation of the beginning and ending balances for the warrant derivative liability measured at fair value using significant unobservable inputs (Level 3) (in thousands):

Balance at January 1, 2021	\$ 14,231
Change in fair value	(1,849)
Fair value of warrants exercised	<u>(12,382)</u>
Balance at December 31, 2021	<u>\$ —</u>

The warrant derivative liability represented the fair value of the warrants issued in conjunction with the term loan agreement entered into in 2019. In April 2021 all warrants were exercised effective with the Company's IPO. No warrants were outstanding at December 31, 2021 (Note 8).

The following methods and assumptions were used by the Company in estimating the fair value of financial instruments:

*Accounts receivable, accounts payable, and accrued liabilities:* The amounts reported in the accompanying balance sheets approximate fair value due to the short maturity of these instruments.

*Debt:* The gross amounts reported approximate fair value due to the debt being a variable interest rate debt and its relatively short-term maturity.

*Warrant derivative liability:* In April 2021 all warrants were exercised effective with the Company's IPO. At exercise, the warrants were remeasured to intrinsic value, with the resulting change in fair value recognized in Other income (expense) in the Consolidated Statements of Operations and Comprehensive Loss. Prior to the exercise of the warrants, the Company estimated the fair value of outstanding warrants using a weighted average between the value derived from a BSM option model for a fully diluted scenario and the price of the warrant by applying the probability-weighted expected return method. The BSM model's inputs reflect assumptions that a market participant would use in pricing the instrument in a current period transaction and included the following as of December 31, 2020:

	December 31, 2020
Value per Series C Preferred share (fully-diluted)	\$ 35.46
Exercise price	\$ 16.98
Expected volatility	77.0 %
Risk-free rate	0.79 %
Time to liquidity (years)	8.97

## 7. Balance Sheet Components

Property and equipment consist of the following (in thousands):

	December 31, 2021	December 31, 2020
Machinery and equipment	\$ 74,548	\$ 54,999
Leasehold improvements	31,488	24,192
Furniture and office equipment	3,189	2,743
Computers and software	2,764	2,677
	111,989	84,611
Less accumulated depreciation and amortization	(78,132)	(47,977)
	33,857	36,634
Construction in progress	19,942	12,084
Total property and equipment, net	<u>\$ 53,799</u>	<u>\$ 48,718</u>

Depreciation and amortization expense was \$18.6 million, \$17.4 million, and \$14.3 million for the years ended December 31, 2021, 2020, and 2019, respectively.

**ZYMERGEN INC.**  
**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

As a result of the 2021 Restructuring (Note 4), the Company determined it would not recover the carrying value of certain machinery and equipment that was solely used in the production of Hyaline. In determining the impairment charge the Company assessed the fair value of the machinery and equipment based on prices for similar assets and expected future cash flows. As a result, machinery and equipment with a carrying amount of \$11.8 million was impaired and written down to a fair value of zero during the year ended December 31, 2021.

Accrued and other current liabilities consist of the following (in thousands):

	December 31, 2021	December 31, 2020
Accrued compensation and compensation-related costs	\$ 6,027	\$ 15,211
Other accrued operating expenses	7,045	9,616
Accrued restructuring costs	2,398	—
Accrued legal service fees	1,940	1,105
Accrued interest	—	842
Accrued tax liabilities	86	114
<b>Accrued and other current liabilities</b>	<b>\$ 17,496</b>	<b>\$ 26,888</b>

## **8. Term Loans**

In December 2019, the Company entered into and in February 2021, the Company amended and restated a credit and guaranty agreement in relation to the Company's senior secured delayed draw term loan facility, with Perceptive Credit Holdings II, LP and PCOF EQ AIV II, LP (the "Perceptive Credit Agreement"), in an aggregate principal amount of \$100.0 million. On closing on December 19, 2019, the Company received \$85.0 million which was available on the closing date, net of fees and repayment of the previous term loan. The Company paid a closing fee of \$1.5 million and other closing costs totaling \$1.3 million. The issuance costs are amortized using the effective interest rate method over the term of the loan. The availability of the additional principal amount of \$15.0 million expired unused on September 30, 2021.

The loan carries a variable interest rate which is the sum of 9.25% plus the greater of the one month LIBOR and 2.25%. In case the LIBOR is no longer available, the parties will enter into an amendment to define the new rate and in the meantime would be replaced by the Wall Street Journal Prime Rate.

The Company's Perceptive Credit Agreement provides that a material adverse change constitutes an event of default. In the event the material adverse change clause is invoked, the outstanding principal, interest, including any applicable default interest and any prepayment premium will become payable on demand of the lender. On October 20, 2021, the lender and the Company entered into Amendment No. 1, Waiver and Consent to the Perceptive Credit Agreement (the "Amendment"). Pursuant to the terms of the Amendment:

- upon execution, the Company paid \$41.0 million, which included \$35.0 million in principal and \$6.0 million of accrued interest and the applicable prepayment premium. Additionally, the Company placed \$63.0 million into an account at the sole control of the lender that represents the remaining obligations under the credit agreement, including any further prepayment premium, which was released in November 2021 upon the lender's approval of the Company's planned cash usage through final maturity;
- modified the final maturity to be June 30, 2022; and
- eliminated the minimum revenue covenant and increased the minimum liquidity covenant.

The Amendment was accounted for as a debt modification under FASB ASC 470-50.

The Company was in compliance with all covenants of the Perceptive Credit Agreement as of December 31, 2021. The amounts outstanding as of December 31, 2020 were classified as current due to the substantial doubt about the Company's ability to continue operating as a going concern as of the date of issuance of the Company's audited annual financial statements, and the potential impact of the material adverse change clause.

**ZYMERGEN INC.**  
**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

Debt consists of the following (in thousands):

	December 31, 2021	December 31, 2020
Senior secured delayed draw term loan facility bearing interest equal to 11.5% as of December 31, 2021 and December 31, 2020	\$ 50,000	\$ 85,000
Unamortized discount and offering costs	(8,310)	(5,669)
Accrued end-of-term payment	2,263	—
Senior secured delayed draw term loan facility, net	43,953	79,331
Less current portion	43,953	79,331
Long-term debt, net	<u><u>\$ —</u></u>	<u><u>\$ —</u></u>

Interest expense on the Company's term loan consisted of the following (in thousands):

	Year ended December 31,		
	2021	2020	2019
Coupon interest	\$ 9,083	\$ 9,938	\$ 1,889
Amortization of debt discount and offering costs	3,359	1,022	271
Accretion of end-of-term payment	2,263	—	783
Total interest expense on term loan	<u><u>\$ 14,705</u></u>	<u><u>\$ 10,960</u></u>	<u><u>\$ 2,943</u></u>

#### ***Warrants Related to Prior Loan Agreement***

In November 2014, the Company entered into a loan and security agreement for a term note which was subsequently amended and extinguished. In connection with the loan and security agreement and its amendments, the Company issued warrants to purchase the Company's common stock. On April 28, 2021, all warrants to purchase the Company's common stock, issued in connection with the Company's prior loan agreement, were exercised at the option of the holder. An aggregate of 226,880 shares were issued in connection with the cashless exercise. As of December 31, 2021, no common stock warrants were outstanding.

