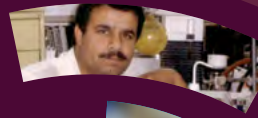


THE MAGAZINE OF THE HEBREW UNIVERSITY OF JERUSALEM

SCOPIUS

VOLUME 67 | 2022-2023

**LEADERSHIP
FOR
TOMORROW**



The Hebrew University of Jerusalem, Israel's first university, is a multidisciplinary institution of higher learning and research where intellectual pioneering, cutting-edge discovery, and a passion for learning flourish. It is a center of international repute, with ties extending to the worldwide scientific and academic community, where teaching and research drive innovation and provide the broadest of education for its students. Ranked among the world's leading universities, Hebrew University is an institution where excellence is emphasized; where advanced, postgraduate study and research are encouraged; and where special programs and conferences attract students and academics from around the world. At its core, the Hebrew University's mission is to develop cutting-edge research, to educate future leaders, and to nurture generations of outstanding scientists and scholars in all fields of learning.

6

campuses: three in Jerusalem (Mount Scopus, Edmond J. Safra, and Ein Kerem) and in Rehovot, Beit Dagan, and Eilat

23,281

students including 13,546 undergraduates, 5,822 master's students, 1,933 doctoral students, and 1,980 overseas and pre-academic students, postdoctoral fellows, and others

4,240

projects in progress across University departments and some 100 subject-related and interdisciplinary research centers

1,034

faculty members

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Ram Semo

Training the Leaders of Tomorrow

This issue of *Scopus* features our students, researchers, faculty, staff, and alumni – highlighting myriad ways that Hebrew University has enabled them to grow and emerge as leaders.

The opening piece, by Dr. Muhammad Al-Nabari, sets the tone for the entire magazine. Born to illiterate parents, he earned two degrees at Hebrew University and later served three terms as mayor of Hura. His story, along with his work in the Bedouin community today, highlights the immense power of education, transforming lives and helping people and communities realize their full potential.

The magazine also features two faculty members, both Hebrew University alumnae, who have recently assumed new leadership positions within the University. Join Prof. Mona Khoury-Kassabri and Prof. Sara Cohen for a discussion about women in academia, their research, and plans for the future.

As Israel's top-ranking university, we are proud of our researchers who are leading academically. In these pages, you will meet new faculty members and top graduate students, brilliant scholars who are conducting cutting-edge research, ranging from classics to chemistry, business to brain science – and beyond.

Of course, leadership can take many shapes and forms, and *Scopus* set out to meet leaders in Jerusalem, across Israel, on the global stage – and even in space! Yes, an experiment involving Doxil (Hebrew University's blockbuster drug for treating recurring ovarian cancer) recently traveled to the International Space Station. Back on Earth, our inspiring students, alumni, and faculty are empowering teenage girls in Israel, leading the cultivated meat and alternative protein markets, saving lives on roads everywhere, helping Ukrainian refugees in Moldova, growing avocados in Africa, and running marathons in Mongolia.

This issue also features two unique units at the University and the passionate women at their helm: the Albert Einstein Archives on the Edmond J. Safra campus and the Correlative Microscopy Unit of the Core Facility at the Robert H. Smith Faculty of Agriculture, Food and Environment. Also in Rehovot, a photo essay celebrates the newly renovated Kennedy Leigh Research Complex for Ecosystem Services in Agriculture.

After two years of online meetings, we are extremely pleased to share photo highlights from our most recent Board of Governors meeting, held in Jerusalem. It was wonderful finally being together and celebrating Hebrew University's accomplishments in person!

This issue of *Scopus* concludes with *Ask the Expert*, which focuses on the United Nations Sustainable Development Goals and their significance to Hebrew University as a leading global research powerhouse.



A. Cohen

Asher Cohen
President



Dan Schlessinger

Daniel Schlessinger
Chairman, Board of Governors

Table of Contents

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6 **Alumni Essay** The Power of Education: Unlocking Our True Potential, by Dr. Muhammad Al-Nabari

12 **Leading Academically** New faculty members and leading graduate students discuss their cutting-edge research

26 **University Leadership** A conversation with two new members of the University's leadership, Prof. Mona Khoury-Kassabri and Prof. Sara Cohen

30 **Behind the Scenes** Visit two unique University units – the Albert Einstein Archives in Jerusalem and the Correlative Microscopy Unit in Rehovot – and meet the amazing women at their helm

THE HEBREW U

36

Photo Essay Meet the entomology researchers who are working in the newly renovated Kennedy Leigh Research Complex for Ecosystem Services in Agriculture

68

Leading Locally Hebrew University students and alumni making an impact in Jerusalem and across Israel

42

Leading Globally Hebrew University alumni and researchers re-defining their fields around the world, from Ukraine to Mongolia, Africa to space!

76

Together Again! Select snapshots from the 85th Board of Governors meeting, celebrated in Jerusalem in June 2022

56

Alumni Worth Following Recent alumni making their mark – remember where you read about them first!

82

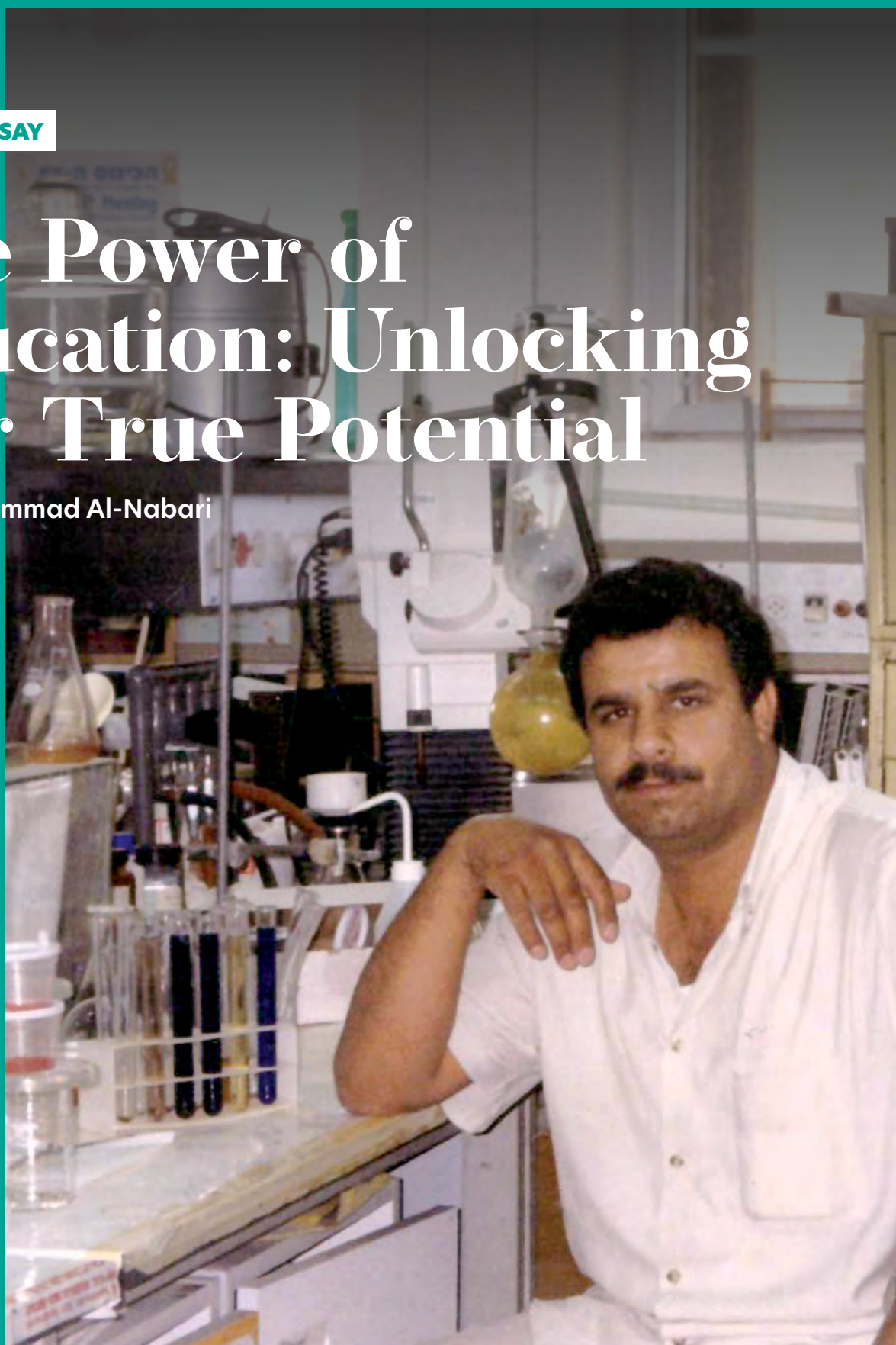
Ask the Expert Prof. Yael Mishael explains the history of the United Nations Sustainable Development Goals, and their significance to University activities and our daily lives

UNIVERSITY OF JERUSALEM

ALUMNI ESSAY

The Power of Education: Unlocking Our True Potential

By Dr. Muhammad Al-Nabari



Dr. Al-Nabari during his graduate studies in his chemistry laboratory in the Philadelphia Building



I am a Bedouin. I grew up herding goats. My parents are illiterate and I'm one of fifteen children. This may sound like the distant past, but it is not. The fact that I am writing these lines today - writing! - attests to the amazing transformations that I've experienced over the last thirty years, made possible entirely by education.

