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Changing Technion

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# TECHNION USA



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Pictured on cover / Bottom row (l-r) Prof. Marcelle Machluf and Prof. Yael Mandel-Gutfreund; second row (l-r) Prof. Idit Keidar and Prof. Ayelet Fishman; top row (l-r) Prof. Tali Tal and Prof. Gitti Frey; not pictured: Prof. Stavit Alon-Shalev

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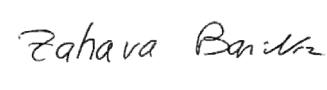
**A**fter two years of isolation and uncertainty, the Technion campus is returning to normal. Students are back on campus. In-person events — including the recent Board of Governors meeting — have resumed. Centennial preparations are well underway, as are plans to open cutting-edge facilities and launch exciting new programs. President Sivan just put the finishing touches on the Technion’s 10-year strategic plan, which will maintain Technion’s global position among the top technological universities in the world as it enters its second centennial.

Once again, there’s a palpable energy in the air on campus. As you flip through the pages of this issue of *Technion USA*, we hope you feel that energy as well. The stories that follow capture some of the most pioneering and inspiring work happening on campus today — from new breakthroughs for neurodegenerative diseases, cancer, and autoimmune diseases to the Technion’s work in outer space. You, our devoted supporters, are partners in these achievements.

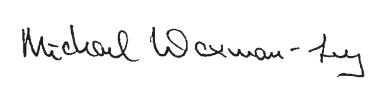


  
Steve Berger  
President



  
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Michael Waxman-Lenz  
CEO

Despite the disruptions of the past two years, the Technion has not slowed down. In many ways, the challenges of the COVID-19 pandemic have served as a sobering reminder of the importance of scientific research and innovation for the public good.

As a premier research institution, the Technion is gifted with some of the most brilliant faculty and a phenomenally talented student body. Every accomplishment you read about in *Technion USA* is due to their diligence, creativity, and determination. In this issue, you’ll meet the female deans who are charting a new path at the Technion, hear from two postdoctoral students about the impact of the Joan and Irwin Jacobs Technion-Cornell Institute Runway Program, and meet some of our alumni.

What you are holding in your hands represents the best of the Technion: its ideas and its people. We hope this edition sparks your curiosity and reminds you of why you are a part of the global Technion community. We are grateful to have your support.



**“Industry and academia are no longer completely separate entities. We are intertwined.”**

— Prof. Uri Sivan

# Inside a Changing Technion

What the Next 100 Years Will Look Like

A

lmost 100 years ago, 17 students began studying at the *Technikum*, a new university on the slopes of Mount Carmel. The first courses at what we now know as the Technion marked a defining moment for the Jewish settlement in Palestine — The *Technikum* was Palestine's first academic institution and the Middle East's first technological-scientific university.

Back then, the Technion offered just two tracks of study: civil engineering and architecture. Today, about 14,000 students can choose from more than 50 undergraduate and 83 graduate programs clustered into 18 academic faculties. The Technion now has 60 research centers in a sprawling campus in Haifa, in addition to a presence on campuses in the United States and China, making it a truly global institution.

Albert Einstein sagely noted that “future Israel can win the battle for survival only by developing expert knowledge in technology.” One hundred years after that observation, it is safe to say Israel is winning that battle thanks to the unparalleled expertise provided by the Technion.

From the very moment the Technion opened its doors, the institution, its faculty, and its students made immeasurable contributions to the state of Israel’s

infrastructure, defense, and economics. Technion alumni developed much of the industrial groundwork the young country depended on in its early days, and the university and its graduates continue to create innovations in a variety of fields.

Technion ingenuity has launched satellites into space, invented the USB flash drive, built “exoskeletons” that allow paralyzed people to walk again, developed defense technology to keep Israel safe, and devised numerous advances in medicine and alternative energy sources. Israeli companies comprise one of the highest concentrations of high-tech startups outside Silicon Valley. The Technion’s more than 123,000 graduates account for at least 70% of Israel’s high-tech workforce.

## A Changing Technion

Throughout history, the Jewish people have adapted and evolved in the face of a changing world. The same can be said of the Technion. Students in Israel and worldwide no longer need to rely on their professors and textbooks for knowledge. They have the internet. Academia was also once the sole source of research that was then applied by industries to create new products and technologies. That, too, has eroded as companies are developing their own well-funded research operations.

"In the past, the professor was the single source of information, perhaps together with a textbook," said Technion President Uri Sivan. "Today, information is available everywhere. There are online courses where one can listen to teachers from the best universities in the world."

This could be an existential crisis for the Technion and the State of Israel. After all, the Technion is unique among its academic peers in that Israel's economy and security are intertwined in the Technion's mission.

Instead, President Sivan saw this dramatic shift in the education ecosystem as an opportunity for the Technion to remake the very definition of what a university could be. In the process, he has helped to transform the Technion's relationship with private sector institutions, add new coursework, and tear down institutional silos in the name of a bolder, stronger, and more competitive Technion.

### **"Hugging" Industry**

Where some universities saw the rise of industry-funded research facilities as competition, President Sivan saw collaboration. "We need to reach a new understanding with those companies," he stated. "Industry and academia are no longer completely separate entities. We are intertwined."

In President Sivan's mind, the question was not how can the Technion compete against these giants? But rather, how can we remind industry of the value of academia? Instead of going head-to-head against well-funded companies like IBM and Apple, the Technion brought them even closer to the Technion — in President Sivan's words, "hugging" industry. He invited company executives and scientists into the classroom as teachers and mentors, while sending Technion students and researchers into industry labs.

Bringing industry deeper into campus is a win-win for both the university and industry. The Technion gets firsthand access to technology and information from some of the world's most cutting-edge companies. Students benefit immensely by learning from these experts. And companies can build a pipeline of enormously talented young creative minds while having their "finger on the pulse" of the latest research coming out of the Technion.

Already, major corporations are flocking to avail themselves of Technion expertise. A prime example of this

collaboration is the partnership between the Technion and American software giant PTC. The company will invest several million dollars to create a joint research and development center on campus. In addition, the Technion is in the process of signing strategic partnership deals with major brands including Doral, Intel, Tzemach Food, Rafael Defense, and Israel Aerospace Industries. Brand-name alliances also become a recruitment tool for attracting talented students and faculty to campus.

The Technion has also worked to alleviate obstacles in commercializing products, making it easier for faculty members to take their ideas to market. The results have been dramatic. Before removing those bottlenecks, just four or five technologies were commercialized each year. Now, said President Sivan, "we are setting up approximately 15 companies a year. In the past two years, we have established 28 companies, and this space is growing fast. I wouldn't be surprised if the Technion became the largest holding company in Israel."

### **Ten-Year Plan: Developing the "Well-Rounded Engineer" . . . and More**

In a world where higher education is changing so rapidly, President Sivan has developed a 10-year strategic plan to keep pace with the new demands of society. "Technion 2031" addresses a wide range of issues covering everything from diversity on campus to classroom curriculum.

First and foremost, Technion 2031 is reimagining something as basic as the Technion's educational approach. Moving past the long-established, siloed method in which students study a single academic discipline such as physics or chemistry, the Technion plans to organize research and learning around today's most pressing challenges: Human Health, Energy, and Digital Industry. President Sivan is already in the process of creating multidisciplinary research centers with shared infrastructure to tackle these core societal concerns. "The grand challenges of the 21st century are all multidisciplinary," he said. "If you take, for example, human health, it's not just medicine. There's a lot of engineering going on, data science going on, physics, and so forth."

By bringing together researchers from different disciplines to collaborate and build on each other's research, the Technion expects to be able to address



Prof. Roy Kishony is a member of both the Faculty of Biology and the Rappaport Faculty of Medicine, making him a part of an elite group of experts whose interdisciplinary knowledge and abilities are advancing science and changing the world

common challenges more rapidly and more effectively than ever before.

The strategic plan would also broaden the Technion's curriculum to offer students more than a scientific education. In the words of President Sivan, "Scientists, architects, medical doctors will at some point in their professional life have to make some major decisions that have consequences on society, ethics, and the environment. We find it essential to give our students some background so they can create for themselves a wider perspective of life."