#### ***Warrants Related to Current Loan Facility***

In connection with the Perceptive Credit Agreement, the Company issued a warrant to purchase the Company's Series C Preferred Stock (the "2019 Warrants"). In April 2021, the 2019 warrants were exercised upon the consummation of the Company's IPO, with aggregate exercise proceeds of \$15.0 million. As of December 31, 2021, no 2019 Warrants were outstanding.

#### **9. Preferred Stock**

As of December 31, 2020, the Company's convertible preferred stock consisted of the following:

	Authorized and Designated	Outstanding	Liquidation Preference (per share)	Liquidation Preference
				(in thousands)
Series A redeemable convertible preferred stock	21,998,250	7,332,750	\$ 4.9893	\$ 36,585
Series A-1 redeemable convertible preferred stock	26,158,833	8,719,611	\$ 0.7599	6,626
Series B redeemable convertible preferred stock	42,244,588	14,081,522	\$ 10.1091	142,352
Series C redeemable convertible preferred stock	76,750,881	24,700,286	\$ 16.9836	419,500
Series D redeemable convertible preferred stock	47,028,472	13,259,111	\$ 22.3269	296,035
	<u><u>214,181,024</u></u>	<u><u>68,093,280</u></u>		<u><u>\$ 901,098</u></u>

On April 26, 2021, immediately prior to the closing of the IPO, all outstanding shares of convertible preferred stock converted into 68,115,459 shares of common stock.

**ZYMERGEN INC.**  
**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

Pursuant to the Amended and Restated Certificate of Incorporation filed on April 26, 2021, the Company is authorized to issue a total of 170,000,000 shares of undesignated preferred stock, par value \$0.001, of which no shares were issued or outstanding as of December 31, 2021.

## **10. Common Stock**

### ***Equity Incentive Plans***

In April 2021, the 2021 Incentive Award Plan (the "2021 Plan") became effective. The 2021 Plan serves as a successor to the 2014 Stock Plan (the "2014 Plan"). The 2021 Plan permits the award of stock options, restricted stock awards, stock appreciation rights, RSUs, performance awards, cash awards and stock bonuses. The Company reserved an initial 10,770,034 shares of common stock for issuance under the 2021 Plan, which includes the remaining reserved and unissued shares under the 2014 plan on the effective date of the 2021 Plan. The number of shares reserved for issuance under the 2021 Plan will increase automatically on January 1 of each calendar year continuing through the tenth calendar year during the term of the 2021 Plan by the number of shares equal to 5.0% of the total outstanding shares of the Company's common stock as of the immediately preceding December 31 or such lesser number as determined by the Board of Directors. Awards granted under the 2021 Plan expire no later than ten years from the date of grant. For incentive stock options and non-statutory stock options, the option price shall not be less than 100% of the fair market value on the day of grant. If at the time the Company grants an option and the optionee directly or by attribution owns stock possessing more than 10% of the total combined voting power of all the Company's classes of stock, the option price is required to be at least 110% of the fair market value on the day of grant. Options and RSUs granted typically vest over a four-year period but may be granted with different vesting terms. As of December 31, 2021, there were 5,962,468 shares available for the Company to grant under the 2021 Plan.

In July 2014, the Company adopted the 2014 Plan for employees and non-employees pursuant to which the Board of Directors granted share-based awards, including stock options, to officers, employees, and non-employees. As of the effective date of the 2021 Plan, no further awards are issued from the 2014 Plan.

### ***Stock Options with Service-based Vesting Conditions***

The following table summarizes option activity under the 2021 Plan and the 2014 Plan:

	<b>Number of Options</b>	<b>Weighted Average Exercise Price</b>	<b>Weighted Average Remaining Contractual Life</b> (in years)	<b>Aggregate Intrinsic Value</b> (in thousands)
Outstanding - December 31, 2020	5,498,490	\$6.65	7.75	\$79,756
Options granted	5,209,926	\$18.65		
Options exercised	(1,483,560)	\$4.50		
Options cancelled	(1,668,890)	\$19.27		
Outstanding - December 31, 2021	7,555,966	\$12.55	8.15	\$3,668
Unvested - December 31, 2021	4,861,059	\$15.76	9.32	\$5
Exercisable - December 31, 2021	2,694,907	\$6.76	6.05	\$3,663

The weighted average grant-date fair value of options granted was \$11.82 per share, \$5.27 per share, and \$3.96 per share during the years ended December 31, 2021, 2020, and 2019, respectively.

The aggregate intrinsic value of stock option awards exercised, determined at the date of option exercise, was \$29.0 million, \$3.5 million, and \$2.1 million during the years ended December 31, 2021, 2020, and 2019, respectively. The aggregate intrinsic value was calculated as the difference between the exercise prices of the underlying stock option awards and the estimated fair value of the Company's common stock on the date of exercise.

**ZYMERGEN INC.**  
**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

Stock-based compensation expense for stock options is estimated at the grant date based on the fair-value using the Black-Scholes option pricing model. The fair value of employee stock options is recognized as an expense ratably over the requisite service period of the awards. The fair value of employee stock options was estimated using the following assumptions:

	Year ended December 31,		
	2021	2020	2019
Expected dividend yield	— %	— %	— %
Risk-free interest rate	0.77% - 1.33%	0.38% - 1.41%	1.50% - 2.50%
Expected term (in years)	5.56 - 6.08	6.08	6.08
Expected volatility	70.09% - 74.67%	50.40% - 73.10%	49.50% - 50.90%

*Expected Dividend Yield* – The Company has never paid dividends and does not expect to pay dividends.

*Risk-Free Interest Rate* – The risk-free interest rate was based on the market yield currently available on United States Treasury securities with maturities approximately equal to the options' expected terms.