I am a Bedouin and I hold a doctorate in chemistry. But wait, I'm getting ahead of myself. I'd always been a good student. When I was fourteen, my life changed dramatically. My eldest brother, who never had the opportunity to earn a higher education, decided to support me and send me to a top-notch high school. There was nothing in the Negev. Anyone serious about pursuing an education had to travel north. I was sent to Jatt, which was considered one of the best schools.

—

The first day of school, the English teacher asked me, "Tell me about your village." I was silent. I didn't know how to answer. I didn't have a village, only an encampment. He mistook my silence for ignorance and shouted, "What are you even doing here? Did you come all the way from the south to sit silently?" His words were sharp, they hurt. I was determined to prove myself.

I worked hard, fully dedicating myself to my studies. I shared an apartment with classmates. It was

like living in the dorms, but we were teenagers. At that age, you either grow up fast or wander. I matured a lot; it was a wonderful period in my life. I visited my family once a month. Friday was our day off, but I couldn't make the round trip in a single day. I'd skip class on Thursday and spend the day traveling by bus. I'd have a few precious hours and spend the night. By early Friday morning I'd be back on the road, heading back north.

I was set on attending university. In eleventh grade I took the psychometric exam and scored well. But I needed money. After graduating high school with top marks, I spent a year working in agriculture. Eleven, twelve hours of back-breaking work in the sun. I learned Hebrew in the field, and attended English classes at night.

After a year, I had saved enough money and was accepted to Hebrew University to study chemistry.

I arrived on the Givat Ram campus in the summer of 1989 for an intensive English summer program. I lived in the HaElef dorms, nothing like the dorms you'd find at the University today, shacks really. Tiny rooms with shared bathrooms and sinks – and, as it turned out, leaky roofs. Mid-winter I moved to better dorms.

Chemistry requires a lot of math and physics. I was always good at math, but physics had never been my strong suit. There were about twenty-five Arab students, we became friends and would study together. Later, working in the lab, I had a more diverse group of friends.

I'd go home once a month. The night before, I'd stay up studying until dawn. At 6:30am I'd be outside the University gate to catch the direct bus to Beersheva. The driver knew me, he'd let me off along the highway. The same happened on Sundays; the Jerusalem-bound driver knew to look for me at the side of the road and would pick me up.



Dr. Al-Nabari during his first year of studies at the Hebrew University

Initially, tuition took up half of my father's income. In my second semester, Hebrew University gave me a scholarship that covered most of my expenses. This alleviated the burden on my family and enabled me to study without working. I needed to earn high enough grades to continue to graduate studies.

I completed my master's degree in Prof. Yehuda Knobler's lab, synthesizing peptides using unconventional methods. I could spend entire days in the lab, immersed in my work. But the days I had to teach – I would be wiped out. I knew I'd never teach. My future would be in industry and research.

By that time, I had more flexibility and owned a car. I traveled south more often, maintaining and fostering my ties in the Negev and in Hura. I was involved in founding the first Association of Bedouin Academics. For a decade, I volunteered to head a local non-profit organization that promoted academic education for Bedouins and opened the first six daycare centers in Hura. We dreamt of establishing a school for excellence.

I spent five wonderful years at Hebrew University, thriving in its academic eco-system. I grew as a person, developed as a scientist, and was already becoming a role model in my community. Those were not easy years – Jerusalem and the country were undergoing turmoil. But I found serenity on campus, in the lab. Working together, side by side, is the best way to break down barriers.

I opted for doctoral studies closer to home, at Ben-Gurion University. It was more like a job. I'd spend the day in the lab, then go home to my wife and children. After completing my doctorate, I joined Chem-Agis (today Perrigo) as head of the R&D division. I'd been working on a particular task for six months to no avail. My predecessor had been stumped for four years. I called a colleague from Prof. Knobler's lab to talk about the problem, and he suggested a different approach, using benzyl chloroformate. As luck had it, he had some in the lab. I drove like a madman – we met mid-way. I raced back to try it out. Eureka! It worked and we beat our Japanese competitors to market. I left industry after only three and a half years, with six patents to my name, and six joint patents.



“I am a Bedouin and I am proud of my heritage and my values.”

Dr. Al-Nabari with then-President of Israel, Mr. Reuven Rivlin, and Prof. Michael Ben-Eli, founder of the Sustainability Laboratory in New York

Moving back to the Negev was moving home. By then there was a sizable community of Hura residents studying and working. Many were academics. We would get together, talk about ways to improve Hura. It was decided that I should run for head of the local council. It sounded preposterous, but I did – and won! I went on to win two more elections, remaining in office for 14 years.

I was an outsider, with no experience in the public sector. That ended up being to my advantage. I suddenly had access to resources and was in a position to foster partnerships. By then, Hura was a small municipality. It was one of the poorest towns in Israel, with a small municipal budget, rampant crime, and almost no municipal services. Over the course of my terms, I increased municipal tax collection, installed security cameras, opened a municipal hotline, and grew Hura’s budget fourfold. Residents became proud of Hura. But improving the present wasn’t enough – I had to create a better future. Employment and education were key.

I re-established the Association of Bedouin Academics and opened an R&D center for Bedouins. I founded, along with partners, a catering service that employs local women to cook for schools, built a sewage purification plant, and opened a nationwide Arabic language telephone support center. But the true shift wasn’t merely creating employment opportunities – it was an innovative approach: helping the weakest members of society by developing solutions, rather than merely describing the problem. I transformed Hura into a beta site for testing government programs. We were able to develop and implement programs that demonstrated myriad ways for improving people’s lives.

Most importantly, I was finally able to open the school for scientific excellence that we had dreamt of a decade earlier – the first serving Bedouin students. Thirty years ago, who would have believed that we’d have such



Dr. Al-Nabari (left) celebrating an international sustainable development project with the former Minister of Agriculture, Mr. Yair Shamir, and Prof. Michael Ben-Eli (2nd and 3rd from left)

a school in the Negev, in Hura? In 2013, students from this school won the gold and silver medals in the First Step to Nobel Prize in Physics competition. Imagine that – students who live in tents without electricity! By the end of my time in office, over 50% of the Bedouin STEM students at Ben-Gurion University were Hura graduates.

I strongly believe that the Bedouins will be, must be, the engine behind the Negev's development and economic growth. There is huge potential: 80% of the Bedouin population is under the age of 30 and the median age is 17 years old. We are witnessing radical transitions: from tribal belonging to spatial, urban affinity. From sheikh rule to democratic rule. Rather



“I am a Bedouin and I am a leader.”

than evolving, we’re accelerating. As any scientist knows, acceleration can lead to instability. But the Bedouin community is brimming with potential. With good education, anything is possible.

I decided against running for a fourth term and am focusing my energy on the national level. I founded two initiatives: *Yanabia* (Springs), which models five areas of life critical for economic growth, and Desert Stars, which is training the future generation of Bedouin leaders – shifting their thinking to encompass the entire Bedouin community, rather than along tribal lines.

I am a Bedouin and I am proud. Proud of my heritage and my values – the same values that my father, and my grandfather before him, were raised with. I aspire to pass these values on to my own children, a valuable gift passing through the generations.

I am a Bedouin and I am a leader – leading my community into the 21st century. I’m proud of my accomplishments thus far, and am excited for the challenges that lie ahead. I will strive, struggle, and succeed. I know I can do it – after all, I am a Hebrew University alumnus!

