J.P. Morgan 41st Annual Healthcare Conference 2023

Company Participants

- Kimberly Powell, Vice President, Healthcare

Other Participants

- Analyst
- Harlan Sur, J.P. Morgan

Presentation

Harlan Sur {BIO 6539622 <GO>}

All right. Good morning, and welcome to J.P. Morgan's 41st Annual Healthcare Conference here in San Francisco. My name is Harlan Sur. I'm the Semiconductor Analyst for the firm. And for the fourth time in five years, we have the team from NVIDIA presenting. And in fact, in the 41-year history of the healthcare conference, NVIDIA has been the only semiconductor company to present here. So very honored to have them again here this year.

For those of you that don't know NVIDIA, leader in accelerated computing semiconductor systems, hardware and software platforms, in areas like artificial intelligence and deep learning, powering some of the world's most powerful supercomputers and driving compute innovation for cloud and hyperscalers as well as large vertical markets like healthcare and life sciences.

Here with us today is Kimberly Powell, Vice President of Healthcare at NVIDIA. She's responsible for the company's worldwide healthcare business, including hardware and software platforms for accelerated computing, AI, visualization, the power of the ecosystems, of imaging, genomics, life sciences, drug discovery and healthcare analytics. So Kimberly, thank you for joining us today, and let me go ahead and turn it over to you.

Kimberly Powell {BIO 22145194 <GO>}

Thank you, Harlan. Thank you very much. Good morning, everybody. Nice and dry. So an honor, really, and I thank you, Harlan and J.P. Morgan, for inviting us back. This is absolutely a different kind of feeling year, and I'm excited to really share it with you.

So let's just do the first housekeeping. Let me start with a reminder that the presentation in QA contains forward-looking statements, and investors are

encouraged to read our reports filed with the SEC and the information that relates to our risks and uncertainties facing our business.

Super. So you might know NVIDIA as an amazing chip company. And in fact, we are. But we're much, much more than that. We are an accelerated computing platform company. Some scientists, some industries actually describe us as a time machine.

We launched our GPUs into general-purpose programmable processors with our programming model called CUDA. We now have well over 33 million CUDA developers. And then for the last 15 years, we've been developing a full stack of computing approach. So the ability to program the chips, but also be able to introduce acceleration libraries, applications and purpose-built computing platforms, whether that's large-scale datacenters for artificial intelligence or embedded supercomputers for the medical devices industry.

And so for each field of science and industry, and applications, we create a full stack, everything from gaming to design, earth and life sciences and self-driving cars and robotics. And this allows us to really serve $100 trillion worth of industry. But we're here to talk about healthcare.

So for healthcare, we created a platform called NVIDIA Clara. It's after Clara Barton. She was the inventor of the American Red Cross, not after Santa Clara, where our headquarters is, and it's an AI computing platform for healthcare. We recognize that healthcare is becoming the absolute largest data-generating industry. And we have global challenges increasing the cost of healthcare delivery and access to healthcare.

So we build computing platforms to serve these grand challenges, leveraging world-class chips and systems. We build platforms that span embedded edge, all the way through to cloud applications and frameworks that span from healthcare delivery to disease and drug discovery. And I'll hopefully show you some of that today.

Our computing platform is why we adopted. We're relied on by all of the top medical imaging companies to turn sensor information into rich images. We're quickly becoming the de facto standard for surgical robotics platforms, for real-time sensor processing. We're helping the medical and cancer centers be able to be really data-driven in their clinical treatment decision-making. And we're increasing the accuracy and throughput of sequencing so that we can reduce the overall cost of genomics and hopefully bring it more into the standard of care. And we're turbo charging the drug discovery process using artificial intelligence to really illuminate biological meaning and explore literally the infinite possibilities of small molecules and antibodies.

So in healthcare delivery, imaging is the essential tool. It's used at every stage of the patient journey, which is why it was one of the application areas we chose to focus on when I started at NVIDIA 15 years ago. As sensors evolve, so do the computing platforms and the applications in the healthcare delivery need to evolve. So from 2D

sensors that allow us to do annual screening into advanced 3D and 4D to do quantitative image analysis and to capture things like function in the new Photon CT scanners that have recently been released.