*Expected Term* – Expected term represents the period that the Company's stock-based awards are expected to be outstanding. The Company has limited historical information to develop reasonable expectations about future exercise patterns and post-vesting employment termination behavior for its stock option grants. Therefore, the expected term of options granted is based on the "simplified method" of expected life, described in U.S. Securities and Exchange Commission's Staff Accounting Bulletin 107, whose acceptance was extended in Staff Accounting Bulletin 110 (based on the mid-point between the vesting date and the end of the contractual term).

*Expected Volatility* – The expected stock price volatility for the Company's common stock was estimated by taking the historic stock price volatility for industry peers based on their price observations over a period equivalent to the expected term of the stock option grants.

Each of the inputs discussed above is subjective and generally requires significant management judgment.

As of December 31, 2021 the Company has employee stock-based compensation expense of \$41.0 million related to unvested stock options not yet recognized, which is expected to be recognized over an estimated weighted average period of approximately 2.82 years.

#### **Stock Options with Market-based Vesting Conditions**

In April 2021, the Company granted options to purchase 2,099,999 shares of common stock to the Company's three founders, effective as of the closing of the IPO and adoption of the 2021 Plan, with an exercise price of \$31.00 per share. The options are divided into five tranches with each tranche vesting, conditioned on the founder remaining a full time employee of the Company, when specific market capitalization and minimum price per share milestones are met, or as measured by total consideration per share in a change in control transaction. The options expire ten years from the grant date; any tranche not earned by the seventh anniversary of the grant date is forfeited. The total grant date fair value of these options was \$39.6 million, which will be recognized ratably for each vesting tranche using the accelerated attribution method as the award is subject to graded vesting over the weighted average derived service period of 3.19 years.

The target market capitalizations, prices, and vesting tranches are set forth in the table below:

	Share Price Target	Market Capitalization Target		Number of Options Granted
		(in thousands)		
Tranche 1	\$ 75.00	\$ 10,000,000		419,998
Tranche 2	\$ 105.00	\$ 12,500,000		419,998
Tranche 3	\$ 135.00	\$ 15,000,000		420,001
Tranche 4	\$ 165.00	\$ 17,500,000		420,001
Tranche 5	\$ 180.00	\$ 20,000,000		420,001

**TABLE OF CONTENTS**

**ZYMERGEN INC.**  
**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

The fair value of the options was determined at the grant date using a Monte Carlo simulation model with the following assumptions:

Expected dividend yield	— %
Risk-free interest rate	1.57 %
Expected term (in years)	10.00
Expected volatility	75.00 %

The expected volatility was based on the most recent ten-year period for the Company's peer group. The stock price projection for the Company assumes a zero percent dividend yield. The risk-free interest is based on the yield on U.S. Treasury bonds with a maturity consistent with the ten-year expected term associated with the market condition of the award.

On August 2, 2021, Josh Hoffman separated from his position as the Company's Chief Executive Officer and resigned as a member of the Board. Mr. Hoffman and the Company entered into an Employment Separation Letter Agreement, pursuant to which, among other things, all unvested equity awards held by Mr. Hoffman were forfeited as of the separation date. As such, Mr. Hoffman forfeited options to purchase 1,183,333 shares of common stock that were granted to the Company's founders as of the closing of the IPO. Accordingly, all expenses related to Mr. Hoffman's unvested and forfeited options have been reversed. Separately, on October 31, 2021, Jed Dean, the Company's co-founder, stepped down from the Company. Under the terms of the 2014 Plan and 2021 Plan, as applicable, and Dr. Dean's employment agreement all unvested equity awards held by Dr. Dean at the time of his departure were forfeited. As such, Dr. Dean forfeited options to purchase 458,333 shares of common stock that were granted to the Company's founders. All expense incurred prior to the separation date related to unvested options were reversed as of the separation date. As of December 31, 2021, 458,333 options remain outstanding and unvested. As of December 31, 2021 the Company has \$6.7 million of stock based compensation related to these unvested stock options not yet recognized, which is expected to be recognized over an estimated weighted average period of approximately 2.51 years.

#### ***Restricted Stock Units with Service-based Vesting Conditions***

The following table summarizes RSU activity (in thousands, except share and per share amounts and term):

	Shares	Weighted Average Grant Date Fair Value
Non-vested Restricted Stock Units as of December 31, 2020	—	\$—
Granted <sup>(1)</sup>	2,924,413	\$14.01
Vested	(53,380)	\$31.25
Forfeited	(395,050)	\$15.02
Non-vested Restricted Stock Units as of December 31, 2021	<u><u>2,475,983</u></u>	<u><u>\$13.47</u></u>

(1) Includes RSUs granted to employees and consultants as part of the acquisition of Lodo (Note 3)

RSUs granted are valued at the market price of our common stock on the date of grant. The Company recognizes compensation expense for the fair value of RSUs ratably over the requisite service period of the awards. The total intrinsic value of RSUs vested was \$0.5 million during the year ended December 31, 2021. As of December 31, 2021 there was \$30.0 million of total unrecognized compensation cost related to RSUs, which is expected to be recognized over a weighted average period of 2.02 years.

#### ***Non-vested Stock***

As part of the acquisition of Radiant Genomics, Inc. ("Radiant") on December 29, 2017, the Company issued shares to the founders of Radiant. Half of the shares were subject to vesting based on the continued service of the founders with the Company post-acquisition over a four-year period. The shares are forfeited if the founders of Radiant do not complete the required service period and therefore represent compensation for post combination services.

**ZYMERGEN INC.**  
**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

The following table summarizes activity of the non-vested stock with service-based vesting granted as part of the Radiant acquisition (in thousands, except share and per share amounts and term):

	Shares	Weighted Average Grant Date Fair Value	Weighted Average Remaining Years	Aggregate Intrinsic Value
Non-vested stock as of December 31, 2020	67,240	\$4.95	1.0	\$1,089
Granted	—			
Vested	(67,240)	\$4.95		
Forfeited	—			
Non-vested stock as of December 31, 2021	<u>—</u>	<u>\$—</u>		<u>\$—</u>

The total intrinsic value of non-vested stock that vested and was released was \$1.5 million, \$0.3 million, and \$0.2 million during the years ended December 31, 2021, 2020, and 2019, respectively. As of December 31, 2021 there was no unvested non-vested stock outstanding.