LEADING ACADEMICALLY

In labs, libraries, and lecture halls, Hebrew University's brilliant new faculty members and top graduate students are conducting cutting-edge research into classics and chemistry, business and brain science – and beyond!







A Body of Knowledge

Dr. Orly Lewis is a time traveler, immersing herself in texts that take her back to Classical antiquity. So much has changed in the few thousand years since they were written: the decline of the Greco-Roman world, the rise of the modern nation state, scientific discoveries, the industrial revolution.

One thing has decidedly not changed at all: the human body. And yet, Dr. Lewis was struck by how differently the human body – its anatomy, physiology, functions, illness – is described in ancient texts, compared to modern scientific textbooks.

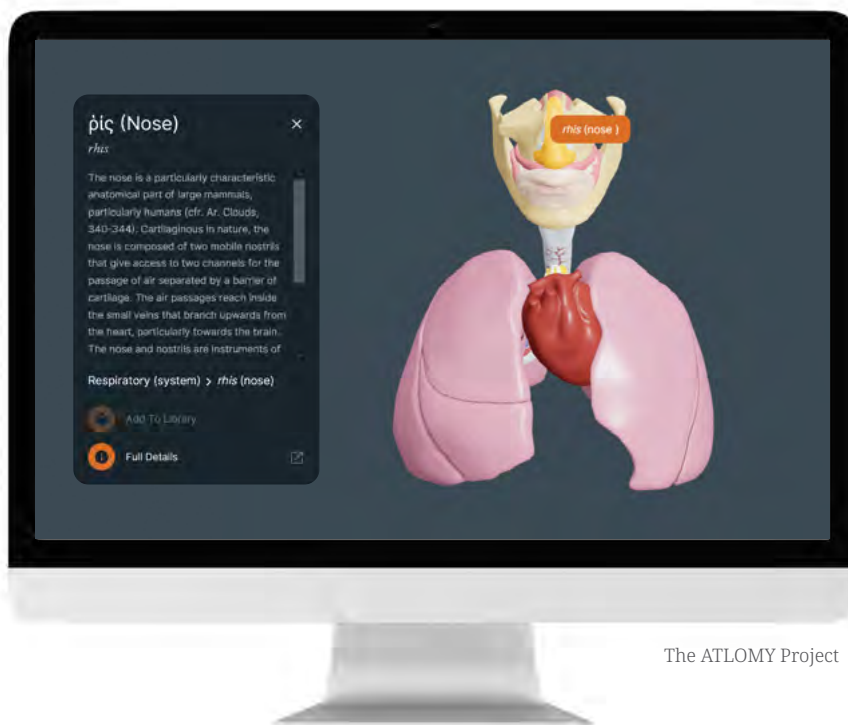
Dr. Lewis began to wonder: why do different cultures associate different body parts with different ideas? Or even to the same idea? How did new ideas about the human body emerge? How did the ancients evaluate measurements

of the body – in health, sickness, and death?

Dr. Lewis realized that texts alone couldn't provide answers. The authors had chosen specific words to represent what *they* saw and, more importantly, how *they* understood it. Fast-forward many centuries. Can the modern reader “see” through the words what the ancients saw? Even if we understand the individual words, are we necessarily referring to – and understanding – the same thing?

What was needed were better reference tools. Dr. Lewis began meeting with modern medical practitioners and participating in dissections – consulting the ancient medical descriptions every step along the way. She perused the texts and collected instances that referred to particular body parts. She increasingly found that space and time could not easily be abridged into two-dimensional, printed articles. Something else was needed.

Dr. Lewis dreamed up the ATLOMY Project (atlas + anatomy) and received a prestigious ERC grant to make it a reality. It is an online, interdisciplinary, and interactive atlas that bridges anatomical ideas and research from ancient Greece and Rome through texts and images. Users can click on an organ, or a specific word within a text, and see other uses across multiple sources. “As a scholar of the humanities, I never thought I'd be hiring programmers and a product manager,” Orly



The ATLOMY Project

“Words can be elusive – things get lost between languages. Visuals, on the other hand, must commit. The ATLOMY Project is a multi-dimensional comparison of ancient texts, which gets us closer to grasping what the ancients meant, and how they understood what they saw.”

remarks. “This platform invites users to explore and compare how the ancients referred to, and understood, the human body – using the technology of today.”

Looking ahead, Dr. Lewis sees the immense potential of opening this platform to additional disciplines and languages.

HEAR MORE
FROM
DR. LEWIS!



Applying Business Savvy to the School System

“The Seymour Fox School of Education is like a large, supportive family. Hebrew University is truly invested in me – not just in my research and teaching, but in me as a scholar, inspiring me to be the best researcher I can be!”

It all started in high school. A young Rima'a Da'as was studying in the math and physics track and was struck by how inspirational her teachers were. She eventually pursued a BSc in mathematics with a minor in statistics at Hebrew University. After graduating, she returned to middle school – as a math and physics teacher.

After several years on the job, she looked around and began asking questions about the efficacy of schools, principals, and teachers – vis-à-vis student outcomes. This led her to pursue a master's and doctoral degree in leadership and policy in education. After completing postdoctoral studies, she joined Hebrew University's faculty in 2020.

Today, Dr. Da'as conducts cutting-edge research at schools, studying how principals' cognitive complexity (their capacity to interpret social behavior in a multi-dimensional way) affects school processes, school outcomes, and fosters innovation. While “cognitive complexity” is a common term in the business world, Dr. Da'as is the first to apply the concept to the school setting.

But that's not all. Dr. Da'as is also researching how principals' characteristics and practices can change aggressive and at-risk behavior by students; along with colleagues, she is developing a guidebook for principals in times of crisis (e.g. the pandemic); she is identifying ways in which middle leaders, such as coordinators within schools, can foster more effective team work among the staff; she is participating in international studies that examine the relevancy of different criteria across cultures; and, lastly, along with a colleague from Bar-Ilan University, she is exploring ways for principals of Israeli-Arab schools to promote their students' social integration and mobility, both within their immediate communities and within Israeli society at large.



Dr. Rima'a Da'as, Senior Lecturer in the Seymour Fox School of Education



In Her Element: Burying CO₂ Deep Within

Scientists unanimously agree that a crucial step towards tackling global warming will be reducing the amount of carbon dioxide (CO₂) in our atmosphere. One method is to proactively capture CO₂ after its creation but before its release from exhaust pipes, power stations, etc. This is done using molecules containing nitrogen (amines), which loosely bond with the CO₂ and prevent it from spewing into the atmosphere. The amines can later be separated from the CO₂ and reused. But the CO₂ remains, in gas form – what can be done with it?

“I always dreamt of becoming a scientist. Today I am living my dream. I love coming to the lab, running my experiments, getting results, and interpreting the data.”

One approach is called *geological carbon sequestration*, where pressurized CO₂ is injected deep into the earth’s bedrock. It reacts with other minerals, creating a new solid mineral called carbonate, which remains under the earth’s surface.

Geological carbon sequestration is an entirely new field of scientific research, and Dr. Daphna

Shimon is aiming to be at its forefront. Her unique approach involves applying nuclear magnetic resonance techniques to gain a deeper understanding of the chemical reactions that give rise to carbonates. Using complex machinery, she’s developing models that predict the most safe and efficient methods for geological carbon sequestration for generations to come.

In fact, Dr. Shimon is taking this one step further. Nuclear magnetic resonance is often inaccurate when metal ions are present (which is almost always the case), so she is using an additional technique, called dynamic nuclear polarization, to increase the accuracy of her readings. She is developing scientific protocols for these techniques, which would serve as guidelines for scientists worldwide using similar methods.



Dr. Daphna Shimon, Senior Lecturer in the Department of Chemistry, with the nuclear magnetic resonance machine in her lab.

The Bacteria Whisperer



Dr. Avihu Yona, Senior Lecturer in Biochemistry, Food Science and Nutrition

“It is an honor and pleasure being at the Robert H. Smith Faculty, where I’m surrounded by researchers and students who have the mindset of a start-up: research for its own sake, but also to change the world.”

As a child, Dr. Avihu Yona loved computers and programming. During his undergraduate studies in biophysics, he realized that DNA was, essentially, just another program, running on a live organism. He continued to graduate work in system biology, focusing his work on evolution in bacteria and yeast.

Bacteria split every half hour, making it easy to track generations over the course of a single day. Dr. Yona has shown that microorganisms do not rely on random mutations alone, but rather have mechanisms that enable them to quickly find beneficial mutations in response to environmental challenges.