And now we're entering into what I call the fifth dimension where we can, in real time, with real-time sensing, we can -- these devices can really actually take action. They can do things like self-navigate. They can do things like adapt while you're in the middle of a radiation treatment. So very, very exciting times.

And so much like the self-driving car industry, I love to use that parallel because we can all sort of understand it, the healthcare industry is becoming software defined and is able to deliver great, great value through software. And in order to do so, you need two computing platforms. You need an AI development platform and AI deployment platform. And you need to connect these two so that the data that you were experiencing on the edge is very dynamic. And it's that data that you can collect at the edge to bring back in to improve these applications and redeploy them. This is the as-the-service architecture, and NVIDIA is building this end-to-end computing platform to serve it.

So here's an example. NVIDIA Clara provides the imaging industry, radiology, pathology, all the surgical data, the AI development platform, it's called MONAI. MONAI is an open source AI framework that we codeveloped with the industry, the academic medical centers and experts. We open source it, and then we have an AI deployment platform called Holoscan. So using MONAI as the AI framework for imaging, we've had over 800 million downloads of this framework. It's absolutely accelerated. And it's a driving force in the exponential growth in the AI research. You can see that through the publications here.

And then to help close the gap between research and clinical deployment, we announced last year, NVIDIA Holoscan is meant to be a commercial off-the-shelf more general purpose computing platform for these applications to live, so that not every medical device needs to reinvent their computing platform every time a new sensor technology comes to market.

So a scalable real-time AI sensing platform and it can scale, as I said, from embedded to cloud. We have developer kits already out there in market, and we announced design wins with several robotic surgery companies already.

The innovators in the industry are using NVIDIA platform to deliver new applications across radiology into therapy. So as you can see, just as we described, Carestream uses artificial intelligence to really have a complete smart AI X-ray room. It's at the room level all the way down to the device level to streamline workflows. You have Varian and Elekta where they can now use AI to do adaptive therapy, real-time adaptive therapy for their patients. I love the intuitive ion because it allows you to navigate into the lung and biopsy areas, otherwise no humans could travel. So these devices are absolutely opening up tremendous new capabilities, and we're excited to see the medical device market continue to go through this revolution.

But I want to go quickly next to a modality that is just super, super exciting. And I think we all saw a 2022 that changed the landscape of genomics tremendously. So genomics is a modality that is delivering great value to healthcare as well as research and drug discovery. It is the largest data generator in healthcare and growing rapidly.

We're witnessing the continued decline in cost, enabling large-scale genomics programs to transpire. However, we need to be sensitive to the fact that a lot of times, when you advertise the cost of sequencing, it's just the cost of sequencing and not the downstream analysis, which is ultimately the insights that we need to care for our patients and to deliver insights into discovery.

And so this is why we are partnering across the genomics industry from new sequencers to bio informatics platforms to cloud services and large pharma. So 2022 was an absolute breakout year for NVIDIA accelerated genomics. We partnered with Oxford Nanopore and Stanford and many others to achieve a Guinness record in clinical sequencing. We made NVIDIA Clara Parabricks free for research and partnered with the Broad Institute and put it in the Terra platform, so it's -- and it's also available in every public cloud.

And just this week, our partners at BioNeMo announced our work in accelerating 96 optical genome mapping workflows for high-throughput on-prem and cloud deployments, where they're having tremendous outcomes helping patients with this new structural variant capabilities.

So AI is becoming vital to all areas of genomics analysis, in fact. Primary analysis, which takes the signal or image and turns it into the genomic base calls, is all done now through artificial intelligence algorithms because it helped realize a step function and accuracy as well as performance. And the higher the throughput of the instrument, the lower the cost of sequencing. So AI is also bringing that speed.

And so just a few months ago, Seattle Children's and the University of Washington were able to deliver a genetic risk assessment within three hours of a newborn's life to rule out that a disease that their sibling had. By reducing the cost, increasing the speed and partnering with the clinical community, we can bring the condition to move sequencing more into the standard of care, and we're really excited to do that across the board with all of our sequencing partners.