#### ***Employee Stock Purchase Plan***

In April 2021, the 2021 Employee Stock Purchase Plan (the "ESPP") was adopted. The ESPP was adopted in order to enable eligible employees to purchase shares of the Company's common stock at a discount. Purchases will be accomplished through participation in discrete offering periods. The Company initially reserved 2,154,006 shares of common stock for issuance under the ESPP. The number of shares reserved for issuance under the ESPP will increase automatically on January 1 of each calendar year beginning after the first offering date and continuing through the first ten calendar years by the number of shares equal to 1.0% of the total outstanding shares of our common stock as of the immediately preceding December 31 or such lesser number as determined by our Board of Directors. The price at which common stock is purchased under the ESPP is equal to 85% of the fair market value of the common stock on the first day of the offering period or purchase date, whichever is lower. The offering periods begin in May and November of each year, except the initial offering period which commenced with the IPO in April 2021 and concluded in November 2021. During the year ended December 31, 2021, 148,802 shares were issued under the ESPP for \$1.25 million. As of December 31, 2021, there were 2,005,204 shares available for the Company to grant under the ESPP.

The fair values of the rights granted under the ESPP were calculated using the following assumptions during the year ended December 31, 2021:

Expected dividend yield	— %
Risk-free interest rate	0.02% - 0.06%
Expected term (in years)	0.48 - 0.50
Expected volatility	60.54% - 74.93%

#### ***Compensation Expense***

Compensation expense related to stock-based awards was included in the following categories in the accompanying Consolidated Statements of Operations and Comprehensive Loss in accordance with the accounting guidance for share-based payments (in thousands):

	<b>Year ended December 31,</b>		
	<b>2021</b>	<b>2020</b>	<b>2019</b>
Cost of service revenue	\$ 2,522	\$ 1,179	\$ 919
Research and development	9,012	1,343	669
Sales and marketing	1,460	468	904
General and administrative	8,317	1,839	1,520
Total stock-based compensation	<u>\$ 21,311</u>	<u>\$ 4,829</u>	<u>\$ 4,012</u>

**ZYMERGEN INC.**  
**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

Compensation expense by stock-based award was as follows (in thousands):

	Year ended December 31,		
	2021	2020	2019
Stock options with service based vesting conditions	\$ 11,911	\$ 4,496	\$ 3,679
Stock options with market based vesting conditions	1,911	—	—
RSUs with service based vesting conditions	5,065	—	—
Non-vested stock	333	333	333
ESPP	2,091	—	—
Total stock-based compensation	<u>\$ 21,311</u>	<u>\$ 4,829</u>	<u>\$ 4,012</u>

***Non-recourse Loans to Employees***

On October 5, 2017, the Company entered into promissory notes with two separate employees in the aggregate amount of \$3.6 million. The notes bore interest at 3.0% per annum and were due on the earlier of October 18, 2027 or the date two weeks prior to the Company's good faith estimate of the date of initial filing of a Form S-1 to sell shares of Company common stock in an initial public offering. Interest was payable annually in arrears and could be added to the principal amount at the borrower's option. Both employees opted to add the interest in the aggregate amount of \$0.1 million to be added to the principal for the interest payment due in October 2019 and October 2020, respectively. The outstanding principal and interest payment added to the principal were included in Additional Paid-In Capital on the Consolidated Balance Sheets.

On March 5, 2021, both promissory notes were repaid, including the principal and all unpaid interest in an amount of \$4.0 million were settled by the receipt of a \$2.0 million payment and the return of 67,050 shares of common stock to the Company. The 67,050 shares of common stock were immediately retired upon return to the Company.

**11. Income Taxes**

The components of income (loss) before provision for income taxes by U.S. and foreign jurisdictions are as follows (in thousands):

	Year ended December 31,		
	2021	2020	2019
Domestic	\$ (361,868)	\$ (262,433)	\$ (236,802)
Foreign	134	190	7
Income (loss) before income taxes	<u>\$ (361,734)</u>	<u>\$ (262,243)</u>	<u>\$ (236,795)</u>

***Provision for (Benefit from) Income Taxes***

The components of the provision for (benefit from) income taxes are as follows (in thousands):

	Year ended December 31,		
	2021	2020	2019
<b>Current:</b>			
Federal	\$ —	\$ —	\$ —
State	7	4	5
Foreign	55	54	3
Total current income tax expense	<u>\$ 62</u>	<u>\$ 58</u>	<u>\$ 8</u>
<b>Deferred:</b>			
State	\$ (11)	\$ (107)	\$ —
Total deferred income tax expense (benefit)	<u>\$ (11)</u>	<u>\$ (107)</u>	<u>\$ —</u>
Total income tax expense (benefit)	<u>\$ 51</u>	<u>\$ (49)</u>	<u>\$ 8</u>

**ZYMERGEN INC.**  
**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

Income tax provision (benefit) related to continuing operations differ from the amounts computed by applying the statutory income tax rate of 21% to pretax loss are as follows (in thousands):

	Year ended December 31,		
	2021	2020	2019
US federal provision (benefit) at statutory rate	\$ (75,992)	\$ (55,111)	\$ (49,727)
State taxes, net of federal benefit	(10,597)	(6,492)	(14,374)
Federal and state R&D tax credits	(6,584)	(6,267)	(6,914)
Non-deductible expenses and other items	1,960	3,162	1,033
Change in valuation allowance	91,264	64,659	69,990
Total	<u>\$ 51</u>	<u>\$ (49)</u>	<u>\$ 8</u>

#### **Deferred Tax Assets**

Deferred income taxes reflect the net tax effects of loss and credit carryforwards and temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and the amounts used for income tax purposes. Significant components of the Company's deferred tax assets and liabilities for federal and state income taxes were as follows (in thousands):

	December 31, 2021	December 31, 2020
<b>Deferred tax assets:</b>		
Federal & state NOL carryforward	\$ 267,664	\$ 185,610
Research & other credits	28,785	22,200
Capitalized R&D	1,791	2,262
Accruals and other	10,071	3,514
Property and equipment	1,484	186
Stock based compensation	2,563	848
Capitalized costs	1,903	—
Other	2,151	54
Total deferred tax assets	<u>\$ 316,412</u>	<u>\$ 214,674</u>
Less valuation allowance	(314,686)	(214,587)
Deferred tax assets, net	<u>\$ 1,726</u>	<u>\$ 87</u>
<b>Deferred tax liabilities:</b>		
Intangibles	\$ 1,726	\$ 87
Total deferred tax liabilities	<u>\$ 1,726</u>	<u>\$ 87</u>
Deferred tax liabilities, net	<u>\$ —</u>	<u>\$ —</u>

Realization of the Company's deferred tax assets is dependent upon future earnings, if any. The timing and amount of any such future earnings are uncertain. Because of the Company's lack of U.S. earnings history, the U.S. deferred tax assets have been fully offset by a valuation allowance. The valuation allowance increased by \$100.1 million and \$65.4 million during the years ended December 31, 2021 and December 31, 2020, respectively.