During his postdoctoral research at the Massachusetts Institute of Technology, Dr. Yona starved specific bacteria until some were able to metabolize oxalate, a natural compound that forms kidney stones. This led to exploring ways to utilize these bacteria as a therapeutic probiotic, breaking down oxalate before stones form. “Selective breeding isn’t anything new,” Dr. Yona explains. “In the past it was done in the field. Today it’s done in the lab.”

Today he continues playing evolutionary tricks in his lab in Rehovot, working in the field of alternative proteins. For centuries, humans have used specific bacteria to ferment cow milk, resulting in cheeses and yogurt. Yet plant-based “dairy” products are lacking because their carbohydrates, which differ from those found in animal milk, cannot be fermented by the traditional microbes. Dr. Yona has achieved proof of concept, developing bacteria that can ferment oat milk into top-notch yogurt.

Looking ahead, Dr. Yona is also interested in exploring lactose intolerance. He is curious whether its painful symptoms are caused by present bacteria (rather than absent enzymes). If this were the case, people worldwide, especially in poor countries, could take specific probiotics that would enable them to metabolize this rich source of protein.



Carla Azar, MSc student in the Abisch-Frenkel Excellence in Biomedical Research program

Drug Delivery – Right to Cancer’s Door

Carla Azar always knew her future would be in medicine. She grew up in a family of medical professionals, but found herself drawn to medical research, rather than practice. She set her mind on the Hebrew University’s biomedical sciences program. “I wanted the best education I could get,” she says. Her high school had been primarily in English, so she first completed the Rothberg International School’s preparatory program to bring her Hebrew up to speed.

During her undergraduate studies, Carla joined Prof. Rotem Karni’s lab. She shadowed a doctoral student, experiencing the trials and tribulations of biomedical research: lab life, successes, failures, publishing, and everything in between. With every day that passed, Carla knew she’d chosen the right path.

During the final year of her studies, Carla heard about the new Abisch-Frenkel Excellence in Biomedical Research program, and decided to apply. Today she is in the program’s second cohort. Abisch-Frenkel graduate students begin a master’s degree and during their second year transition to the direct PhD track. In addition to their studies and research, they participate in a unique year-long course that teaches them skills that will serve them as researchers: written and oral

communication, problem solving, creativity, critical thinking, and more.

Carla is conducting her research under the supervision of Prof. Karni and in collaboration with Prof. Zvika Granot. Employing a method that won the Nobel Prize in Chemistry in 2018, she searches for peptides (the building blocks of proteins) that target cancerous leukemic cells – but not regular cells. This is the first step towards developing more precise cancer therapies. “There is currently no cure for leukemia – one major form of treatment is chemotherapy, which has awful side effects, killing good cells along with cancerous ones,” Carla explains.

Once identified, this peptide could be used to “decorate” nanoparticles that encapsulate RNA therapies developed by Prof. Karni, serving, essentially, as a precise drug delivery system. This would eliminate tumors more easily, while greatly reducing negative side effects.

“Hebrew University is a great place to conduct medical research. I feel that we’re all on one large team, motivated by the drive to advance medicine and medical knowledge.”

Lying for Good?

Mika Guzikevits feels at home at Hebrew University - and rightly so. She's been here for a while. She has under her belt a dual bachelor's degree in psychology and business administration, one master's degree in social psychology, another in business administration, and now she's working on her doctorate in business administration.

Mika is fascinated by one particular intersection between these two fields: the social aspects of deception. As an undergraduate student, she began working in Prof. Anat Maril's neurocognition lab, which fostered her sense of belonging to an academic community. Towards the end of her studies, she took a course on negotiations taught by Prof. Shoham Choshen-Hillel, whose expertise includes judgment and decision-making. They began chatting, and Prof. Choshen-Hillel

worthy they are, in fact, judged to be. Using online crowdsourcing platforms, Mika collected real lies and disseminated questionnaires. Responses started flowing in, and her data showed that pro-social liars were judged more favorably than selfish liars. These findings may indicate that people feel they have a license to lie, and thus engage in unethical and corrupt behavior.

By this point, Mika couldn't cram a single extra data point into her thesis. She decided to broaden her research question and take it to the next level. Today, Mika is a second-year doctoral student at the Jerusalem Business School and the Federmann Center for the Study of Rationality. Her research asks how the perceived "advantages" of being a pro-social liar affect people's behavior. Will people lie more? She continues to use online questionnaires and has expanded her methods to include experiments, both in the lab and the field.

"The Jerusalem Business School offers a unique, interdisciplinary, and intimate academic experience – a great place to pursue doctoral studies!"

invited Mika to attend her lab's weekly meetings to get a sense of the field and lab life. Mika gladly accepted and soon began working on a master's degree under Prof. Choshen-Hillel's guidance.

Mika's research examined the difference in moral judgment between selfish lies (self-serving) and pro-social lies (serving others). She looked at how different liars expect to be judged and how moral, benevolent, and trust-



Mika Guzikevits, doctoral student at the Jerusalem Business School



Shiran in the teff fields at the Robert H. Smith Faculty of Agriculture, Food and Environment campus.

Teff Love: Seeds for Humanity

Most eleven-year-olds ride bikes. But Shiran Ben-Zeev was different. At eleven, he was driving a tractor through his family's wheat fields and almond orchards. It was only natural that he'd choose to study plant sciences at Hebrew University. During his undergraduate studies, he undertook a research project in Prof. Yehoshua (Shuki) Saranga's lab. One day, Shiran was summoned to take a look at a fellow student's teff field – one agronomist helping another.

This field trip was the first step in what has become an eight-year journey for Shiran. Teff, a native Ethiopian grain, was brimming with promise: a nutritious crop that could grow through the hot, dry Israeli summer. Shiran was hooked. He began a master's degree at the Robert H. Smith Institute of Plant Sciences and Genetics in Agriculture, working under the guidance of Prof. Saranga, studying 400+ varieties of teff seeds that had been sitting in a vault since the 1970s. Planting a subset of the seeds in study fields in different climates, he identified the varieties' core traits and how the environment affected their growth.

Yet soon a problem arose. For no apparent reason, some teff plants permanently bend over. Lodging, as it is known, causes dampness and mold, reduces growth, or simply places the seeds out of reach for mechanical

harvesting. Ready to tackle this challenge, Shiran transferred to the direct PhD track.

Shiran is employing a three-pronged approach: identifying the ideal depth and density for planting seeds, studying teff's genome, and comparing how root size and structure affect lodging.

"I greatly enjoy the environment at the Smith Faculty. Many of the professors come from a farming background themselves – it feels like peer-to-peer learning. We all want to improve Israeli agriculture."

Only a small number of researchers worldwide study teff, and Shiran's work has overturned a number of assumptions. He surveyed an unprecedented number of varieties, developed best practices for planting, and has shown that teff has a potential yield twofold higher than previously thought.

In his spare time, Shiran hosts the Smith Faculty of Agriculture's podcast, *HaHakulta*, and looks forward to his postdoctoral appointment at the US-Israel Agricultural Research and Development Fund (BARD).



Dr. Roey Schurr, ELSC graduate, in his postdoctoral lab at Harvard

White Matter Matters

As a Hebrew University undergraduate, Roey Schurr chose to study physics and cognitive sciences. While participating in a research project at Hadassah, seeking neurological markers for psychogenic nonepileptic seizures (psychologically induced seizures), he realized he was hooked on the brain. His next step was a no-brainer: he enrolled in the graduate program at the Edmond and Lily Safra Center for Brain Sciences (ELSC).

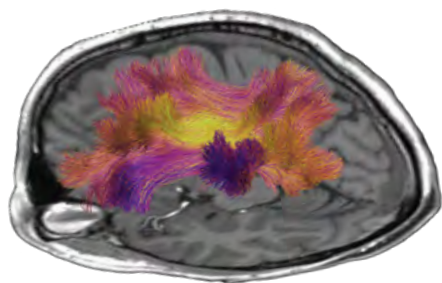
“Hebrew University and ELSC provide a challenging environment, in every sense. There is so much to learn, with research in so many fields. But we also challenge each other – at seminars, someone always critiques and asks the speaker difficult questions. This is how science advances. Not by politely agreeing, but by challenging each other to be the best scientists we can be.”