With more sequencing platforms and modalities entering the market, we are going to be pushing these 40 exabytes of genomic data out there into the world. And we already have 500,000 genomes into 1 million genome databases associated with patient data. And these are becoming readily available. And so we must harness the latest breakthroughs in artificial intelligence to drive our biological understanding and therapeutic discovery.

So we had some incredibly exciting breakthroughs at the end of last year at the Supercomputing Conference. It's a super neat example of how you can harness

large genomic data to drive genomic understanding. And we worked with NVIDIA Argonne National Labs, University of Chicago and achieved this just last -- late last year and won the Gordon Bell Supercomputing Award.

So you know the latest technology that is taking the world by storm is generative AI in large language models, most notably, ChatGPT. These models are trained on extremely large unlabeled data sets, and they can learn context and meaning by tracking relationships and sequential data. Sounds very much like genomics, if you ask me.

And so the same can be used on genomic sequencing data, and we did just that, co-developed a model called Genes LM [ph]. And it's the first genomic scale and the largest biological language model to date. So used 110 million bacteria sequences from the Patrick database. And then we fine-tuned it with 1.5 million SARS-CoV-2 genomes. And the model was able to not only predict the evolution of the virus, so potentially be useful for an early warning system, but it was also able to accurately identify variance of concern. And this is all published, and the paper is in the source there. So really, really super, super amazing breakthrough here.

And I want to kind of give you a sense to what are these models learning? And how are we going to be able to really understand how they learn and represent biologically relevant information? So let me just kind of play this video that the team made this to sort of give you a description of what's going on.

You can see through clustering that the model is finding semantic meaning in the latent space. And first, you can see it cluster genomes by their sequence lengths, and then we're going to move into here. You can see it with this GC content indicating secondary structure stability. And then we could even zoom in on particular enzymes, and we can see the structural differences. And this is something actually the model was never trained for.

And so these models are actually helping us with interpretability. No longer are the days of deep learning black boxes. These foundation models are -- give us a new ability and become the bedrock for us to really be able to read and start to understand biological meaning. So very, very exciting opportunities here. And this is -- language models applied to genomics. We are just getting started.

So like generative AI has set off broad use across all industries, AlphaFold set the image at moment for AM Biology. And standing on the shoulders of giants and the breakthrough is coming from deep mine and open AI, biology labs at Meta, Roast Lab, Baker Lab, Barsele Lab [ph] and thousands more published papers in 2022. So generative AIM biology is witnessing that same broad applicability across life sciences and drug discovery.

Like I said, from pandemic early warning systems to target discovery, to protein structure prediction, to virtual screening, to drug target interactions and protein engineering, literally touching every phase of the drug discovery process. And so

biology is going from an empirical science, experimentation and exploring the physical natural world to computer science and AI, and we're -- it's quickly moving from a science to an engineering.

So just this morning, we're announcing exciting results of a collaboration between NVIDIA, InstaDeep, who -- congratulations, who just announced they were being acquired by BioNTech and Technical University Munich. And it's resulted in a state-of-the-art genomics language model. Genomic language models are still in early investigation, DMA Bart being one of the early notable ones. But you can imagine that much of this technology has been applied to natural language processing, but the genome has four letters in 3 billion -- of 3 billion long sequence. So it presents new challenges.

And so we use the NVIDIA Cambridge-1 supercomputer. We trained a collection of large language genomic models. And the highest performing model called nucleotide transformer. It achieves state-of-the-art on not only one of the benchmarks, but on 15 out of 18. And that means that this large foundation model is able to generalize across many, many tasks, which otherwise were built model at a time quite narrowly.

The paper is really, really informative, and it shows you that multi-species data was super important to be good at generalizing across these tasks. It was also very important in showing that you need larger and larger language model sizes. And that's why NVIDIA is here, so we can enable that to happen.