#### **Net Operating Loss and Tax Credit Carryforwards**

As of December 31, 2021, the Company had a net operating loss carryforward for federal income tax purposes of approximately \$1,042.4 million of which \$106.4 million will begin to expire in 2033 and \$936.0 million of the federal net operating losses will carryforward indefinitely. As of December 31, 2021, the Company had a total state net operating loss carryforward of approximately \$660.7 million, which will begin to expire in 2027. Utilization of some of the federal and state net operating loss and credit carryforwards are subject to annual limitations due to the "change in ownership" provisions of the Internal Revenue Code of 1986 and similar state provisions. The annual limitations may result in the expiration of net operating losses and credits before utilization.

As of December 31, 2021, the Company has federal research credits of approximately \$34.5 million, which will begin to expire in 2034 and California state research credits of approximately \$28.8 million which have no expiration date. These tax credits are subject to the same limitations discussed above.

**ZYMERGEN INC.**  
**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

**Unrecognized Tax Benefits**

The Company records unrecognized tax benefits, where appropriate, for all uncertain income tax positions. The Company recorded unrecognized tax benefits for uncertain tax positions of approximately \$28.8 million as of December 31, 2021, of which none would impact the effective tax rate if recognized as the benefit would be offset with an increase in the valuation allowance. Any adjustments to the Company's uncertain tax positions would result in an adjustment of its net operating loss or tax credit carry forwards rather than resulting in a cash outlay.

The Company's policy is to include interest and penalties related to unrecognized tax benefits, if any, within the provision for taxes in the Consolidated Statements of Operations and Comprehensive Loss. During the years ended December 31, 2021, 2020, and 2019, respectively, no interest or penalties were required to be recognized relating to unrecognized tax benefits.

The Company files income tax returns in the U.S. and various states in the U.S. The Company is subject to examination by U.S. federal and state tax authorities for all years since inception due to the carry forward of unutilized net operating losses and research and development credits.

The Company has the following activity relating to unrecognized tax benefits for the years ended December 31 (in thousands):

	2021	2020
Beginning balance	\$ 24,540	\$ 17,602
Gross increase - tax position in current period	7,267	6,938
Ending balance	<u>\$ 31,807</u>	<u>\$ 24,540</u>

Although it is reasonably possible that certain unrecognized tax benefits may increase or decrease within the next twelve months due to tax examination changes, settlement activities, expirations of statute of limitations, or the impact on recognition and measurement considerations related to the results of published tax cases or other similar activities, the Company does not anticipate any significant changes to unrecognized tax benefits over the next twelve months.

**12. Net Loss Per Share**

Basic net loss per share is determined by dividing net loss by the weighted average shares outstanding for the period. The Company analyzes the potential dilutive effect of stock options, non-vested stock, RSUs, stock issuable under the ESPP, and warrants under the treasury stock method (as applicable), during periods of income, or during periods in which income is recognized related to changes in fair value of its liability-classified securities.

The following table presents the calculation of basic and diluted net loss per share (in thousands, except share and per share data) applicable to common stockholders:

	Year ended December 31,		
	2021	2020	2019
<b>Numerator:</b>			
Net loss, basic	\$ (361,785)	\$ (262,194)	\$ (236,803)
Less: Gain on change in fair value of warrant liabilities	1,849	—	—
Net loss, diluted	<u>\$ (363,634)</u>	<u>\$ (262,194)</u>	<u>\$ (236,803)</u>
<b>Denominator:</b>			
Weighted average shares used in calculating net loss per share, basic	74,226,964	12,217,889	10,791,734
Effect of dilutive securities:			
Warrants to purchase Series C convertible preferred stock	78,838	—	—
Weighted average shares used in calculating net loss per share, diluted	<u>74,305,802</u>	<u>12,217,889</u>	<u>10,791,734</u>
Net loss per share, basic	\$ (4.87)	\$ (21.46)	\$ (21.94)
Net loss per share, diluted	<u>\$ (4.89)</u>	<u>\$ (21.46)</u>	<u>\$ (21.94)</u>

TABLE OF CONTENTS

**ZYMERGEN INC.**  
**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

The following potentially dilutive shares were excluded from the calculation of diluted net loss per share applicable to common stockholders because their effect would have been anti-dilutive for the periods presented:

	Year ended December 31,		
	2021	2020	2019
Shares issuable under convertible preferred stock	—	68,115,459	54,856,348
Warrants to purchase Series C convertible preferred stock	—	883,333	883,333
Options to purchase common stock	7,555,966	5,498,490	4,805,884
Restricted stock units	2,475,983	—	—
Non-vested stock	—	67,240	134,480
Warrants to purchase common stock	—	242,322	242,322
<b>Total</b>	<b>10,031,949</b>	<b>74,806,844</b>	<b>60,922,367</b>

### 13. Revenue, Credit Concentrations and Geographic Information

#### *Revenues from research and development service agreements*

The Company has primarily earned revenue by engaging in R&D service contracts. The Company also earns revenue through collaborative arrangements with partners to develop novel materials to be commercialized by the collaborative partner and the Company.

The Company's R&D service contracts generally consist of fixed-fee multi-phase research terms with concurrent value-share and/or performance bonus payments based on developing an improved microbial strain. The research term of the contracts typically spans several quarters and the contract term for revenue recognition purposes is determined based on the customer's rights to terminate the contract for convenience. Other payment types, typically consisting of performance bonuses or value share payments, are constrained until those payments become probable or are earned. The Company recognized performance bonuses of \$0.3 million and \$1.2 million for the years ended December 31, 2021 and 2020, respectively. For the year ended December 31, 2019 performance bonuses the Company recognized were insignificant. For the years ended December 31, 2021, 2020, and 2019, respectively, the Company has not recognized any royalty or value share payments.

When acceptance clauses are present in an agreement, the Company recognizes the R&D service revenue at a point in time when the R&D services provided have been accepted by the customer and the Company has a present right for payment and no refunds are permitted. The Company recognized revenue at a point in time due to customer acceptance clauses of \$2.7 million, \$0.6 million, and \$5.5 million for the years ended December 31, 2021, 2020, and 2019, respectively.