Incoming ESLC graduate students undergo an intensive year and a half study program before joining a lab and developing their own research projects. At the end of this period, Roey was most fascinated with what science least understood: white matter, the nerve fibers that connect and transmit information between different regions of the brain.

Roey enthusiastically joined Prof. Aviv Mezer’s lab, researching non-invasive ways to map the white matter tracts in the human brain using quantitative MRI scans. To this end, he utilized computational tools to combine information about the diffusion of water molecules and the amount of myelin, the insulating substance that enwraps the white matter fibers. This integrative approach proved extremely useful in increasing the accuracy of existing methods for mapping white matter.

Roey and Prof. Mezer demonstrated their method worked on one tract, then another, and then another.

A Vote of Confidence



Reconstruction of a large white matter tract. Different colors represent varying molecular content, gleaned from different quantitative MRI scans.

The potential implications of their groundbreaking findings are manifold: improving surgery on epilepsy patients, uncovering how brain structure supports brain function in healthy people, and shedding light on the structural abnormalities in conditions involving white matter, such as dyslexia or multiple sclerosis. By generalizing their method to conventional MRI scans, it can be applied in any lab.

After completing his doctoral research, Dr. Schurr undertook another project in Prof. Mezer's lab: studying white matter in postmortem brain tissue using Nissl-stained slides. For 140 years, Nissl staining was used almost exclusively to study neurons in the cortex. Roey demonstrated that these slides contain troves of information about the brain's white matter – hidden in plain sight.

This finding opened up endless opportunities for further research, as Nissl-stained slides are prevalent in labs worldwide. Dr. Schurr and Prof. Mezer published their findings in *Science* magazine in late 2021, just as Roey began his postdoctoral research at Harvard.

Tal Lento had a dream. She was going to be a teacher. She wanted to teach a subject that she loved, so she decided to immerse herself in the subject matter, rather than attend a teacher training college. That is how she ended up studying history and political science at Hebrew University.

During her second and third years, she participated in the Excellence Forum, which is where she first heard about the Advanced Graduate Study Program (AGSP, *Telem* in Hebrew). Tal surprised herself by even considering graduate school. Neither of her parents had a college education, and she'd lacked academic role models. "You can be what you see," she reflects. She had worked to put herself through her bachelor's degree; it was clear that she would need financial support to continue studying.

Tal applied to AGSP – and was accepted. Although considered a direct PhD program, AGSP students first write a master's thesis. She began working under the guidance of Prof. Reuven Y. Hazan, studying Israel's 2015 transition to the constructive vote of no-confidence (voting in a new government in lieu of the old one). Her in-depth research revealed the shift was done quietly, without much public discussion – a shame, considering that it essentially redefined the legislative-executive relationship. For her doctoral research, Tal expanded upon this topic, comparing Israel and Belgium – the only two countries to have adopted the constructive vote of no-confidence as full-fledged democracies.



"I'm thankful that I was encouraged to apply to AGSP. It entirely changed my academic experience. Research gets lonely, and AGSP provided a social framework, while also opening the gates of academia and introducing me to faculty members and mentors."



From Microscopes to Manuscripts

After graduating high school, Shachar Orlinski thought she had her academic path set out for her. She had studied in an honors biology program and saw her future in the lab. But a year in, she realized biology wasn't for her. Yet she was positively struck by how much she enjoyed conducting research.

Exploring her options, she took a course on Latin American history – and felt like she'd won the lottery. History was her calling! She became increasingly interested in early medieval Northern European history, even taking summer courses in Latin and paleography (the study of historical writing systems and manuscripts) at the National Library of Israel.

After completing her master's degree under the guidance of Hebrew University's Prof. Yitzhak

Hen, she decided to continue her studies and was accepted to the Barbara and Morton Mandel Doctoral Program in the Humanities and Social Sciences. Shachar is greatly enjoying the program's interdisciplinary learning, being challenged by her peers, workshops to hone her academic and presentation skills, developing herself as a scholar, and of course, the program's social aspects, as research can often be a lonesome experience.



Shachar F. Orlinski, doctoral student in the History Department

“I’m thankful for the support that enables me to dedicate myself to my studies and intellectual endeavors,” says Shachar. “The study of humanities enables us to better understand humankind, human culture, and ourselves, and this requires developing and honing critical thinking skills.”

Shachar’s doctoral research attempts to elucidate what it meant to be legally free in the Merovingian Gaul (western Europe, 5th-8th centuries CE). She’s drawing on historical texts, chronicles, and legal documents – all in Latin – to understand what freedom meant in the region, as the Roman Empire was coming to an end, yet its influences remained.

“The study of history is a method of gauging the different possible manifestations of human nature. Research into the past provides important insight into contemporary events, as well as into our own hearts and minds.”

Harbingers of Change: Women Leading the Way

This past year, Hebrew University was pleased to welcome two inspiring women, both University alumnae, into its leadership: Prof. Mona Khoury-Kassabri was appointed Vice President of Strategy and Diversity, and Prof. Sara Cohen was named Dean of the Rachel and Selim Benin School of Computer Science and Engineering.

Prof. Sara Cohen





Prof. Mona Khoury-Kassabri

In 2016, only 18% of Hebrew University professors were women. Today the number stands at 22.8% - a slight improvement. We hope that Prof. Khoury-Kassabri and Prof. Cohen are harbingers of changes to come - increasing the representation of women at Hebrew University. *Scopus* sat down with them to ask about their paths into academia, their research, and how they are leading Hebrew University into the future.

Before we start talking about the present and looking into the future, let's talk about where it all began. Your decision to begin studying, and your choice to come to Hebrew University.

Prof. Mona Khoury-Kassabri: The Hebrew University of Jerusalem wasn't an obvious choice for me. I knew I wanted to study. My parents, who didn't have the opportunity to get a higher education, wanted me and my sister to go to university. I grew up in Wadi Nisnas, a disadvantaged neighborhood in Haifa. It really shaped my worldview. I wanted to work with

bought the family a computer. It was pretty early technology; personal computers hadn't really taken off yet. I taught myself some programming. When it was time to choose a course of study, I enrolled in both mathematics and computer science at Hebrew University and participated in the Amirim Nature honors program. By the end of my first year, I had fallen in love with computer science and kept it as my only major. I was fortunate to be guided in my Amirim research project by Prof. Yehoshua (Shuky) Sagiv, who introduced me to the world of databases, which is still my focus today.

researchers. I'd just given birth to my first child when I began my PhD studies and was worried about balancing research and family. He advised me to be fully present, whether at home or on campus, which was great advice – although not always easy in practice. Long before working from home was in style, Shuky helped and encouraged me to conduct my research wherever was more convenient for me.

Shuky also insisted that I travel to international conferences to meet people and advance my career. He would cover the costs of flying out, presenting, and returning a day or so later, to make it easier for me and my growing family.

MKK: Speaking of balancing an academic career and family life... I knew that a postdoctoral position abroad was necessary if I wished to obtain an academic appointment in Israel. I had secured Fulbright funding and a position in Chicago, but my husband couldn't come for the entire year. I went alone, with our 11-month-old daughter. I put her in daycare. It wasn't ideal, but I was at a critical point in my career.

Regarding guidance during my studies – back then, I didn't fully understand what it meant to pursue an academic career. As a faculty member, and later, as the Dean of the Paul Baerwald School of Social Work and Social Welfare, I feel greatly responsible for directing and guiding my students from day one: mapping out their academic route, training them to write research proposals, instilling in

“I feel greatly responsible for guiding my students from day one: mapping out their academic route, training them to write research proposals, instilling in them the skills to become top-notch researchers.”

- Prof. Mona Khoury-Kassabri

people, to help people. I settled on social work. My parents preferred I stay close to home, but a relative who had studied at Hebrew University convinced them I'd be fine. Once I arrived in Jerusalem, I fell in love – with the campus, the students, the atmosphere. From the beginning, I knew I'd continue to a master's degree, to increase my impact.

Prof. Sara Cohen: My interest in computers started early on, when I was in third grade and my father

You both eventually decided to pursue doctoral studies at Hebrew University. Can you share a bit about the people who guided you along the way?

SC: I originally had no thoughts of graduate studies, but Shuky was persuasive and convinced me to continue, and then to transfer to a direct PhD track. Shuky is a very caring person, a fatherly mentor for me. He truly believes in his students – as people, not only as

them the skills to become top-notch researchers – with all that entails.

Let's talk about your research. Could you explain your field to our readers?