So the highest performing model ranged from 500 million parameters to 2.5 billion, and the 2.5 billion parameter model absolutely went out. So this will be published in a paper in the coming hours as archived chunks through it, and then we will also make a fraction of these models readily available in the coming weeks.

This is exactly why we created NVIDIA BioNeMo service, announced in September last year at our GPU Technology Conference, to enable the over $200 billion of R&D market and drug discovery. How can we give them access to the tools, the frameworks, the applications at data center scale to accelerate drug discovery?

So BioNeMo is making it easier and more efficient to build and use generative AI in large language models across every stage of that drug discovery process I just enumerated. BioNeMo is in early access, and we're working across the entire ecosystem with the leaders in biology and drug discovery field from research to the tech bios, all the way through to the large pharmaceutical companies.

Today, we are also announcing with our partner, Evozyme, that we've built a generative AI model for protein engineering called ProT-VAE. It's a protein transformer variational auto and coder. As you know, proteins are the building blocks of life. Every cell contains proteins. They're present in our everyday life from clothes we wear, food we eat, air we breathe. So the field of protein engineering looks to discover new proteins that can help design more effective drugs and

remove carbon from the air or make more environmentally friendly clothes. However, the number of potential proteins far exceeds the number of particles in the universe.

So Evozyme was able to use in a few short weeks, be able to use NVIDIA BioNeMo, use our pre-trained models, inject their special sauce with the VAE encoder and train a model and be able to, from sequence, generate proteins that they were able to experimentally synthesize and validate in the lab. The beauty about this is they use BioNeMo to fine-tune that model for family of proteins. So you can fine-tune it for a set of proteins that has the given properties function and characteristics that you want, and then it can generate a library of those.

And so I want to, again, give you a little flavor for what that looks like. So the -- here's an example of a protein called human PAH. It's a protein responsible for a precursor to making pigments, hormones, also neurotransmitters, and it can even cause some pretty rare disease disorders. So the ProT-VAE model, it was trained on PAH protein family. And here, we sampled two of the proteins generated and validated.

The first protein generated had 51 mutations, which is about 85% similarity to the original, and it has a 2.5x, a huge 2.5x enhancement in function. This is what exactly you want when you're developing new therapies.

ProT-VAE also generated another protein with 167 mutations, so only 50% similar. This is where no human would intellectually go, but it was able to still achieve enhanced function. And so the protein language of ProT-VAE, it generated proteins nature's never seen before, but it was able to maintain the function for the desired properties that they were measuring for. So this is the promise of these large language models, the ability to explore way outside the space. And so we're going to extend what is today the common use of directed evolution and extend it into machine-guided directed evolution. And it's really an accelerator to be able to discover new proteins.

And so I'll conclude with NVIDIA is building the compute platforms to address the breadth of healthcare to benefit from extraordinary capabilities enabled by generative AI and accelerated computing. MONAI for imaging, Parabricks for genomics, BioNeMo for drug discovery are helping the industry harness the computation and massive accelerate R&D and the workflows that drive healthcare and life sciences.

And so the time for generative AI and biology is now. An explosion of seminal work happened in just the last three months of last year. I've exemplified them here with these models, and they are elucidating biological meeting. This is going to help us understand disease, and it will accelerate our ability to discover new therapies. And so we can build representations of large and complex data sets now and make meaningful predictions.

So with that, I hope I leave you with a very bright and sunny future of what 2023 holds to really harness this technology, and I look forward to answering your

questions. Thank you.

Questions And Answers

Q - Harlan Sur {BIO 6539622 <GO>}

(Question And Answer)

Great presentation. Are there any questions out there? I'll just ask, did you wait for the mic? Got one back there.

Q - Analyst

NVIDIA's revenues seem to have peaked in April of last year and have declined -- quarterly declined since. Can you explain that? And why you think it's temporary?

A - Kimberly Powell {BIO 22145194 <GO>}

I cannot. I am not in our Investor Relations team, so I will politely decline that answer.

Q - Analyst

Thanks.

Q - Harlan Sur {BIO 6539622 <GO>}

Questions? I've got one right over here in the middle.