The following table represents changes in the balances of our contract liabilities (in thousands):

	December 31, 2020	Additions	Adjustments	Deletions	December 31, 2021
<b>Contract liabilities:</b>					
Deferred revenue	\$ 3,014	\$ 8,513	\$ 6,013	\$ (9,345)	\$ 8,195
	December 31, 2019	Additions	Adjustments	Deletions	December 31, 2020
<b>Contract liabilities:</b>					
Deferred revenue	\$ 1,760	\$ 8,138	\$ —	\$ (6,884)	\$ 3,014

Additions to contract liabilities during the year ended December 31, 2021 include \$1.4 million of deferred revenue through the acquisition of Lodo (Note 3), prior to the adoption of ASU 2021-08. Additions to contract liabilities during the year ended December 31, 2020 include \$0.6 million of deferred revenue through the acquisition of enEvolv (Note 3). Long-term deferred revenue is included in Other long-term liabilities on the Consolidated Balance Sheets. Adjustments to deferred revenue for the year ended December 31, 2021 are attributable to the adoption of ASU 2021-08, as applied to a customer contract in connection with the acquisition of Lodo (Note 2), and the expected termination of a research and development services agreement.

**ZYMERGEN INC.**  
**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

Transaction price allocated to the remaining performance obligation represents contracted revenue that has not yet been recognized, which includes unearned revenue and unbilled amounts that will be recognized as revenue in future periods. Transaction price attributable to performance obligations to be completed in future periods consisted of the following (in thousands):

	Current	Noncurrent	Total
As of December 31, 2021	\$ 4,185	\$ 4,755	\$ 8,940

The Company's noncurrent remaining performance obligation is expected to be recognized in the next 1.1 to 3.3 years.

#### **Credit Concentrations**

Customers representing 10% or greater of revenue were as follows:

	Year ended December 31,		
	2021	2020	2019
Customer A	25 %	35 %	14 %
Customer B	23 %	*	— %
Customer C	14 %	18 %	16 %
Customer D	*	10 %	— %
Customer J	*	15 %	19 %

\* Less than 10%

Customers representing 10% or greater of billed accounts receivable were as follows:

	December 31, 2021	December 31, 2020
Customer A	— %	37 %
Customer D	— %	23 %
Customer E	68 %	23 %
Customer G	— %	17 %
Customer I	29 %	— %

#### **Geographic Information**

The Company's revenues by geographic region are presented in the table below (in thousands):

	Year ended December 31,		
	2021	2020	2019
United States of America	\$ 6,794	\$ 6,103	\$ 11,386
Asia	4,803	4,738	3,607
Europe	5,146	2,443	426
Total revenue	\$ 16,743	\$ 13,284	\$ 15,419

**ZYMERGEN INC.**  
**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

#### **14. Collaborative Agreement**

The Company entered into a Partnership Agreement with Sumitomo Chemical Co. Ltd. on April 9, 2019 (Sumitomo Collaboration). Through the Sumitomo Collaboration, the parties wish to establish a structure and operating model in which the Company's technology, through bioreachable molecules, is harnessed in innovation for certain materials and applications of strategic interest to Sumitomo Chemical. The scope and specific terms governing the research and development efforts will be set forth in written project plans (Project Plan) for each Zymergen and Sumitomo Development Item. The agreement is effective for 6 years and will automatically extend by additional one year periods, unless either party provides written notice at least 180 days prior to the end of the then-current term. The cooperation between the parties will be exclusive within the applicable field for Sumitomo Development Items and Zymergen Development Items accepted by the Joint Steering Committee. Outside of the field, the parties each have a right of first offer to participate in the development for other uses of the Sumitomo Development Items or the Zymergen Development Items.

During the development term, the parties will each be performing research and development activities for their respective Development Items. The Zymergen Development Items are generally inputs into the further processing activities to make the Sumitomo Development Items with the aim of commercializing the Sumitomo Development Item. The direct costs of the research and development projects are shared between the parties with each paying 50% of costs, with settlement of such amounts on a quarterly basis. As of December 31, 2021, the Company has one ongoing Project Plan for the development of specified materials and performed research and development services for that Project Plan. The performance of the Project Plans is overseen by a Joint Steering Committee (JSC).

The Company determined that the Sumitomo Collaboration falls within the scope of ASC 808. As mentioned above, both parties share the development cost of their respective Development Items. The Company considers these activities to represent collaborative activities as both parties are active participants and share the risks and rewards of the activities. The Company evaluated the terms of the Sumitomo Collaboration and did not identify any service or other deliverables that would be in the scope of other authoritative guidance such as ASC 606. Sumitomo Chemical's share of our R&D activities and the development of the Zymergen Development Item are considered to be part of the Company's ongoing major or central operations and management has determined that the Company is the principal participant to provide R&D services to the Sumitomo Collaboration. The Company analogizes to ASC 606 and recognized revenue in a separate 'Collaboration revenue' line on the Consolidated Statements of Operations and Comprehensive Loss. Using the concepts of ASC 606, the Company has identified research and development activities as its only performance obligation. The Company further determined that the transaction price under the arrangement consisted of solely variable consideration which was contingent upon the costs incurred during the respective periods to be invoiced.

The Company's share in Sumitomo Chemical's R&D activities of the Sumitomo Development Item is recognized as research and development expense. Research and development expenses recognized from the arrangement during the years ended December 31, 2021 and December 31, 2020 amounted to \$2.2 million and \$1.4 million, respectively. Research and development expenses recognized from the arrangement during the year ended December 31, 2019 were insignificant. The Company recognized collaboration revenue of \$4.2 million, \$3.5 million, and \$2.2 million for the years ended December 31, 2021, 2020, and 2019, respectively.

#### **15. Commitments and Contingencies**

##### ***Operating Lease Commitments***

The Company leases certain facilities and recognizes rent expense on a straight-line basis, net of sublease income, over the non-cancellable lease term and records the difference between cash rent payments and the recognition of rent expense as a deferred rent liability. Rent expense under operating leases was \$35.2 million, \$15.3 million, and \$14.4 million for the years ended December 31, 2021, 2020, and 2019, respectively.

**ZYMERGEN INC.**  
**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

Total future minimum rental commitments under long-term leases, net of sublease income, with an initial term of more than one year are estimated as follows (in thousands):

2022	\$ 26,387
2023	30,450
2024	30,630
2025	29,459
2026	30,350
Thereafter	206,587
	\$ 353,863

### **Contingencies**

The Company is subject to various litigation and arbitration claims that arise in the ordinary course of business, including but not limited to those related to employee matters. Unless otherwise specifically disclosed, we have determined that no provision for liability is required related to any claim against the Company.