MKK: I got my academic start studying violence in schools – I adopted a new perspective in my doctoral studies, shifting the focus from the individual student to the larger context: the students' characteristics, their neighborhood, the school climate, and family characteristics – exploring how these factors may simultaneously affect student behavior. My advisor, Prof. Rami Benbenishty, had just begun a project with Prof. Ron Astor (today at UCLA). It was exciting to be part of an entirely new field with a large sample size – 16,000 schoolchildren. To this day, I continue to study juvenile violence in a variety of contexts – schools, social networks (cyberbullying), and political violence.

SC: I study databases, which is essentially how we store, search, and extract data. My over-arching research goal is to make data access efficient, effective, and user-friendly. In particular, I am currently interested in diversity, fairness, and representativeness in querying. This is especially pertinent in the 21st century, the era of big data. The ability to identify sets of data items, within a huge set, in an unbiased manner, is crucial for enabling equitable use of this data later on.

This issue of *Scopus* focuses on leadership. Could you share the ways you are fostering the

next generation of leaders at Hebrew University?

SC: Our main goal is to ensure that our students graduate with a deep understanding of the field of computer science and a top-notch skill set, so that they can become leaders in both academia and high-tech industries. As society increasingly outsources actions and decisions to machines, wider considerations come into play. True leaders must also understand how the algorithms they build affect the world at large. Recent real-life examples of discriminatory artificial intelligence are a case in point.

The Benin School of Computer Science and Engineering has an exciting undergraduate program called MATAR, Interfaces of Technology, Society, and Networks, in which students learn, among other topics, about the history and role of mass media, its impact, and ethical dilemmas. Our school also offers an undergraduate course in cyber law (taught by a retired judge), and a course on data revolutions from historical and social perspectives. I look forward to exploring additional ways to better equip our

students to use technology to make the world a better place.

MKK: It is so inspiring to hear that computer science students can take courses on the ethical, or human-centered aspects, of technology. Of course, caring for people and their well-being is the basis for social work.

My identity is multifaceted – I am an Arab, a woman, a mother, a researcher – and so much more. Of course, these identities intersect and affect each other. As Vice President of Strategy and Diversity, I am working to increase diversity – whether through subsidizing Arabic language classes, creating specific courses for fostering cooperation between students from different backgrounds, or celebrating Women's Day by pairing up inspirational women from across the Hebrew University community, to get to know each other.

Thank you so much for sharing with our readers. Best of luck in your new positions!

True leaders must understand how the algorithms they build affect the world at large. Recent real-life examples of discriminatory artificial intelligence are a case in point.

- Prof. Sara Cohen





BEHIND THE SCENES

Get a glimpse into the inner workings of two Hebrew University units: the Albert Einstein Archives and the Correlative Microscopy Unit of the Core Facility – and the inspiring women at their helm!



Chaya Becker in the Einstein Archives

Curiosity and Genius: Preserving Einstein's Legacy

In Toronto, Chaya Becker had been a preschool teacher. She spent her days cultivating young minds, piquing children's curiosity. But that did not prepare her for the twist her career took after making *aliya* in the early 1990s. Today she is the archivist for the Albert Einstein Archives, coordinating projects within the archives of the man who once famously said, "I have no special talents. I am only passionately curious."

In the early aughts, Chaya came across a job board advertising the position of assistant to then-curator of the Albert Einstein Archives, Dr. Ze'ev Rosenkranz. Chaya applied on a whim and was accepted. After about a decade on the job, Chaya was ready to advance her

career and become the archivist, to assume responsibility for the world's largest collection of Einstein's manuscripts, correspondences, papers, and books.

Chaya sought out opportunities for professional growth. Hebrew

University had just closed its School of Library, Archive, and Information Studies, so Chaya enrolled at Beit Berl College, where she earned a certificate in archival studies. When the position opened up, Chaya was the perfect fit.

Chaya's work falls into three distinct categories.

First, she cares for the collection – handling precious documents and other archival material, ensuring preservation treatments by a professional paper conservator to maintain the aging papers and nearly four thousand books that comprised Einstein's personal library, which are also under the care of a book conservator. These volumes have traveled the globe – in the 1930s Einstein's personal library was shipped from Berlin to Princeton, where the collection grew until, in the 1980s, it was shipped in its entirety to Jerusalem.

Along with her colleagues, Dr. Roni Grosz, Miriam Kutschinski, and Anna Rabin, Chaya handles requests submitted by researchers and scientists worldwide asking to view Einstein's documents or manuscripts to advance their own work. The archive also hosts in-person visitors, including researchers, diplomats, heads of state, and other VIPs. In advance of each visit, Chaya and the archives team carefully select items from the collection to present, focusing on each visitor's particular interests, culture, or history. On a few occasions, the archive even hosted Albert Einstein's descendants! To mark the 140th anniversary of the great scientist's birth, Hebrew University invited Karen Cortell

ciary of Einstein's estate, Hebrew University must protect his image and reputation. While many companies wish to be associated with Einstein's genius, it is my job to ensure that his image and likeness are used in an appropriate and respectable manner."

Lastly, Chaya is part of the team involved in the creation of exhibitions about Einstein, his life, and his legacy. In 1922, Albert Einstein travelled to the Far East, and the European

damage." Back in Jerusalem, the archive is kept at 20 degrees Celsius and 45% humidity. Many items are stored in special acid-free polyester sleeves to protect them from ultraviolet light, and the storage lighting meets the strictest archival standards.

The next few years will be exciting ones for Chaya and the Einstein Archives. "February 2023 marks the 100th anniversary of Einstein's one and only visit to the Land of Israel, where he delivered the first

"I love my job. I learn something new every day – about Albert Einstein, about other scientists. I've never had a dull day at work."



Reisman, Albert Einstein's relative, to speak at a celebratory event. "I was able to show her letters written by her grandmother," Chaya recalls. "It was very touching."

Second, Chaya coordinates requests to use Albert Einstein's image on commercial products and in advertisements. Hebrew University holds the publicity rights on Einstein's image, likeness, and his literary works. Requests truly run the gamut, ranging from insurance companies to computer software, teddy bears to t-shirts – and even dog food. "As the benefi-

scientist and the people he met developed an immense liking and interest in each other. To mark the 100th anniversary of this trip, a number of Asian institutions organized exhibitions, drawing upon the Einstein Archives at Hebrew University. "Lending original objects is complex," Chaya warns. "We need to guarantee that the object will be safe and secure, and stored in the proper climate-controlled environment. Even small fluctuations to the temperature or humidity can cause immediate and long-term

scientific lecture on Mount Scopus, before Hebrew University officially opened its doors," Chaya remarks. "This anniversary is ours alone. With the cooperation of a number of other Hebrew University departments, I'm hoping to develop exciting programs to commemorate his visit, perhaps even following in his footsteps through the city."

Another exciting development is the Einstein House, which is currently under development and will open its doors in the coming years. "The new facility will enable the Einstein Archives to do more outreach – host more groups, more visitors, hold more public programs. I'm excited to continue sharing Albert Einstein's exceptional legacy with the Israeli public and researchers worldwide."

VISIT THE
EINSTEIN
ARCHIVES!



Dr. Reichert-Zelinger next to the Jeol 7800F high resolution scanning electron microscope, funded with the support of the U.S. Agency for International Development (USAID)



Peeking into the Art of Creation

Dr. Einat Reichert-Zelinger still remembers the drawer in her childhood bedroom. Her father filled it with newspaper clippings about his uncle, Einat's grandfather's brother, cut from the daily paper and preserved ever so carefully. But her great uncle wasn't an important politician or a world-renowned rockstar; he was a scientist.

Prof. Israel Reichert had established the field of phytopathology (the study of plant diseases) in Israel and retained recognition throughout his career as its foremost researcher, culminating with being awarded the Israel Prize in 1955.

When Einat decided to study plant protection sciences at Hebrew University, it was just a matter of time until someone asked about her last name. That person was Prof. Jaacov Katan, who had conducted his doctoral research under her grandfather's supervision. He invited Einat to his lab, where she first encountered microscopy. She developed such good imaging skills that she would often assist Prof. Katan's doctoral students with their measurements.

Einat continued to her own doctoral studies at a joint program between Oxford University and Oxford Brookes University, under the supervision of the late Prof. Chris Hawes and Dr. Molly Dewey, where she studied a specific fungus that plagues a variety of wheat grown also in Israel. It was here that she fully understood the immense power of imaging as a research tool. She had access to so many different types of machines: the confocal laser light microscope, the scanning electron microscope (SEM) that can also handle frozen



responsible for all things microscopy in the lab, including training new students.