Q - Analyst

Yes. Can you just talk about the competitive landscape, your customers? What other alternatives they have? How much has done internally? How much they need to go outside for AI solutions?

A - Kimberly Powell {BIO 22145194 <GO>}

Yes. I think the competitive landscape in artificial intelligence is we are in a unique position at NVIDIA. We're the only AI company that can also work with every other AI company. Our platform is well adopted in every single public cloud. It's adopted by every single computer maker on the planet, and it ranges in sizes from embedded computers, all the way through to cloud platforms.

And so if you look at that sort of future description of what we can offer the market, it's a ubiquitous computing platform. And so it allows us to give the application developers, the industries the ability to transform business models and run these exciting new application workloads completely at scale.

And as you know, we dedicated the company to artificial intelligence going back some 10 years ago -- yes, at least 10 years ago. And the description language I

described called CUDA has been around even longer, 15 years. And so the ability to reinvent sort of that software ecosystem is very, very tricky.

And that's why I really describe NVIDIA not as a chip company, but we are an accelerated data center company. And so to compete at that level is very, very difficult. And the software investment that we've made and our ecosystem partners have made is really what differentiates us and allows us to remain -- allows us to innovate continuously at the speed of light, because we're a full stack company.

Q - Harlan Sur {BIO 6539622 <GO>}

Questions? I've got a question. So -- and maybe this will answer the gentleman's first question. Obviously, the consumer part of your business was weaker last year because of the weaker macroeconomic trends, some of the lockdowns in China. The data center business, which is where your franchise belongs, that's -- I think that grew 40%, 50% last year, and it's still on. It's still going at a very strong sort of double digits year-over-year clip.

In fact, the data center business for NVIDIA has grown at a 70% CAGR over the past three years. It's 60% of your total revenues. Underneath that, accelerated compute spending within healthcare continues to grow at an extremely rapid rate as you sort of reflected in your presentation. Can you just give us a sense, snapshot of the revenue scale, the growth rate for your healthcare franchise over the past few years? And how do you see the SAM opportunity for healthcare over the next three to five years?

A - Kimberly Powell {BIO 22145194 <GO>}

Yeah. I mean healthcare is an extremely important industry, and it's quite broad. And I hope I was able to let you know that we're focused on some very important large markets within it, whether that be genomics, medical devices, the biopharma industry. So we believe that we could be the next $1 billion industry for NVIDIA.

And you can -- as I described, there's these two computing platforms that are needed for the future of how we're going to innovate, develop software and as a service. And so one proxy you could use, Harlan, is look at the growth in AI research papers. It's all being done on that development platform. So in the last two years, 120% growth, and then we're addressing the ability to deploy these applications. They're maturing now. They're running in the data center.

But now they also want to run at the edge because there's a lot of incredible value you can provide the industry when you're developing real-time insights at the edge and then also have a flexible computing platform to continue that analysis and development back in the data center in the cloud. So that's kind of the proxy that we use, and I think 120% growth sounds great.

Q - Harlan Sur {BIO 6539622 <GO>}

Yes, absolutely. Questions?

Q - Analyst

Hi. Yeah. As a follow-up -- sorry, I lost my voice. As a follow-on from that perspective around this potentially becoming $1 billion industry for the data center sort of value proposition that NVIDIA can underpin, which of the traditional healthcare stakeholders need to enable or buy into the value chain of your end customers? So do you need reimbursement or regulatory or sort of government buy-in to the innovative products that get built on the stack for you to realize the $1 billion at your end?

A - Kimberly Powell {BIO 22145194 <GO>}

Yeah. I think -- I don't know if that's going to be our rate limiter at the moment. I think as I sort of alluded to, these large language models that we just described that were built in just the last three months of last year, they take an entire supercomputer to train them. So just to be able to explore this new capability in generative AI and large language models is a data center in itself for said customers.

So the pharmaceutical industry, you can hear it all over the floor here at J.P. Morgan, they're building centers of excellence in AI. They're using all of the massive data sets that they've acquired over the last decades of drug development. There was $40 billion of investment that was pumped into what the term I love, which is tech bios, technology-first biology companies, because they're -- we're able now to generate so much biological data to really drive this model development.