To do that, the Technion is establishing a small humanities department for the first time in the institution's history. The program, which is dubbed "The Well-Rounded Engineer" and is becoming mandatory for all undergraduates, provides students with a societal

perspective, an environmental awareness, and a familiarity with issues of diversity and ethics. Graduate students will be asked to incorporate chapters on the societal or ethical implications of their work into their theses.

Embracing challenges and turning them into advantages has been the story of the Technion since it first opened its doors. And the Technion isn't slowing down now. In addition to the aspects discussed above, Technion 2031 aims to expand the university's cutting-edge research capacity and recruit talented faculty who would rise into leadership positions, while solidifying strategic partnerships with corporations, the public sector, and other universities. It's the kind of continuous innovation that has helped the Technion — and the State of Israel — remain an ascendant force for over 100 years. ■

# Creating a Sustainable Future



Almost every commodity, from detergents to penicillin to fertilizer, is produced industrially through catalysts, substances introduced to speed up chemical reactions. Yet as indispensable as they are, many catalysts used in industry today create significant environmental waste and economic inefficiency. The Technion's soon to be established Center for Sustainable Processes and Catalysis aims to discover novel, green catalysts from naturally abundant elements so that industrial processes will require less energy and become more sustainable.

**Distinguished Professor Ilan Marek**, chair of the Center, spoke at the ATS Presidential Forum in March 2022 along with clean energy specialists **Assistant Professor Charlotte Vogt** and **Associate Professor Matthew Suss**. The trio was interviewed by **ATS National BOD member David Rosenblatt** (*pictured left*), vice chairman and founder of Arava Power, about the magic of catalysis and the Center's plans.

**David Rosenblatt:** Charlotte, people assume we need to go green to keep the Earth sustainable for our children and grandchildren. What does sustainability mean in practical terms? Would we need to reduce consumption?

**Charlotte Vogt:** I look to the near future, 20 to 30 years from now, and see two scenarios. In the first, we rely completely on breakthrough technology. But a more realistic scenario is one that is more reliant on legislation to curb the emission of CO<sub>2</sub>, and less on breakthroughs, and it will be a mix. There's going to be some solar, some biomass, and still some fossil fuels. Almost everything from purses to curtains, shag rugs, epoxy, you name it, is made from

crude oil. There is a chance there are going to be things that can more efficiently be made using crude oil. Utilizing or storing emissions wisely and switching our electricity supply to renewables are key.

**DR:** Ilan, is it possible to create a sustainable planet when many countries do not cut carbon emissions proportionately to us or offset their carbon through renewable energy sources?

**Ilan Marek:** That is indeed a real issue, but we have some responsibilities towards the new generations, the generation of our children, of our grandchildren. At some point, one has to start and help the world to be a better place. In the last century, science and technologies have

drastically improved our quality of life but we also have created a situation that is not sustainable anymore. Each one of us should be concerned and correct our mistakes, and in the pure Jewish tradition, we need to do our best to repair our world. Let us be a role model, to show the path to a better world, and I am convinced that subsequently, many will follow.

**DR:** Matthew, you discussed integrating solar energy into the national grid. Since the intermittent nature of renewables causes new issues for grids, will transitioning to green energy be delayed as we wait for investments and build-outs of the grid to be completed?

**Matthew Suss:** In order to transition to the majority of electricity being



supplied by renewable energy sources such as solar and wind, we will need to modify the grid to include low-cost energy storage. However, we're fairly far from this goal, as in the U.S. solar and wind account for just over 10% of all electricity generated. In the meantime, there is room for renewable energy to continue to grow as grid-scale storage solutions are developed.

**DR:** Ilan, faced with these difficult challenges, can you tell us what's in store for the soon to be established Center for Catalysis and Sustainable Processes?

**IM:** We're creating a center in which scientists from many and diverse disciplines will be working at the same place, mixing knowledge and expertise to solve the global issues of sustainability. A single powerhouse making new catalysts for different topics with applications that will be transferred to the real world.

This Center will be an incubator of young talents recruited worldwide from various disciplines. They would spend seven years working side by side at the Center, and then return with an enriched perspective to their individual faculty. This is something unique in Israel. The building will

have state-of-the-art equipment and will be constructed with plenty of open spaces for people to share ideas. Think of it as a bottle of champagne. When you shake it and pop the cork, you have bubbles everywhere. That's exactly what we want to do. We'll create a place where faculty will come with brilliant ideas and rotate in and out. It will never be a static system.

**DR:** Charlotte, why is the Technion well suited for this type of center?

**CV:** The Technion has a long track record in developing groundbreaking technologies and is already doing research in the field of catalysis.

What's particularly special for me is that in addition to working on incremental improvements to existing processes — which is important — the Technion encourages you to just play around in the lab and see what comes out. This produces breakthroughs because by definition, a true breakthrough can only come if you don't know what you're working towards. I also want to see the technology we come up with implemented to help make the world a better place, and the Technion has a robust T<sup>3</sup> (Technion Technology Transfer) program.

**DR:** Matthew, what does success look like for the future in terms of sustainability and the impact of the Technion Center 10 years from now?

**MS:** One important goal is that solar and wind power account for 50% or more of the total electricity generated. Why can't we go entirely with renewables? It's because renewable energy is intermittent — generated only when the sun is shining or the wind is blowing. So you need to store

that energy in batteries to be able to deliver it at times of low electricity production. In my lab, we're exploring innovative catalysts to create long-lasting, inexpensive batteries that store clean energy on a large scale. We have Israeli and EU funding and are collaborating with various companies such as Shell to develop a promising hydrogen-bromine battery. The Center for Catalysis and Sustainable Processes has the interdisciplinary vision, talented people, and mandate to make major contributions to energy storage solutions widely implemented in 10 years. ■

Pictured above (l-r) / Profs. Ilan Marek, Matthew Suss, and Charlotte Vogt at the 2022 Presidential Forum



# Models of Determination

**Meet the Female Deans Making History at the Technion**

The Technion has been a magnet for trailblazing women in the science, technology, engineering, and mathematics fields since it first opened its doors in 1924. That inaugural class of just 17 students included one woman, who came to the Technion to study architecture and civil engineering at a time when women were discouraged from pursuing higher education.

The ranks of Technion women have grown significantly since 1924. Thanks to the concerted efforts of Professor Shimon Marom, executive vice president for academic affairs, about 40% of all appointments

relating to promotions and tenure for academic staff are women. The number of undergraduate female students at the Technion has also increased to 42%. And shortly after becoming the Technion president in 2019, Professor Uri Sivan, along with Professor Ayellet Tal, his advisor for Advancing Women in Science and Engineering, established a committee to increase the representation of women in senior faculty and other influential roles.

In 2022, the Technion reached another milestone for gender equality: a record seven deans are women. The achievement is a landmark in the ongoing effort

to expand diversity on campus. President Sivan noted, "The achievement of seven female deans all gaining tenure at the same time is especially impressive considering the relatively small number of women in the engineering, science, and exact science professions. The Technion hopes these deans will serve as a model for young women aspiring to careers in these fields."

**Professor Ayelet Fishman, dean of students,** is head of the Laboratory of Molecular and Applied Biocatalysis in the Technion Faculty of Biotechnology and Food Engineering. As dean of students, she oversees the well-being

and personal advancement of all Technion students. Prof. Fishman has conducted extensive research on protein alternatives that do not rely on animal sources. For example, she developed a vegan gel that can be used to create chocolate pudding that has the same texture as milk-based pudding and is healthier than existing soy puddings.

**Professor Stavit Alon-Shalev, dean of Continuing Education and External Studies,** is a professor in the Rappaport Faculty of Medicine and the director of the Genetic Institute of Emek Medical Center in Afula, Israel. Prof. Alon-Shalev focuses on using nanotechnology to decipher the genetic bases of inherited diseases. She has served on numerous national committees guiding the use of medical genetics in Israel, including the Committee for Rare Diseases of the Ministry of Health.