On August 4, 2021, a putative securities class action was filed on behalf of purchasers of the Company's common stock pursuant to or traceable to the registration statement for its IPO. The action is pending in the United States District Court for the Northern District of California, and is captioned *Shankar v. Zymergen Inc. et al.*, Case No. 3:21-cv-06028-JCS. The action alleges violations of Sections 11 and 15 of the Securities Act of 1933, as amended, in connection with the Company's IPO, names the Company, certain of our current and former officers and directors, our IPO underwriters, and certain stockholders as defendants and seeks damages in an unspecified amount, attorneys' fees, and other remedies. The Company intends to defend vigorously against such allegations.

On November 9, 2021, a purported shareholder of Zymergen filed a putative derivative lawsuit in the United States District Court for the Northern District of California that is captioned *Mellor v. Hoffman, et al.*, Case No. 4:21-cv-08723. The complaint names certain of the Company's current and former officers and directors and the Company as nominal defendants based on allegations substantially similar to those in the securities class action. The complaint purports to assert claims on the Company's behalf for breach of fiduciary duty, unjust enrichment, abuse of control, gross mismanagement, corporate waste, and contribution under the federal securities laws and seeks corporate reforms, unspecified damages and restitution, and fees and costs.

In addition, certain government agencies, including the SEC, have requested information related to the Company's August 3, 2021 disclosure. The Company is cooperating fully.

### **16. Subsequent Events**

On March 1, 2022, Aaron Kimball resigned from his position as Chief Technology Officer of the Company, effective as of April 1, 2022 (the "Separation Date"). In consideration for his continued employment through the Separation Date, as of such date, (i) Mr. Kimball will be entitled to acceleration of 17,708 of his outstanding restricted stock units and (ii) all of his then vested stock options will remain outstanding and exercisable until April 1, 2023. All unvested equity awards held by Mr. Kimball (after giving effect to the foregoing) will be forfeited as of the Separation Date. All expense incurred prior to the Separation Date related to unvested equity awards will be reversed as of the Separation Date.

**Item 9. Changes in and Disagreements With Accountants on Accounting and Financial Disclosures**

None.

**Item 9A. Controls and Procedures**

**Evaluation of Disclosure Controls and Procedures**

We maintain disclosure controls and procedures that are designed to provide reasonable assurance that information required to be disclosed in our periodic and current reports that we file with the SEC is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms, and that such information is accumulated and communicated to our management, including our acting Chief Executive Officer and our Chief Financial Officer, as appropriate, to allow timely decisions regarding required disclosure.

Our management, with the participation and supervision of our acting Chief Executive Officer and our Chief Financial Officer, have evaluated our disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as amended, or the Exchange Act) as of the end of the period covered by this Form 10-K. Based on that evaluation, our acting Chief Executive Officer and our Chief Financial Officer have concluded that, as of the end of the period covered by this Form 10-K, our disclosure controls and procedures were effective to provide reasonable assurance that information we are required to disclose in reports that we file or submit under the Exchange Act is recorded, processed, summarized, and reported within the time periods specified in SEC rules and forms, and that such information is accumulated and communicated to our management, including our acting Chief Executive Officer and Chief Financial Officer, as appropriate, to allow timely decisions regarding required disclosure.

**Management's Annual Report on Internal Control Over Financial Reporting**

This Form 10-K does not include a report of management's assessment regarding internal control over financial reporting or an attestation report of our registered public accounting firm due to a transition period established by the rules of the SEC for newly public companies.

**Changes in Internal Control over Financial Reporting**

Our management is responsible for establishing and maintaining adequate internal control over financial reporting as such term is defined in Rule 13a-15(f) of the Exchange Act. An evaluation was also performed under the supervision and with the participation of our management, including our acting Chief Executive Officer and our Chief Financial Officer, of any change in our internal control over financial reporting that occurred during our last fiscal quarter and that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting. That evaluation did not identify any change in our internal control over financial reporting that occurred during our latest fiscal quarter that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

**Limitations on Effectiveness of Controls and Procedures**

In designing and evaluating the controls and procedures, management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable and not absolute assurance of achieving the desired control objectives. In reaching a reasonable level of assurance, management is required to apply its judgment in evaluating the cost-benefit relationship of possible controls and procedures. In addition, the design of any system of controls also is based, in part, upon certain assumptions about the likelihood of future events, and there can be no assurance that any design will succeed in achieving its stated goals under all potential future conditions; over time, controls may become inadequate because of changes in conditions, or the degree of compliance with policies or procedures may deteriorate. Because of the inherent limitations in a cost-effective control system, misstatements due to error or fraud may occur and not be detected.

**Item 9B. Other Information**

None.

**Item 9C. Disclosure Regarding Foreign Jurisdiction that Prevent Inspections.**

None.

## **Part III**

### **Item 10. Directors, Executive Officers and Corporate Governance**

Information required by this item will be contained in our definitive proxy statement to be filed with the SEC on Schedule 14A in connection with our 2022 Annual Meeting of Stockholders (the “Proxy Statement”), which will be filed no later than 120 days after the end of our fiscal year ended December 31, 2021, and is incorporated herein by reference.

We have adopted a Code of Business Conduct and Ethics that applies to all of our employees, officers and directors, including our Chief Executive Officer, Chief Financial Officer and other executive and senior financial officers and code of ethics for the Chief Executive Officer and other senior financial officers, both of which are available on our website at [investors.zymergen.com/corporate-governance/documents-charters](http://investors.zymergen.com/corporate-governance/documents-charters). We intend to disclose future amendments to our code of business conduct and ethics and our code of ethics for the Chief Executive Officer and senior financial officers or any waivers of such codes, on our website or in public filings.

### **Item 11. Executive Compensation**

The information required by this item regarding executive compensation will be incorporated by reference to the information set forth in our Proxy Statement.

### **Item 12. Security Ownership of Certain Beneficial Owner and Management and Related Stockholder Matters**

The information required by this item regarding security ownership of certain beneficial owners and management and our equity compensation plans will be incorporated by reference to the information set forth in our Proxy Statement.

### **Item 13. Certain Relationships and Related Transactions, and Director Independence**

The information required by this item regarding security ownership of certain beneficial owners and management and our equity compensation plans will be incorporated by reference to the information set forth in our Proxy Statement.

### **Item 14. Principal Accounting Fees and Services**

The information required by this item regarding principal accountant fees and services will be incorporated by reference to the information set forth in our Proxy Statement.