So I think purely from that realm, we can reach that potential $1 billion opportunity amongst many of the other opportunities, but the analysis of genomics. But generative AI and large language models is just a clear easy one to understand.

Q - Analyst

How much of your healthcare business today comes from genomics versus radiology and robotic surgery and more conventional healthcare segments?

A - Kimberly Powell {BIO 22145194 <GO>}

I don't think we -- I don't know if I would be that granular about it. It used to be, call it, sort of like an 80/20 split where we would be so in the medical devices. I kind of grew what you described would be very medical device centric. That's where we started. That's where our heritage lies, going inside of CT scanners, inside the genomic sequencing instruments, powering the robotic surgery platform.

So all of that was kind of, call it, 80% and 20% was kind of coming from simulation that's going on in the pharmaceutical industry, the genomic analysis. And we're definitely now coming into more of a 50/50, because of some of the dynamics that I just described of massive amount of computing that is being -- that is happening in pharmaceuticals. So the balance is there, but they're both growing at the sort of indicated pace of what you're seeing in the AI research.

Q - Analyst

Just a quick follow-up. Did you say what your healthcare revenue is today? You said your --

A - Kimberly Powell {BIO 22145194 <GO>}

I did not.

Q - Analyst

You don't release that?

Q - Harlan Sur {BIO 6539622 <GO>}

Questions?

Q - Analyst

Thank you for a great presentation, a huge fan of NVIDIA.

A - Kimberly Powell {BIO 22145194 <GO>}

Thanks.

Q - Analyst

And we buy a lot of your stuff as an AI start-up. But I see that recently, the bio -- tech bio market has kind of declined. So some companies have, of course, grown dramatically, hopefully like us, but some have declined. So how do you see the split now between big pharma and tech bio going forward in terms of the GPU sales and also cloud sales? And because many pharmaceutical companies are still kind of in a little bit of an Intel world, but now, of course, everybody is switching to NVIDIA, but how do you see that split?

A - Kimberly Powell {BIO 22145194 <GO>}

Yeah. I don't want to predict the market, Alex. We're kind of -- as a platform company, we love to raise all boats and support the ecosystem the best way that we can. You're a fantastic partner at -- and Silico paved the way in showing that generative AI can be used across the complete drug discovery process coming to GTC for the last 10 years.

So one, you have to be a believer. I think pharma is still trying to figure out, are we a believer in this technology? So they're doing a lot of dipping into it. And they're also kind of waiting and watching and partnering with the tech bio company.

So I don't want to make a prediction. I think the industry and the number of therapies and the personalization of medicine, there's room for everybody if they were up to me. But I don't -- I think that there's a tremendous amount of promise. I think there is a need to think differently in this day and age with the tools that we

have, with the automation of digital biology, that we need to see what the future holds.

Q - Analyst

Thank you. I actually think that $1 billion is probably low balling it. I think that you are already at the billing That's type.

A - Kimberly Powell {BIO 22145194 <GO>}

Yeah, within the next five years.

Q - Analyst

Thank you.

A - Kimberly Powell {BIO 22145194 <GO>}

Thanks, Alex.

Q - Analyst

Thank you, Kimberly, for a great speak, --

A - Kimberly Powell {BIO 22145194 <GO>}

Thanks.

Q - Analyst

That's vibration for the future. So yes, so I'm Kim from WinFrame in Vietnam, and we trade -- or we met on NVIDIA as a platform for training system as well as for production. So everything we moved from CPU onto GPU now.

A - Kimberly Powell {BIO 22145194 <GO>}

Thank you.

Q - Analyst

So I have two questions for you. One is, what do you think about ChatGPT that will be influenced into healthcare from your point of view? And second is the generated like sequential majority of that, what do you foresee about?