**Professor Marcelle Machluf, dean of the Faculty of Biotechnology and Food Engineering\***, has received international accolades for her cutting-edge cancer and drug delivery research. She was named *Lady Globes*' "Woman of the Year" in 2018, and her work has been included in the Israel Ministry of Science and Technology's list of "Israel's 60 Most Impactful Developments." She is perhaps best known for her work in tissue regeneration as well as her targeted drug delivery system called Nano-Ghosts, which uses stem cells to home in on tumors, unleashing their therapeutic load at the cancer site.

**Professor Gitti Frey, dean of the Faculty of Material Sciences and Engineering,** has been with the Faculty of Material Sciences and Engineering since 2002 and is affiliated with the Grand Technion Energy Program. In her research,

Prof. Frey studies how to assemble organic and inorganic materials into optoelectronically functional systems that are integrated into products such as LEDs or solar cells. She has been internationally recognized for her research work and has been lauded numerous times by the Technion for excellence in teaching and research.

**Professor Idit Keidar, dean of the Andrew and Erna Viterbi Faculty of Electrical and Computer Engineering,** studies computer engineering with a focus on distributed systems such as cloud storage, where files of millions of users are stored in a network of tens of thousands of machines. She has collaborated with industrial partners (including IBM, Microsoft, Yahoo, and VAST Data) on designing and building distributed systems. Yet she is particularly keen on understanding the theoretical foundations that can improve the practice. Prof. Keidar is also an accomplished prose writer whose short story recently won second place in a creative writing contest for scientists.

**Professor Yael Mandel-Gutfreund, dean of the Faculty of Biology,** is the past president of the Israeli Society for Bioinformatics and Computational Biology and an internationally celebrated expert in systems biology. Prof. Mandel-Gutfreund studies DNA and RNA binding proteins, which has led to the development of novel drug targets. She has also studied how viral infections can impact gene expression in placental and embryonic cells to understand how these infections can impact pregnancy.

**Professor Tali Tal, dean of the Faculty of Education in Science and Technology,** leads the faculty's science and environmental education

**I believe anytime you are given an opportunity you have to take it. Women can do anything — but we must be determined."**

— Prof. Ayelet Fishman

research group. Her research focuses on learning science in informal settings, inquiry-based learning, environmental education, and learning with socioscientific issues. Prof. Tal served as the president of the National Association for Research in Science Teaching, and was the chair of the Ministry of Education Professional Committee of Environmental Sciences.

Speaking recently to female students at the Technion, Prof. Fishman said: "I believe anytime you are given an opportunity you have to take it. Women can do anything — but we must be determined."

These seven women — respected leaders in their field who are globally recognized for their contributions to society — are proof positive that determination pays off. ▀

\*Editor's note: Prof. Machluf's tenure as dean of the Faculty of Biotechnology and Food Engineering concluded at the end of the 2022 academic year. Another female researcher — Professor Sima Yaron — has been named as her successor.

# PUSHING THE BOUNDARIES OF COMPUTER SCIENCE

For the Good of Humanity

**H**ave you filled a prescription for antibiotics recently? Used a virtual fitting room to try on clothes at home? Admired a new building going up in your community?

You have computer science to thank — yes, even for that virtual fitting room! Computer science has improved almost every aspect of our modern lives, even for the Luddites among us. Researchers at the Technion are taking it one step further, pushing the boundaries of computer science to deliver useful, innovative solutions to complex problems plaguing our society.

## Minimizing Antibiotic Resistance ... with Computers

The use of antibiotics, while essential to curing bacterial infections, can lead to the proliferation of antibiotic-resistant bacteria. A team led by Professor Roy Kishony from the Faculties of Biology and Computer Science has used genomic sequencing techniques and machine learning analysis of patient records to develop an antibiotic-prescribing algorithm that cuts the risk of an emergence of antibiotic resistance by half.

"We wanted to understand how antibiotic resistance emerges during treatment and find ways to better tailor antibiotic treatment for each patient to minimize their risk of infection recurrence,"

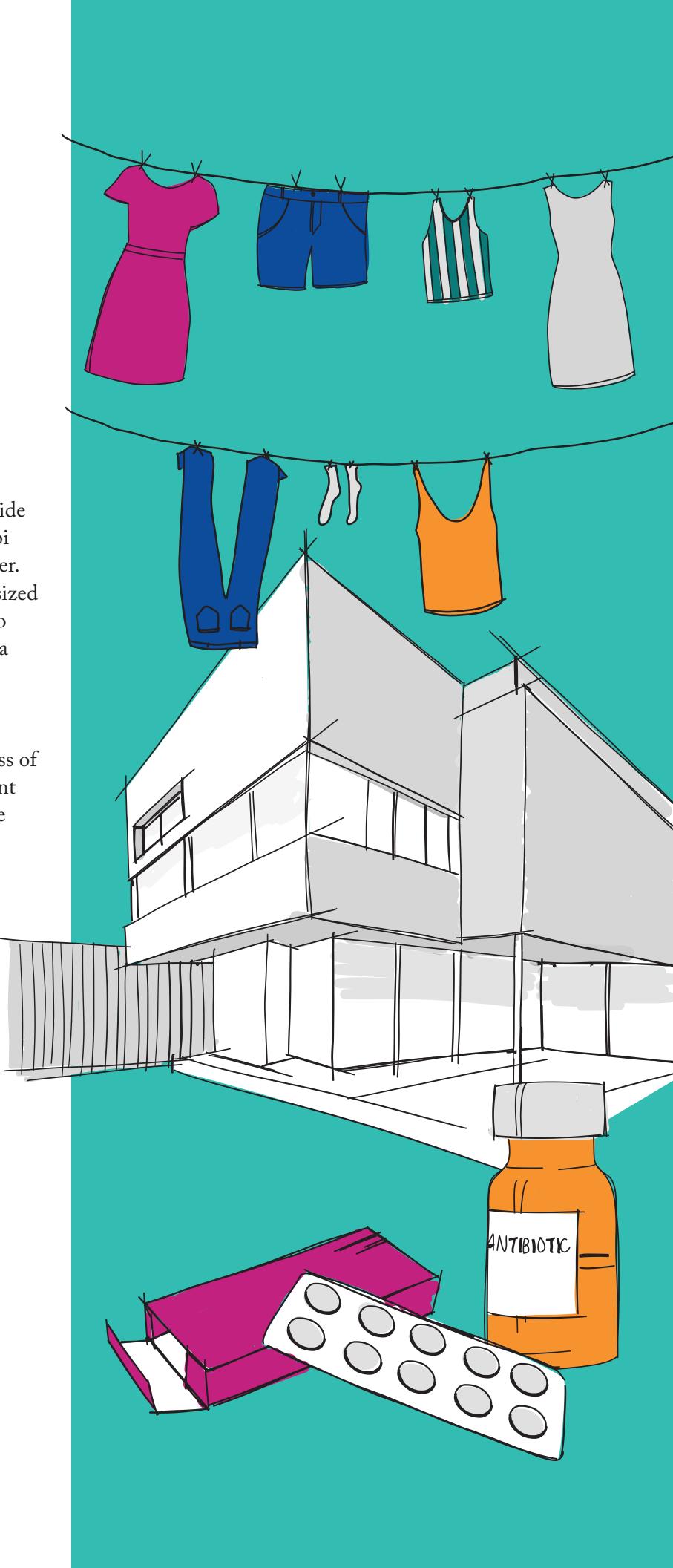
said Prof. Kishony, who worked alongside researchers at the Kahn-Sagol-Maccabi (KSM) Research and Innovation Center.

Prof. Kishony and his team hypothesized that antibiotic resistance is due more to reinfection by existing resistant bacteria from the patient's own body than to random bacterial mutations. So they created an algorithm that matches an antibiotic not only to the responsiveness of the bacteria causing the patient's current infection, but also to the bacteria in the person's own microbiome. Researchers hope their algorithm can be applied at the point of care, providing doctors with better tools to personalize antibiotics to improve treatment and minimize the spread of resistance.

This is just the Technion's latest application of computer science and artificial intelligence to the medical field. Its researchers have invented ingenious smart bandages that can monitor your medical condition in real time, and have used AI to mitigate the effects of gender bias in clinical trials.

## The Next Generation of AI Innovators

Of course, Technion students are not waiting until graduation to make their mark. Each year, undergraduates in the Henry and Marilyn Taub Faculty



of Computer Science showcase their inventions at the faculty's annual projects fair.