**Part IV****EXHIBIT INDEX**

Exhibit Number	Description	Incorporated by Reference				
		Form	File Number	Exhibit	Filing Date	Filed Herewith
3.1	<a href="#">Amended and Restated Certificate of Incorporation of Zymergen Inc.</a>	8-K	001-40354	3.1	April 26, 2021	
3.2	<a href="#">Amended and Restated Bylaws of Zymergen Inc.</a>	8-K	001-40354	3.2	April 26, 2021	
4.1	<a href="#">Amended and Restated Investors' Rights Agreement, dated July 29, 2020, by and among the Company and certain Investors listed therein.</a>	S-1	333-254612	4.1	March 23, 2021	
4.2	<a href="#">Form of Stock Certificate for common stock of the Registrant.</a>	S-1	333-254612	4.2	March 23, 2021	
4.3	<a href="#">Description of Securities.</a>					X
10.1**	<a href="#">Amended and Restated Credit Agreement and Guaranty, dated as of February 26, 2021, by and among Zymergen Inc., the Subsidiary Guarantors from time to time party thereto, the Lenders from time to time party thereto and Perceptive Credit Holdings II, LP, as the Administrative Agent.</a>	S-1	333-254612	10.1	March 23, 2021	
10.2**	<a href="#">Amendment No. 1, Waiver And Consent To Amended And Restated Credit Agreement And Guaranty.</a>	10-Q	001-40354	10.3	November 15, 2021	
10.3	<a href="#">Strategic Partnership Agreement, dated as of April 9, 2019, by and between Registrant and Sumitomo Chemical Co. LTD.</a>	S-1	333-254612	10.2	March 23, 2021	
10.4+	<a href="#">Form of Indemnification Agreement between the Company and each of its directors and executive officers.</a>	S-1/A	333-254612	10.3	April 14, 2021	
10.5+	<a href="#">2014 Stock Plan, as amended.</a>	S-1	333-254612	10.4	March 23, 2021	
10.6+	<a href="#">Form of Stock Option Grant Notice and Stock Option Agreement under the 2014 Stock Plan.</a>	S-1	333-254612	10.5	March 23, 2021	
10.7+	<a href="#">2021 Incentive Award Plan.</a>	S-8	333-	99.2	April 23, 2021	
10.8+	<a href="#">Form of Stock Option Grant Notice and Stock Option Agreement under the 2021 Incentive Award Plan.</a>	S-1/A	333-254612	10.7	April 14, 2021	
10.9+	<a href="#">Form of Restricted Stock Unit Award Grant Notice and Restricted Stock Unit Award Agreement under the 2021 Incentive Award Plan.</a>	S-1/A	333-254612	10.8	April 14, 2021	
10.10	<a href="#">Employee Stock Purchase Plan.</a>	S-8	333-	99.3	April 23, 2021	
10.11	<a href="#">Non-Employee Director Compensation Policy</a>	S-1/A	333-254612	10.10	April 14, 2021	
10.12	<a href="#">Form of Employment Agreement.</a>	S-1	333-254612	10.11	March 23, 2021	
10.13+	<a href="#">Letter Agreement with Jay Flatley.</a>	8-K	001-40354	10.1	August 3, 2021	

TABLE OF CONTENTS

10.14+	<a href="#">Employment Separation Letter Agreement with Josh Hoffman.</a>	8-K	001-40354	10.2	August 3, 2021
21.1	<a href="#">List of Subsidiaries of the Company.</a>				X
23.1	<a href="#">Consent of Independent Registered Public Accounting Firm.</a>				X
24.1	<a href="#">Power of Attorney (included in the signature page of this Annual Report on Form 10-K).</a>				
31.1	<a href="#">Certification of the Principal Executive Officer pursuant to Rules 13a-14(a) and 15d-14(a) under the Securities Exchange Act of 1934, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.</a>				X
31.2	<a href="#">Certification of the Principal Financial Officer pursuant to Rules 13a-14(a) and 15d-14(a) under the Securities Exchange Act of 1934, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.</a>				X
32.1*	<a href="#">Certifications of the Principal Executive Officer and Principal Financial Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.</a>				
101.INS	XBRL Instance Document				
101.SCH	XBRL Taxonomy Extension Schema Document				
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document				
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document				
101.LAB	XBRL Taxonomy Extension Label Linkbase Document				
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document				

+ Management contract or compensatory plan or arrangement.

\* The certifications attached as Exhibit 32.1 that accompany this Annual Report on Form 10-K are deemed furnished and not filed with the Securities and Exchange Commission and are not to be incorporated by reference into any filing of Zymergen Inc. under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended, whether made before or after the date of this Annual Report on Form 10-K, irrespective of any general incorporation language contained in such filing.

\*\* Portions of this exhibit have been omitted pursuant to Item 601 of Regulation S-K promulgated under the Securities Act because the information (i) is not material and (ii) would be competitively harmful if publicly disclosed.

**Item 16. Form 10-K Summary**

None.

## SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

Zymergen Inc.

Date: March 29, 2022

By:	<u>/s/ Jay Flatley</u>
Name:	Jay Flatley
Title:	Chairman and Acting Chief Executive Officer

By:	<u>/s/ Enakshi Singh</u>
Name:	Enakshi Singh
Title:	Chief Financial Officer

Date: March 29, 2022

## POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints each of Jay Flatley and Enakshi Singh his or her true and lawful attorney-in-fact and agent, with full power of substitution, for him or her and in his or her name, place and stead, in any and all capacities, to sign any and all amendments to this Annual Report on Form 10-K, and to file the same, with all exhibits thereto, and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorney-in-fact and agent, full power and authority to do and perform each and every act and thing requisite and necessary to be done in connection therewith, as fully to all intents and purposes as he or she might or could do in person, hereby ratifying and confirming all that said attorney-in-fact and agent, or his or her substitutes or substitute, may lawfully do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the registrant in the capacities and on the dates indicated.

Name	Title	Date
<u>/s/ Jay Flatley</u> Jay Flatley	Chairman and Acting Chief Executive Officer <i>(Principal Executive Officer)</i>	March 29, 2022
<u>/s/ Enakshi Singh</u> Enakshi Singh	Chief Financial Officer <i>(Principal Financial Officer and Principal Accounting Officer)</i>	March 29, 2022
<u>/s/ Sandra E. Peterson</u> Sandra E. Peterson	Lead Independent Director	March 29, 2022
<u>/s/ Steven Chu</u> Steven Chu	Director	March 29, 2022
<u>/s/ Christine M. Gorjanc</u> Christine M. Gorjanc	Director	March 29, 2022
<u>/s/ Travis Murdoch</u> Travis Murdoch	Director	March 29, 2022
<u>/s/ Matthew A. Ocko</u> Matthew A. Ocko	Director	March 29, 2022
<u>/s/ Zach Serber</u> Zach Serber	Director	March 29, 2022
<u>/s/ Rohit Sharma</u> Rohit Sharma	Director	March 29, 2022