When the position opened at the Center for Scientific Imaging in the Core Research Facility, Einat felt in her heart that it was her destiny. The unit holds and operates more complex machinery than regular labs and has extremely high-end image processing programs. The staff assists researchers and students to plan and execute their experiments most effectively.

kind,” Einat explains. “The question becomes one of big data – analyzing your findings. To this end, I’m leading the way towards applying machine learning to microscopy data.”

Einat needed a project on which to develop these protocols, a testing grounds of sort. She has retained a strong affiliation with Dr. Heifetz’s lab, and her ongoing research on *Drosophila* serves that purpose.

She reflects, “Microscopes never cease to amaze. Whether it’s me

“I have the best job in the world! Every day brings a new story or evolving project. I love working with versatile microscopes and am surrounded by a wonderful team. I get to peek into the art of creation while doing science. I’m always curious what scientific mystery I will help unravel on any given day.”

samples, and the transmission electron microscope (TEM). She also mastered the technique of cutting thin sections and antibody staining with gold particles. “I was enchanted by the radical glimpse that microscopy offered into things too small for the naked eye,” Dr. Reichert-Zelinger recalls.

After graduating, Dr. Reichert-Zelinger returned to Hebrew University to conduct postdoctoral research in Dr. Yael Heifetz’s lab. She was studying the connection between nutrition, aging, and fertility – specifically, the biological clock in *Drosophila* (small fruit flies), along with Prof. Oren Froy from the Department of Biochemistry, Food Science and Nutrition. But she couldn’t escape the microscopes. Einat quickly became

Einat is currently working to develop microscopy protocols for researchers from different fields, identifying which microscope is best suited for which measurement, and how to optimize findings by combining measurements from different machines. This is no small feat – the Smith Faculty alone has researchers from biology, plant sciences, entomology, soil and water, biochemistry, and more – not to mention researchers from other campuses and external companies who hire Hebrew University’s services.

“The new frontier is correlative microscopy – combining different machines, each with its advantages and disadvantages, to glean the best measurements possible for experiments of any and every

peering through for the umpteenth time or high school students on a field trip getting their first look, you cannot ignore that sense of awe.”



Left to right: Daniel Waiger, Dr. Reichert-Zelinger, and Tali Kossovsky alongside the Jeol IT100 LV scanning electron microscope, funded with the support of the U.S. Agency for International Development (USAID)

PHOTO ESSAY



Dr. Jonathan D. Bohbot studies mosquitoes' sense of smell, what smells attract or repel them – and why. He hopes that his research will enable the development of biosensors, as well as the design of smells fatal to the mosquito, enabling better control of pest populations.

Securing Life on Our Planet, for Generations to Come

Hebrew University's entomology researchers used to be scattered across the Robert H. Smith Faculty of Agriculture, Food and Environment. Officially, the department occupied a single building, which housed four research labs.

The other researchers were scattered. "We lacked cohesion," says Dr. Yael Mandelik, who heads the department. "We almost never saw each other, never had scientific interactions. We also couldn't expand, we had no room to grow."

Just last year, the entomology department moved into its new home: **The Kennedy Leigh Research Complex for Ecosystem Services in Agriculture**, which occupies the structures formerly known as the Warburg and Aaronsohn buildings. The former houses four scientists conducting research at the molecular level, while the latter hosts three ecological scientists, those who study individual insects, communities, and populations. The complex is also much

closer to the lab of one additional scientist, who continues to work at the edge of campus, where his beehives are kept at a safe distance.

To further encourage interaction, a beautiful garden with benches was constructed between the buildings. The plants were carefully chosen to attract insects. "Finally," says Prof. Sharoni Shafir, who heads the Institute of Environmental Sciences, "we're together – from molecules to eco-systems."

Scopus set out to meet the scientists and visit their labs in the newly renovated complex. In addition to the researchers featured here, Dr. Yael Heifetz and Dr. Philippos Papatianos also have labs in the Kennedy Leigh Research Complex.





The Aaron Aaronsohn building, 1958



Now and then. Today's researchers, from left to right: Prof. Moshe Coll, Prof. Shai Morin, Dr. Yael Mandelik, Prof. Sharoni Shafir, Dr. Jonathan D. Bohbot, and Prof. Boaz Yuval.



1

1. Prof. Moshe Coll studies insect ecology, the biology and behavior of herbivores and their natural enemies in agro-ecosystems, and biological control of insect pests.
2. Prof. Boaz Yuval holds the Morris and Helen Mauerberger Chair in Agricultural Entomology. He studies nutritional and sexual ecology of flies and insect-bacteria interactions. His work has focused on mosquitoes, Mediterranean and olive fruit flies, and, recently, an invasive fly in the Galapagos islands.
3. Prof. Shai Morin studies the interactions between insects and their environment, with the aim of understanding the molecular mechanisms that enable insects to adapt and overcome biotic and abiotic challenges such as toxic plant defenses, climate change effects, and chemical treatments.
4. Dr. Yael Mandelik is an ecologist and conservation biologist. Her studies on insect pollinators and pollination explore questions related to pollination services to crops and wild plants, human-induced changes to pollinator communities, and pollinator health – all with the aim of contributing to sustainable agriculture and biodiversity conservation.



3



2



4





LEADING GLOBALLY - AND BEYOND!

Grab your passport and pack your bags! Follow Hebrew University alumni and scientists as they lead the way around the globe, from the Ukrainian border to Mongolia, from Africa to Israel - and even into low-earth orbit!



When Disaster Calls

Growing up, Hagit Krakov remembers her grandmother often saying *nichochesh nienada!* ("If you don't want it, don't take it!"). But she never imagined the situation in which she would utter those words herself - albeit, as a joke.



It was March 2022, and Hagit was sitting in a tent in Palanca, a Moldovan town a mere 27 miles from Odessa, Ukraine. The tent had been pitched a few days earlier by IsraAID, an international non-governmental humanitarian aid organization, and Hagit was there heading IsraAID's mission to Moldova in the immediate aftermath of the Russian invasion.

Snow was flurrying outside but the tent was nice and warm, offering a few hours of respite. Hagit sat with a group of women, mostly mothers, while the children participated in activities nearby. One little boy came over to his mother, agitated, but nothing she did calmed him. Hagit leaned over and whispered into her ear: *nichochesh nienada!* The mother burst out laughing and the little boy relaxed. Amid the tensions, he hadn't seen his mother smile or laugh in days.

Moldova wasn't Hagit's first humanitarian mission. In 2015 she had just graduated from the Hebrew University's Glocal program with a master's degree in international development and was taking her first steps into the professional world when a 7.8 magnitude earthquake struck Nepal. She was desperate to get to the field, but by the time she reached fellow Glocal alumna Naama Gorodischer

(today IsraAID's Program Director), they didn't need any more people on the ground. "But," Naama ventured, "a tropical cyclone just devastated Vanuatu. Want to go there?" Hagit located Vanuatu on a map, packed her bags, and left. Over the next nine months, she worked with the World Health Organization, the World Bank, and other partners to develop programs focused on water, hygiene, and mental health – which continue to run until this very day.

Two days after returning to Israel, Hagit's phone rang. It was Naama. Refugees from Syria, Afghanistan, and Iraq were making their way to Europe – risking everything trying to reach Greece on flimsy boats. The next day, Hagit boarded a plane. Over the course of the next month, she set up IsraAID's emergency response in northern Greece, developing programs that ran continuously for six years.

In the years that followed, Hagit travelled to Fiji after cyclone Winston and to Italy following earthquake Amatrice – developing long term recovery programs. In between, she managed IsraAID's growing number of long-term development programs from the Tel Aviv office. Around the outbreak of the pandemic, Hagit and her partner were preparing to

“At every step along the way, I must ensure that I’m working with the community, through the community.”

move their young family to London. But when disaster calls, Hagit picks up the phone. She began developing a local emergency response to the pandemic, working with seven local organizations to serve Sudanese and Eritrean asylum seekers and refugees in Israel.

In early 2022, Hagit's phone rang again. It was Naama – of course. She inquired whether Hagit knew any Russian or Ukrainian speakers in London, who might be of assistance. (She didn't and suggested hiring locals). The next day, Hagit called Naama back – this time offering to help.