This year, multiple student projects focused on giving back. In one project for the nonprofit Friends for Health, dedicated to helping people who cannot afford the lifesaving medication they need, the Technion students created a computerized interface that will shorten waiting times and help the nonprofit assist even more patients. Others developed programs that dealt with fair trade, donation of excess food from restaurants, accessibility mapping, and more.

Still other student projects focused on practical applications of AI in everyday life, such as a "smart" clothesline. Equipped with a tarp and sensors to detect water and light, the smart clothesline can unroll the tarp over clothes if it rains, fold the tarp back when the sun comes out, and even send reminders to do the laundry when the weather promises to be fine.

## Algorithms for Architecture

While architectural projects are often planned on computers, they are built using construction methods that have remained unchanged for decades. Human intervention on-site is usually necessary, especially when architectural planning is based on complex spatial systems such as thin, doubly curved surfaces, known as shells. But the use of robots in construction and architectural manufacturing is a vision steadily becoming a reality.

A research group from the Taub Faculty of Computer Science is closing the gap between sophisticated computer planning and its practical execution on the ground, employing an algorithm that streamlines and automates architectural forms.

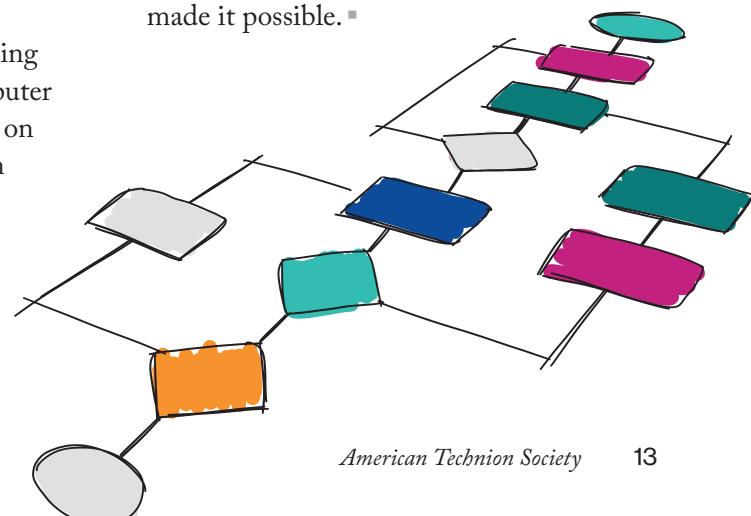
The algorithm "can take complex surfaces and break them down into small

segments, hexagons, in a way that increases the surface's mechanical advantages," group leader Professor Mirela Ben-Chen of the Center for Graphics and Geometric Computing explained. The algorithm can not only reduce the cost and construction time of new buildings, but also has sustainable advantages that lessen the environmental impact of the building process. "Ultimately, we hope that our research will lead to the development of a system that can compute and manufacture building segments through automation, so that they can be assembled on-site without detracting from or compromising architectural or structural complexity."

## The Power of Computers

Technion students and faculty members are guided by a belief that academic findings need not stay within the walls of academia. Rather, it is in the application of education to real-life problems that students and faculty can make their biggest impact. That philosophy has earned the Technion international acclaim, as it is ranked #1 in Europe, and #15 in the world, in the field of artificial intelligence.

But perhaps the faculty's biggest accomplishment lies in the impact Technion people and innovations are making in how we treat illnesses, support our favorite charities, construct our homes and workplaces, and more. So when you look up at a particularly impressive skyscraper or fold your sun-dried clothing, say "thanks!" to the clever Technion innovators who made it possible. ▀



# Technion INNOVATIONS



## Smart "Band-Aid"-Like Health Monitors

*Developed by Prof. Hossam Haick and postdoctoral fellows Youbin Zheng and Rawan Omar*

These wearable patches with pain-free microneedles monitor medical conditions and relay data to the patient and doctor. Measuring components like sodium, glucose, and pH levels, they might prevent heart and kidney diseases, and more.

*Photo Credit: Freepik.com*



## Engineering an Ear

*Developed by Prof. Shulamit Levenberg with Sheba Medical Center*

This new technology creates custom-made, functional, 3D-printed ears for those born with malformations of the external ear, avoiding painful reconstruction methods that use cartilage from the patient's chest.

*Photo Credit: Technion*



## Electricity from the Sea

*Developed by Technion Ph.D. candidate Yaniv Shlosberg and the Limnological Research Institute*

Researchers used common seaweed to harvest electrical currents from the sea that are as powerful as standard solar cell technologies and even more environmentally friendly.

*Photo Credit: Adobe Stock*



## "Sensing" Machine Breakdowns

*Developed by Feelit Technologies Ltd., founded in the Technion DRIVE accelerator by Prof. Hossam Haick and alumni Meital Segev-Bar '10, Ph.D. '17, and Gady Konvalina '07, M.S. '11, Ph.D. '14*

Feelit prevents costly machinery failures with innovative sensors that monitor pressure, temperature, vibration, leakage, wall integrity, and other industrial parameters of pipes, pumps, and valves.

*Photo Credit: Feelit Technologies Ltd.*



## Agricultural Robotics Transform Indoor Farming

*Developed by Technion alumni Adi Nir '00, M.S. '08 and Omer Nir M.S. '14, Ph.D. '22, CEO and CTO, respectively, MetoMotion*

MetoMotion's fully autonomous system uses advanced AI, 3D vision, and data science to identify, pick, and pack ripe fruit.

*Photo Credit: MetoMotion*

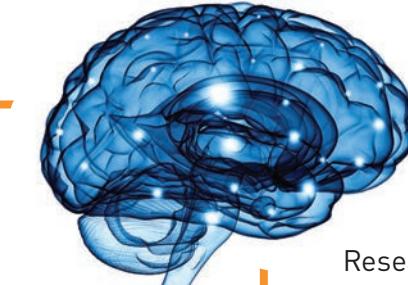


## Self-Repairing Electronics

*Developed by Asst. Prof. Yehonadav Bekenstein*

Self-repairing robots abound in sci-fi movies. Now Technion scientists have created nanocrystals that could be incorporated into electronics and orbiting solar panels to heal themselves.

*Photo Credit: Adobe Stock*



## Telescopes Made with Fluids Revolutionize Space Optics

*Fluidic Telescope Experiment (FLUTE) developed by Prof. Moran Bercovici with NASA's Edward Balaban*

Telescope dimensions in space have always been limited by the size of the launcher. Now, an Israeli astronaut has used fluids to create lenses in space up to 100 times bigger than traditional telescopes, enabling deeper space exploration.

*Photo Credit: Studio Ella Maru*



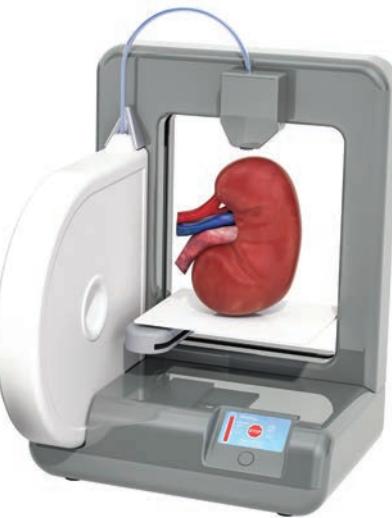
## 3D-Printed Kidneys

*Developed by CollPlant Biotechnologies, led by alum Yehiel Tal '79, M.S.'82, with United Therapeutics Corporation*

Protein in the leaves of tobacco, plants associated with devastating disease, is being extracted to manufacture 3D-printed kidneys.

The artificial kidneys could save the lives of patients waiting on donor transplant lists.

*Photo Credit: Adobe Stock*



## Steering Surgical Needles to Their Target

*Developed by Asst. Prof. Oren Salzman with scientists from the University of North Carolina*

A new algorithm guides medical needles safely and precisely through the body to do biopsies and other treatments in difficult-to-reach areas behind bones or vulnerable tissue.