A - Kimberly Powell {BIO 22145194 <GO>}

Yeah. Thank you, yes. ChatGPT is just -- it's an amazing technology, and it's -- you got to ask yourself, it's just about what do you want to use it for? I kind of think about it right now, and just because in my own little world, back when we started work on AI and radiology, everybody jumped to the conclusion that AI and radiology has to diagnose somebody. No, it doesn't. It has a massive amount of utility throughout the entire workflow and process of radiology.

So it's really about what do you want to do with the AI. Do you want it to write your assay? Did I wanted to write my presentation? No, I did not. But I might want to do it to learn about how an enzyme. Or yes, you can ask some interesting questions like that. So I think it will. I think the type of technology will have and should have a utility in healthcare. I'm not saying that it does today, but I think it will. And its utility will be different than maybe where some people want to leap to. It doesn't have to be that far of writing up a medical report and discharging a patient.

And then for generative AI, I think there's been -- Alex, who's just here just already has proof points how you're able to now discover novel targets and therapies that are in human trials. So that is well underway and being proven. And so if that isn't promised enough, but then where you have this large body of biologists and scientists who may not come from the computer science world, what I love about generative AI in these language models is we can now interrogate them in an interpretable way. So we can now learn together that the computer science community and the science community can learn this together and really start to unlock biological meaning.

We know we don't know enough about the genome. So these models, my hope, is that they're going to help elucidate a lot of that. And then generative AI, like DALI, where you can go from one domain to another from text to an image, how could that not have massive utility in going through the different types of data sets in healthcare, from health records to genetic marker to what they saw in your image to what your pathology report is looking at?

So with the likes of Genomics England and U.K. Biobank, we're looking at, can we harness these new big data sets to see if there's a DALI in healthcare that has utility. So it's not a panacea. It's a utility. It's a tool, right? And the whole point is can we accelerate? Can we increase our understanding and really move this field along and find more therapies for patients who need them? Thanks for the question.

Q - Harlan Sur {BIO 6539622 <GO>}

Questions? I'm going to put my semiconductor cap back on because your chips and your hardware systems are the foundational building blocks, right? And you guys unlock all the innovation via your vertical markets with the platforms. The team just rolled out its next-generation compute acceleration platform, the H100. That's based on the Hopper architecture, 4-nanometer, leading-edge manufacturing technology, 80 billion transistors on a single piece of silicon, one of the largest chip designers in the world.

Typically, the team focuses a lot of its efforts on cloud and hyperscalers at their early stages and followed by enterprise and vertical segments like healthcare. Talk to us about the adoption curve for the team's prior generation A100 platform, and how do you see the uptake and momentum for the next-generation H100 that the team is rolling out now?

A - Kimberly Powell {BIO 22145194 <GO>}

Yeah. I think it's going to be incredible. So we've already started early access and early work in the area of genomics, as I said, right? There's an insatiable demand for compute to deal with the amount of data that's coming off those instruments. And the more throughput, the lower the cost. So we already have a tremendous pickup in that.

What I'll say is, in the past, you had to wait for the technology to come up and become available. Well, we're moving at speed of life. And throughout the first quarter of Q1, you're going to see H100 popping up in all of the public clouds, tens of thousands of them. So we're very excited that it's going to be readily available. So these workloads can automatically take advantage of it.

And with some of the incredible features that it presents from a perspective of these large language models, it has a transformer core in it for the transformer large language models, it has in it to really squeeze down the efficiency and take these large language models, which would either be very expensive to inference and be able to do that very effectively. So I think it's going to be a rapid migration to H100, and the market is prepared and ready for it.

Q - Harlan Sur {BIO 6539622 <GO>}
Perfect. Well, we're just about out of time. Kimberly, thank you for your participation and look forward to having the team back next year.

A - Kimberly Powell {BIO 22145194 <GO>}
Thank you so much for having us. Yeah.

Q - Harlan Sur {BIO 6539622 <GO>}
And look forward to monitoring the progress and execution of the team this year.

A - Kimberly Powell {BIO 22145194 <GO>}
Thank you all for coming. Appreciate it.

Q - Harlan Sur {BIO 6539622 <GO>}
Thank you.

A - Kimberly Powell {BIO 22145194 <GO>}
Thank you.