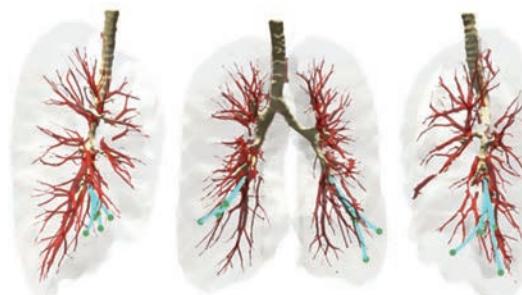
*Photo Credit: Technion*

## Breakthrough in Alzheimer's Research

*Developed by Prof. Galia Maayan and Ph.D. candidate Anastasia Behar with French scientists*

Researchers have created a new, artificial molecule that suppresses the formation of free radicals that damage brain cells, inhibiting the progression of Alzheimer's.

*Photo Credit: Adobe Stock*



# Promising Breakthroughs

**Groundbreaking, Multidisciplinary Research Explores Radical New Frontiers in Medicine**

**Understanding that medicine has much to contribute toward our knowledge of engineering, and vice versa, the Technion is one of few technical institutions in the world that boasts its own medical school.** Technion faculty have facilitated robust cross-disciplinary research and consistently seeded and executed bold new breakthroughs that have pushed the boundaries of medicine. Here are four exciting discoveries from our talented bench of medical researchers.

## Curing Neurodegenerative Diseases

The good news: The body is capable of curing neurodegenerative diseases, including Huntington's and ALS. The bad news: It frequently fails to recognize the problem and dispatch the right solution, known as chaperone proteins.

**Professor Reut Shalgi** led a team of researchers to explore this erratic behavior of chaperones.

The body manufactures proteins by folding long chains of amino acids in specific ways to form three-dimensional structures. However, sometimes the folding sequence goes awry, creating protein aggregates, and laying the groundwork for neurodegenerative diseases.

Chaperones usually intervene before such problems occur. They help misfolded proteins refold and prevent protein aggregation — but they sometimes don't. Prof. Shalgi's research explored why.

For chaperones to work, the body needs to do two things: recognize there is a problem and dispatch the right protein for the job. In the case of ALS, the cells miss the very first step — they do not even recognize there is a problem. In Huntington's, the cells detect the problem but send the wrong proteins. As a result, the diseases progress.

Understanding what goes wrong in chaperone protein deployment could provide crucial insights for the treatment of Huntington's and ALS. "Since the ability is there, we hope future treatments can be developed to employ the body's own tools to cure these debilitating neurodegenerative diseases," said Prof. Shalgi.

## A Novel Way of Inhibiting Cancer Growth

Scientists have known that tumor cells grow by inviting nerve cells to infiltrate their walls, a process that feeds their growth and stimulates migration and proliferation. This led

Technion researchers to explore the fundamental question: What if we could change the cancer cell–nerve cell dynamic and recruit the nerve agent to our side?

In an experiment with mice, **Associate Professor Avi Schroeder** and **Ph.D. candidate Maya Kaduri** injected nanoparticles carrying anesthetic into the bloodstream, in the direction of the tumor. The nanoparticles were coated with a polymer that let them fly under the immune system's radar and circulate long enough to do their job, without damaging healthy tissue.

When they reached the tumor, the nanoparticles released their anesthetic into the surrounding nerve cells. The anesthetic effectively paralyzed the nerve cells and cut off communication channels that the cancer cells depend on to grow. The team found that the method not only inhibited cancer growth, it also reduced metastasis. Given that annually, approximately 10 million people die from cancer around the world, this development is a promising achievement.

"Today, we understand that to effectively treat cancer we must not only target the cancer cells themselves but also cut them off from their supporting environment," said Kaduri. "We believe that this treatment could significantly improve the clinical outcomes of cancer patients in the future, either as a single treatment or in combination with other therapies."

## Saving the Lungs of Premature Babies

Applying a simple topical cream may go a long way toward helping

Top (l-r) / Prof. Reut Shalgi, Assoc. Prof. Avi Schroeder, and Maya Kaduri, Ph.D. candidate

Bottom (l-r) / Assoc. Prof. Josué Sznitman, Assoc. Prof. Asya Rolls, and Tamar Koren, M.D./Ph.D. candidate



premature babies — and their parents — breathe easier.

Babies who are born prematurely may not have healthy lungs since the respiratory system is one of the last to mature in utero. As a result, they often require mechanical ventilators in their first days, which lack standardized methods of operation. Medical staff typically factor in the infant's condition to adjust machine settings for the volume and flow rate of air, but these methods can be arbitrary.

**Associate Professor Josué Sznitman** and his team studied the complications using a 3D silicone model of premature babies' upper respiratory tract. To truly mimic the effect of ventilation on the body, the team grew a layer of human lung cells in the model. Subjecting the artificial model to typical mechanical ventilation conditions, researchers found that forces caused by the air jet from the ventilator can create stress, inflammation, and damage in the airway cells. The team succeeded in blunting the adverse effects by

applying a topical medicine usually used for asthma patients before beginning mechanical ventilation.

The findings may also help patients who require long-term mechanical ventilation — like those being treated for COVID-19 and chronic obstructive pulmonary disease (COPD). Paving the way for gentler treatment of premature babies is essential work given that 1 in 10 babies are born prematurely.

## Autoimmune Diseases Might Have a New Ally: The Brain

While people have long experienced psychosomatic illness, Technion researchers have now observed exactly how the brain can make the body sick, and how to reverse it. These findings could potentially offer hope to people suffering from stress-related autoimmune diseases such as colitis, Crohn's disease, and psoriasis.

**Associate Professor Asya Rolls** and **M.D./Ph.D. candidate Tamar Koren** induced inflammation in the colons of mice. They were able to identify

neurons in the brain that showed increased activity during the process of inflammation. Long after the mice were healthy again, the team triggered the brain neurons and the inflammation reappeared. The experiment demonstrated that the brain stored "memory traces" of the past infection that could kick-start an immune response, even without the actual presence of a disease.

Testing the hypothesis in the other direction, the scientists showed that suppressing the brain cells that remembered the colitis reduced the disease in mice who were ill.

"There is an advantage to gearing up for battle when one is about to engage in the same activity again," said Prof. Rolls. "A shorter response time would allow the body to defeat the infection faster and with less effort."

While we need many steps to translate research from mice to humans, this finding lends deeper insight into how the brain and body work together. ■

# A “RUNWAY” TO A BETTER WORLD

Postdocs Share How the Program Supercharged Their Innovations

**C**elebrating its 10th anniversary, the Joan and Irwin Jacobs Technion-Cornell Institute at Cornell Tech on Roosevelt Island has become part of New York City’s higher education landscape. Through its Runway Startup Postdoc Program, it has also injected entrepreneurial energy into the city.

Runway, launched in 2014, helps recent Ph.D. graduates with an entrepreneurial bent transition into the high-powered world of startups. Students describe Runway as part business school, part research lab, and part startup incubator. The two-year program combines workshops on building a business with mentorship from industry experts, while also providing a salary, research budget, housing allowance, and space to create.

The impact of Runway’s hands-on approach speaks for itself: **In less than eight years, the program has launched more than 30 startups, created nearly 200 new jobs, and generated at least 26 new patents.**

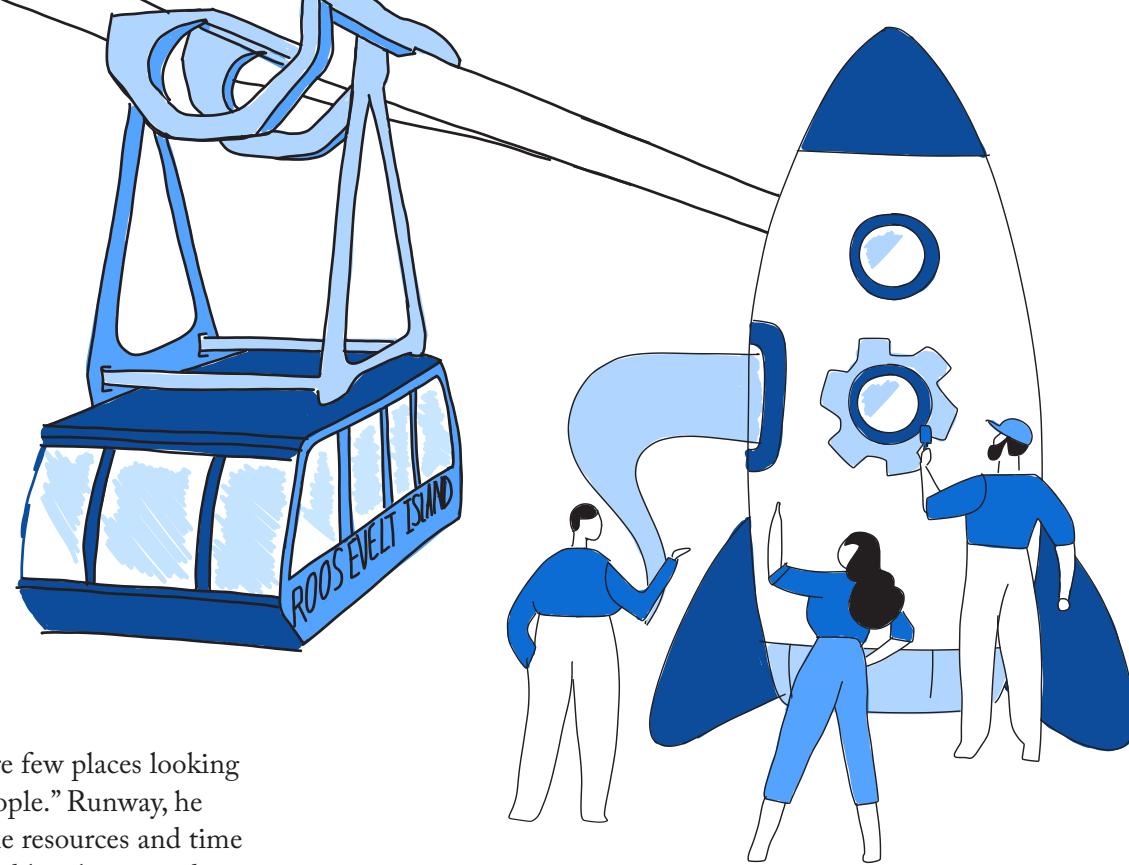
“Without Runway, I doubt I could be an entrepreneur, to be 100% honest,” reflected Ali Khaloo, a structural engineer who graduated the program in 2021. “I was at that transition in life,” he said about moving from academia into the startup

world, “and there were few places looking for those kinds of people.” Runway, he said, provided him the resources and time to “start a business and hit the ground running. Runway is unique in that they really support you to go all the way. No other program has that kind of mentality.”

Khaloo was 12 years old when he was traveling with his family in Istanbul, Turkey, and witnessed an earthquake. “Within seconds you could see so many bridges and buildings that fell apart and killed people,” he recalled. He has been passionate about engineering ever since and entered Runway with the goal of tackling the problems that come with aging civil infrastructure.

“Infrastructure globally is crumbling,” he said. “Assets that we use on a daily basis, mostly built after World War II, are not safe. They are falling apart, and they’re putting the lives of people in danger.” So Khaloo invented a cloud-based solution that takes images, videos, laser scans, and other subsurface sensors of a bridge, road, or building and creates a highly detailed 3D “digital twin.” Next, a patented AI-powered technology is used to identify and quantify current damages or areas of weakness, along with maintenance plans to prevent future failures.

**Runway gave Khaloo the resources to turn this ingenious solution into**



**Aren**, an award-winning startup working across the globe to build a **digital health record of our roads and bridges**, ensuring the safety of the infrastructure we rely on every day. “I can only speak highly of Runway and the support they provide. And that support continues, even after graduating. I still get introductions to meet with people or potential investors who could help my business,” said Khaloo.

Fellow Runway graduate Colin Plover was also struck by the community Runway provided him as a new entrepreneur. “This work is complicated and difficult even when you’re trained to do it, and I hadn’t been trained to do it,” he said. “Having peer groups, advising, and an environment that helped encourage me and move me along was a huge opportunity. It opened doors that weren’t available to me before.”

Plover was inspired to go into nursing in part because his aunt was a nurse. “Nurses are the backbone of healthcare systems,” he said. “They are the most numerous healthcare providers, providing the majority of care, and they are the ones connecting with patients and families at the bedside 24/7.”

A medical-surgical nurse, Plover is now a postdoctoral fellow in Runway researching health systems. He chose the program to help him translate his research and desire to make an impact into **Nightingale** — a software, research, and analytics company that helps nurses improve the efficiency of care delivery and patient outcomes.

“The impetus for this came when I was working at the bedside as a nurse, and pursuing my Ph.D., wrestling with the contradiction that we wanted nurses to be practicing at the highest level of their capabilities, and we want nurses to be with patients. But we were spending too much of our time not providing direct patient care because we were burdened with logistics, charting, and non-direct patient care tasks,” said Plover. Also, most hospitals didn’t have the bandwidth or the technology to collect and analyze data that could provide insights to improve patient care.

**Runway is helping Plover move quickly from ideation to working directly with hospitals.** He hopes that many healthcare systems will soon be using Nightingale’s software to help nurses tackle a host of operations more efficiently.

In addition, institutions are giving Plover access to their data so Nightingale can analyze the information and help make more data-driven and evidence-based care delivery decisions for better outcomes.

Thanks to Aren, we can trust that the roads, bridges, and buildings we use every day are safe and well-maintained. Because of Nightingale, nurses now have a powerful tool at their disposal to serve their patients, families, and communities. These are just two examples of how Runway moves innovative ideas into the marketplace to make our lives safer, better, and healthier. Today’s challenges are complicated, and the Jacobs-Technion Cornell Institute is finding solutions and helping New York City become a vibrant technological hub. ■

# From Sci-Fi to Surface Duo

The Journey of One Technion Alum

**T**he 1983 Cold War science fiction technothriller *WarGames* was a box-office hit that garnered three Academy Award nominations. The film about a young hacker who unwittingly accesses a Pentagon supercomputer also made its mark on then 12-year-old Guy Merin. “I went straight from the theater to K-Mart and bought my first computer,” he recalled. “I started my journey there.”

It’s a journey that took him from earning a bachelor’s degree in computer science at the Technion to Microsoft, where he played a key role in the recent release of Surface Duo 2 — the latest iteration of the dual-screen Android smartphone, named by *TIME* magazine as one of the best innovations of 2020.

“It’s a super cool innovation,” said Merin, director of engineering for the apps team, of the industry’s first dual-screen phone. The device doubles as a notebook, allowing users to write with its Surface Pen on one screen while chatting or emailing on the other. “It’s an office on the go,” Merin said, explaining that having two screens mimics an office environment where a laptop is connected to a second display. And Surface Duo folds up into a single screen that fits in your pocket.

Merin and his brothers grew up in Jerusalem, except for a year in Chicago (site of the life-changing movie), where his father moved the family for his work as an eye doctor. He served in the Israel Defense Forces in the Paratroopers Brigade, traveled the world, and entered the Technion in



1994. “The first year was a bit of a shock,” he said. “The work was very demanding.”

In time, he figured out how to manage what he called the three S’s: sleep, study, and a social life. “You can’t have them all, all of the time. You have to prioritize,” he said. Getting that balance, he said, was not only the key to success at the Technion but also helped him later in juggling responsibilities as a father, husband, and Microsoft team leader. He also credits the Technion for teaching him how to learn on his own. “Once you learn how to learn, you can pick up any new technology.”

Graduating in 1997, he landed a position at Microsoft in Israel. Upon accepting the offer, he remembers saying up front: “I plan to stay two to three years, study from the experts, and then leave to start my own company.” He stayed indefinitely, as Microsoft gave him the entrepreneurial freedom to create his own projects and see them to fulfillment.

Merin currently lives in Redmond, Washington, where Microsoft’s headquarters are located, with his wife Ayelet, an architect, and two teenage boys — and is on the American Technion Society Pacific Northwest Leadership Council. “The Technion gave me a lot,” he said. “How can I give back?” In addition to providing financial support, Merin hopes to mentor Technion computer science students and to influence the curriculum. “That’s something I can do to contribute back to the Technion and benefit the computer science industry.” ■

# THE FINAL FRONTIER

Astrophysicist Prof. Ehud Behar is intent on unearthing the mysteries of extragalactic events.



of Israel’s historic Rakia Mission to the International Space Station, which enabled entrepreneurs and scientists to test their work in the unique research environment of outer space. GALI will be installed outside of the space station, where it will monitor bursts and transmit signals to Earth for analysis.

“We astronomers don’t like the atmosphere, it gets in the way of what we’re trying to observe,” said Behar, dean of the Faculty of Physics and past director of the Norman and Helen Asher Space Research Institute. He hopes the mission will allow astronomers to avoid Earth-derived clutter and study gamma-ray bursts and related cosmic events early in their life cycle. “There’s a good chance we will understand how neutron stars collide and what happens (next). What is the physical mechanism that emits these gamma rays? So far we have mostly theories and not enough data,” Behar said. “We’re still only scratching the surface in understanding how exactly a star explodes.”

Professor Ehud Behar and his team are looking to fix this time lag with their Gamma-Ray Burst Localizing Instrument (GALI). This shoebox-sized device can identify the direction of gamma-ray bursts to help astronomers train their telescopes toward the right regions of space, faster. By studying gamma rays, astronomers are able to see these high-energy events and learn more about how they shape our universe.

So impressive is GALI’s potential that it was part

much smaller instrument than has been used before.

Why does space exploration matter? Studying science is important for its own sake, Behar said: “It’s like asking a mountaineer the reason to climb a mountain. Because it’s there. Some game-changing technologies have even been built on chance discoveries.”

Israel has long been committed to space technology, which helps drive the economy and contributes to the country’s international standing. The Technion has played a major role, establishing an aerospace engineering faculty in 1954 that remains the only one of its kind in Israel. Being at the Technion is a big plus. “There are scientists here who have built satellites before,” said Behar.

“**We’re not just buying a satellite and adding our instruments to it. We’re proud to be building it all from scratch.**”

Behar traces his own fascination with the cosmos to his childhood. Later on, he was drawn in by the challenge of taking on difficult subjects like physics and math. “I have been riding this fun carousel for a while,” Behar said. “I still feel like a kid in a candy store.” ■

# Technion's Awe-Inspiring Graduate Students

The Engine and Soul of the Technion



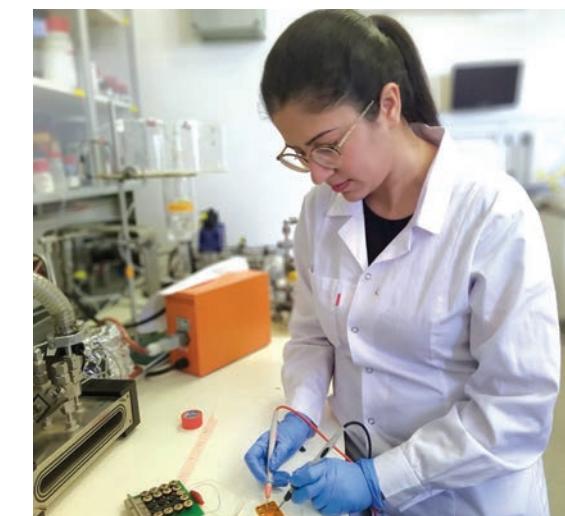
**Rawan Omar '14, M.S. '17** was first introduced to the Technion as part of a high school tour to encourage women in STEM. Excited by what she saw, she told herself, "I want to come again, but next time I'll come as a student."

Omar was born and raised in the small, rural Israeli village of Zemer, the oldest of five sisters.

Growing up, she was interested in science and technology, but it was not common for women in her village to pursue STEM. "I faced challenges as a passionate female who aspired to be an engineer," she said. "But I decided to stand **against the odds** and I became the first woman in my village to pursue higher degrees in engineering."

With a supportive family behind her, Omar earned her bachelor's and master's degrees in biotechnology and food engineering. Sadly, in the last year of her master's studies, her father was diagnosed with lung cancer. Her graduation ceremony

**I decided to stand against the odds and I became the first woman in my village to pursue higher degrees in engineering.**



was the last event he attended before passing away. Nonetheless, "this loss made me more determined to continue my studies to be able to support my family, community, and country in return," she said.

Following two years at Teva Pharmaceuticals as a chemical analyst, Omar returned to the Technion for her Ph.D. Currently, she is working with Professor Hossam Haick, known for his nanoarray technology,

around the world, especially girls in science and engineering. She and her husband also founded a company that provides outdoor and indoor activities geared toward team building and self-empowerment.

She acknowledges that her path was difficult at first. "But I proved it was possible," she said. Her perseverance and achievement have not gone unnoticed. Three young women in her hometown are now seeking undergraduate degrees in biomedical and civil engineering, and her youngest sister will soon start studying data science. "I'm proud that in my village I've encouraged more girls to study at the Technion."

Omar and **Dean Zadok '19** were two of four Ilene & Steve Berger Technion Visiting Fellows, selected for their excellence and well-rounded personalities, to visit American Technion Society supporters across the U.S. this past year.

Omar is also an **advocate for empowerment** and equal access to higher education. She co-founded the Alrowad-YASA (Young Arab Scientists Association) to close the gap between Israeli Arab scholars and the scientific community at large. As a member of the New York Academy of Sciences, she volunteers in their programs 1,000 Girls, 1,000 Futures and The Junior Academy to mentor and encourage young students from



Zadok visited four Israeli universities when deciding where to study computer science. He chose the Technion — hands down. His story is a testament to the widely held belief that the Technion attracts the best.

Zadok always knew he wanted to be a computer scientist. So he met with researchers at several universities to determine the best fit. "The people at the Technion were more modest about their research," he said. "There was less bragging, they just wanted to work." After completing his military service as a team leader in the IT department of the Israel Defense Forces, Zadok left his hometown of Tel Aviv to start his studies at the Technion.

One day he passed by a student's house and saw the Technion Formula Racecar team presenting their project — a Formula-style racecar. "It was fascinating," he said. "I didn't believe that it was their own work. I couldn't imagine students building this themselves." Soon he was right in there with the mechanical engineering and materials science students designing and building a prototype car for the International Formula Student competitions.

His first project was a telemetry system that supervises the car remotely to detect problems. Then, as the only computer scientist on the team, he was called upon to

help build Israel's **first driverless Formula racecar**. Over the course of the next year, the team refurbished one of its oldest racecars. Zadok recruited a group of computer science students, and together they developed a machine learning algorithm that allowed the car to drive on its own without any human intervention.

"We were the first Israelis to put an autonomous vehicle on the road for testing," Zadok said. And the event received widespread media attention in Israel.

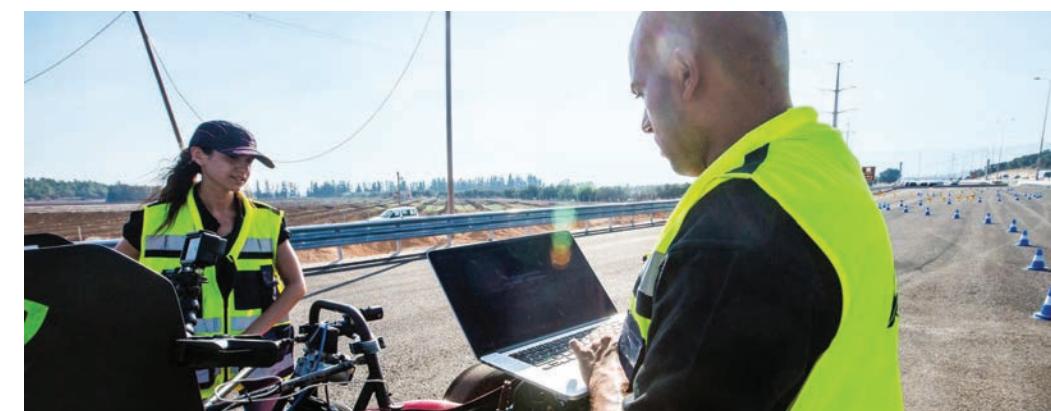
**I realized I wanted to shift my abilities to do something more beneficial to the community.**

in available products for robotic prostheses and decided to center his master's degree thesis on the issue.

Specifically, Zadok is developing a **prosthetic hand** that combines aspects of the algorithm used in his autonomous racecar with ultrasound technology.

Currently, most prosthetic hands can only perform simple gestures such as grasping

and letting go. Zadok is creating a sensor-based system able to read physiological signals from the lower limb and instruct a robotic hand to perform dexterous, fine



finger movements such as keyboard typing or playing the piano. He also volunteers at Haifa3D, a nonprofit that provides free 3D printed hands to people with congenital disorders or who have had traumatizing accidents.

**Omar and Zadok are among the Technion's 5,000 graduate students — the engine that carries out much of the university's cutting-edge research. Their creativity and determination are certain to help shape the future, bringing new medical devices and technologies to change the lives of people around the world.**

# Giving Is a Multigenerational Family Affair

The Wertheimers Renovate Lab for Prosthetics



Pictured above / Family members came to the Technion this spring to celebrate the dedication of the new lab. (l-r) Francis Harvey, Nancy Harvey, James Kenley, Judy Kenley, William Harvey, Bruce Wertheimer, David Wertheimer, Patti Wertheimer, Barbara Weckstein

Pictured right / Bruce Wertheimer at the podium at the dedication

**T**he late Naomi Wertheimer would remember playing hopscotch and jump rope in the schoolyard as a young girl, standard rites of passage in the 1950s. But she would also remember that a friend could only watch from the sidelines because she had a wooden leg. That memory is at the heart of a gift to the Technion to advance prosthetics — a gift that also captures the Wertheimer family's commitment to involve multiple generations in their philanthropy.

Naomi's husband Bruce, a second-generation Technion supporter, and the couple's four children are establishing the Naomi Wertheimer Assistive Lab in honor of Naomi, who passed away in 2016. Bruce explains that Naomi never forgot her friend. In addition, her heart went out to the soldiers who lost limbs defending their country during the Israeli wars. Then while touring the Technion in 1996, Naomi met a team of researchers developing prosthetics and she was hooked. "This became her passion," he said.

Bruce and a dozen family members, including his four children and two grandchildren, visited the Technion on April 7, 2022, to dedicate the new lab. "It was a beautiful ceremony," said Bruce. "We were all very excited and thrilled that the lab is already functioning."

Several professors spoke of projects being developed in the lab, which could be in use in just three to five years from now. "Naomi would have been thrilled that her family had helped her provide a way for people using prosthetic devices to improve their daily lives."

The gift will help refurbish the Biomechanics Center of Excellence in the Faculty of Mechanical Engineering. The lab will focus on improving prosthetic fit and design and developing brain-computer interface technology. BCI, as the technology is called, is a computer-based system that acquires brain signals and translates them into commands that are relayed to an output device to carry out a desired action, such as moving a prosthetic.

Bruce inherited his love for the Technion from his parents, Joseph and Theresa, who helped establish American Technion Society (ATS) chapters in Chicago, Sarasota, and the Los Angeles area in the 1950s. "I grew up hearing about the Technion," he said. Bruce is now passing on that legacy to the next generation. "Each of my children contributed a sizable amount to this project, and that makes me feel great." Barbara Grauer, a family friend and Bruce's partner, also contributed to the operation of the lab.

While Bruce's involvement stems from his parents, he and his father both were engineers, so they were naturally attracted to the Technion. Living with Naomi in Sarasota since the 1970s, "we were known as the Technion couple," said Bruce. They hosted ATS fundraising dinners, spearheaded initiatives to construct buildings and refurbish labs, and gave generously to support campus dormitories, faculty recruitment, the Rappaport Technion Integrated Cancer Center, and other projects. Bruce was on the ATS Sarasota board and Naomi once served as its president.

Bruce's sister Elaine fondly remembers their father saying: "If the Jews are going to make it in Israel, it's going to be with their brains." Elaine was active on the Bay Area



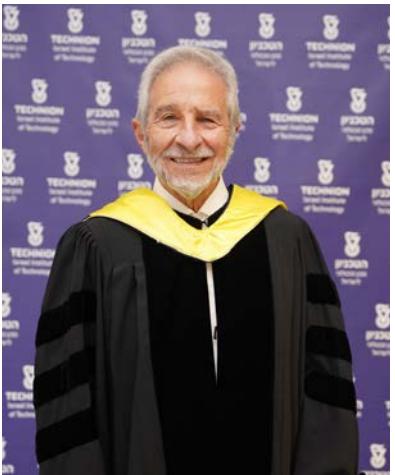
Silicon Valley Board of Directors and passed her seat to her daughter Leslie in 2018.

"Supporting the Technion connects me to my grandparents and my mom, and allows me to give to Israel," says Leslie. "For our family, Judaism has always been about respect for education. So supporting the Technion always made sense to us, and still does." She and her husband, Jerry Behar, hope to extend the Wertheimer legacy to four generations. "We try to share our love of Israel and the Technion with our children."

Irwin Wertheimer, Bruce and Elaine's brother, is also a dedicated supporter of the Technion. He will soon be celebrating his centennial birthday, just as the Technion gets ready to commemorate 100 years since opening its doors. The Wertheimer family is certainly connected to the Technion for life. ■

# TECHNION BOARD OF GOVERNORS MEETING

June 10 - 15  
2022



Pictured left / Technion Guardian Dr. George Elbaum, who received an Honorary Doctorate, is a member of the ATS – San Francisco Leadership Council, the ATS National Board (BOD), and the Technion Board of Governors (BOG)

Pictured right / President Prof. Uri Sivan at the Honorary Doctorate Conferment Ceremony during the Technion BOG



Pictured left / Technion Guardian, ATS BOD member, and Chairman of the Technion BOG Scott Leemaster

Pictured right / Prof. Uri Sivan and Technion Honorary Fellowship recipient Rob Polak. Polak is a Technion Guardian, and a member of the ATS BOD and Technion BOG.



Pictured left / Prof. Uri Sivan and Technion Honorary Fellowship recipient Ira Taub. Taub is a Technion Guardian, and a member of the ATS BOD and Technion BOG.

Pictured right / ATS President Steve Berger, speaking at the Harvey Prize Ceremony at the Technion BOG meeting



## Yoram Benbarak: *Engineer, Entrepreneur, and Changemaker*

Planned Giving Donor and Alum Gives Back to the University that Helped Shape His Career

and computer programming classes ever taught at the Technion.

Yoram Benbarak '71, M.S. '73 was an undergraduate student when computer technology was going through a momentous revolution that would help catapult Israel into its famed status as the Startup Nation and a leader in innovation. The Technion was on the front lines. Distinguished Technion Professors Jacob Ziv and Abraham Lempel co-created the algorithm that serves as the basis for essential file compression currently used in computers and smartphones to send PDFs, videos, and music over the internet. "That was a time of great change," said Yoram, who studied under Professor Ziv and was a student in the first semiconductor

Now he is returning the favor. "My gifts are my way of giving back to the institution that treated me so well," he said.

Yoram is taking advantage of the IRS's qualified charitable contribution rules, and starting in 2022 will also benefit from the required minimum distribution rules that allow him to donate annually directly from his taxable IRA to the American Technion Society (ATS) without incurring taxable income. "I like knowing I can help the Technion now."

In addition, Yoram recently decided to leave a significant portion of his IRA to ATS as part of his estate plan because he knows that each dollar from his IRA will go tax-free to ATS. "I hope that my legacy will contribute to the Technion's continued ability to excel." ■

### Contact Us

By joining ATS's Genesis Circle Society, you have the opportunity to support students, faculty, and cutting-edge innovation and research that will secure the future of Israel and leave a lasting legacy of your generosity. Explore our planned giving opportunities and find a charitable plan that works for you.

Judy Sager, Executive Director of Planned Giving  
judy@ats.org / 781.531.0441



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Excitement is already building for the Technion's Centennial in 2024. As we march toward the one-in-a-lifetime celebration, we are asking ATS supporters to join in the fun by sharing photos and stories of past trips to the Technion campus.

Interested? For more information, please visit [ats.org/centennial-photo-project](http://ats.org/centennial-photo-project).

Pictured above / Sam Kahan, ATS – Baltimore leader,  
on the Technion campus in Haifa, Israel