Two days later, Hagit was standing at Moldova's border with Ukraine with a small emergency response team. Over the course of three intense weeks, Hagit led them in building partnerships with the Palanca municipality, the

“Humanitarian work is always a long-term project. When disaster strikes, we quickly develop an emergency response. We then work with the community, listen to their needs, and plan together the next steps: recovery, rehabilitation, and, finally, community development.”

Moldovan Ministry of Interior and other governmental entities, teachers, social workers, and even the Library Association of Moldova, an extremely civic-minded organization dedicated to preserving Moldovan culture and heritage. The logistics team scouted stores and assembled winter, baby, and resilience kits. IsraAID began training volunteers and professionals, developing their capacity to deal with the short- and long-term effects of the massive influx of refugees, ranging from emotional support, working on a transitional education plan for children, and so much more. All the while, Hagit would watch the constant stream of Ukrainians crossing the border, taking their first steps into Moldova – and into their new life as refugees.

And that's how Hagit found herself sitting in a tent in Moldova, whispering her grandmother's words into the ears of a Ukrainian mother.



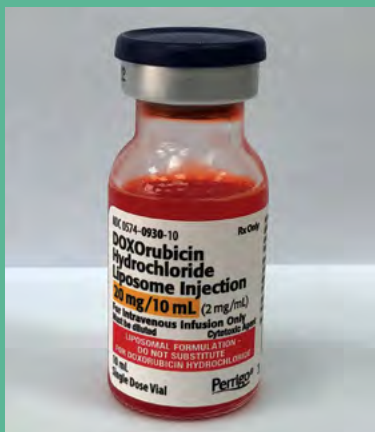
Hagit at IsraAID's site in Palanca, Moldova



The Sky is Not the Limit

When Prof. Yechezkel (Chezy) Barenholz from the Faculty of Medicine's Department of Biochemistry and Molecular Biology co-invented Doxil, a nano-drug for treating recurring ovarian cancer, he had no idea how far the drug would go – quite literally. Thanks to Prof. Sara Eyal from the School of Pharmacy, Doxil recently returned from a field trip to the International Space Station (ISS).

Doxil was first approved by the American Food and Drug Administration (FDA) in 1995, making it the first nano-drug to be approved by the agency. Nearly three decades later, Doxil continues to lead – globally and beyond! In early 2022, it became the first nano-drug to travel to space, when it completed a one-month stay aboard the ISS.



Prof. Barenholz actually invented Doxil twice. The original innovative nano-drug was approved by the FDA in 1995 and has since been used extensively worldwide. Yet interestingly, while Prof. Barenholz's patents formed the basis for Doxil, the processes of large-scale production weren't known to him.

After Doxil's patents expired, together with Yissum (Hebrew University's technology transfer company), Prof. Barenholz founded Ayana Pharma Ltd. with the aim of developing and producing liposomal drugs. Ayana Pharma successfully developed a generic version of Doxil, known as Doxorubicin-HCl Liposome Injection. In late 2021, the FDA approved the drug, making it the company's first to be approved. The generic drug is produced in Israel and sold in the United States.

To reach space, Prof. Eyal loaded the generic version of Doxil (see sidebar) into a miniature SpacePharma laboratory, where conditions could be monitored and controlled from Earth. The laboratory was launched on a Space X spaceship that routinely delivers supplies and scientific materials to the ISS.

Prof. Barenholz explains: “The nano-drug’s structure is based on nano-liposomes, a bubble in which an envelope of fat molecules that resemble the components of cell membranes which encircle a small amount of water. Within this water there is the anti-cancer agent in the form of a unique single nano-rod crystal per each nano-liposome. The first aim in sending the nano-drug to space was to evaluate whether subjecting it to zero-gravity would alter its complex structure. If so, the next step will be to determine whether these changes alter the drug’s therapeutic efficiency back on Earth.”

Prof. Eyal got her first taste of space medicine three years ago, when she participated in a University of Washington project that was launched to space. This motivated her to establish the field of space medicine at Hebrew University. She took a sabbatical to work with SpacePharma, an Israeli company that specializes in sending tiny experiments to space. Today, her research combines sustainable research on Earth with projects conducted in space.

“Micro- and zero-gravity aren’t only for space exploration. These extreme conditions can also be used to achieve scientific advances in drug development, agriculture, and more,” she says.

Prof. Eyal conceived of and was the lead investigator on the study that sent generic Doxil into space. Funded by Hebrew University and the Israel Space Agency, the experiment was a truly collaborative effort. Scientists involved include the School of Pharmacy’s Prof. Ofra Benny, who developed the organ-on-a-chip for carrying cancer cells to space; Prof. Uri Raviv from the Department of Chemistry who, along with Prof. Barenholz, will analyze the drug’s nano-structure upon its return to earth; and Prof. Tal Burstyn-Cohen from the Faculty of Dental Medicine, who will contribute her expertise in the mechanisms that cause changes within cells.



Prof. Sara Eyal preparing the miniature laboratory in Cape Canaveral

Prof. Eyal’s commitment to space medicine goes even further. She led the way to purchasing a zero-gravity simulator, which is located within the School of Pharmacy. Together with Prof. Ayal Ben-Zvi and Dr. Assaf Honig from Hadassah, Prof. Eyal uses the simulator to understand how gravitational changes cause brain damage in fighter pilots. She also studies the effect of microgravity on the uptake of essential compounds (e.g., glucose) and medications by human cells. She looks forward to involving high school students who participate in the University’s Mars Colony program in her projects.

Prof. Eyal is also the academic advisor of the Hebrew University rocketry club, and she encourages researchers to launch their experiments on sub-orbital rockets built by the students. Dr. Ronen Hazan of the Faculty of Dental Medicine has already taken her up on this invitation.

“What we learn in space directly translates to better understanding our bodies, medicines, and the interactions between them – ultimately, making life better on Earth!”

- Prof. Sara Eyal

Lastly, aiming to inspire the next generation of researchers, Prof. Eyal teaches a class on space medicine. The course is the first of its kind in Israel, and students from across medical fields learn about space medicine and “translate” their research projects into zero-gravity conditions.



Food for the Future

In tackling climate change, the meat industry is often blamed for inordinate resource depletion and emitting disproportionate amounts of greenhouse gases. But what if your next burger could be the solution - rather than the problem?



A sandwich with a meat patty cultivated by Future Meat Technologies

For Hebrew University Prof. Yaakov (Koby) Nahmias, this is not a pipe dream.

In 2018 Prof. Nahmias founded Future Meat Technologies with the goal of making cultivated meat a greener, healthier, non-GMO, and affordable culinary option. (For more information on alternative proteins, including cultivated meat, see sidebar on p. 61). Within four short years, Future Meat has become a global leader in the field, raising one of the most significant amounts of capital investment in the industry.

The first cultivated patty cost \$250,000 to produce. Thanks to a number of scientific breakthroughs, Prof. Nahmias has reduced the price to \$1.70 for a chicken patty and is aiming even lower. And in the spirit of true affordability, he plans to sell the product at diners and restaurants – making it accessible to a wider public.

Today, Future Meat’s small Rehovot-based production plant is capable of producing the equivalent of one cow a day – or 5,000 beef patties. Prof. Nahmias is currently working on obtaining FDA approval and developing plans for a full-scale production facility in the United States.



Future Meat Technologies production line in Rehovot, Israel



Prof. Yaakov (Koby) Nahmias, President & Founder of Future Meat Technologies

“We have a non-GMO product that can grow forever and feed the entire world – while being extremely cost effective. But it’s not only about price – it’s also about taste. We make sure that our product is nothing short of mouth-wateringly delicious.”



Simply Unstoppable

Saranchuluun (Sara) Otgon has broken a barrier or two in her life. And, of course, one fateful bone.

Sara sharing her story at TEDx in Chinggis City, Mongolia

When Sara was 13, she was horseback riding in the Mongolian countryside when she fell and broke her ankle. Without access to a hospital, her grandmother rubbed traditional herbs and hoped for the best. But Sara's condition worsened, and eventually she headed to the city. She visited a few clinics and hospitals until receiving her diagnosis: bone cancer.

She spent four years in the cancer center, undergoing an amputation and chemotherapy. After her recovery, Sara kept her secret

under wraps – literally. “In Mongolia, people would associate a disabled body with a disabled mind,” she laments. “I always wore long pants to cover my leg.” She eventually earned a bachelor's and master's degree in social work, hoping to address the psychosocial issues experienced by other cancer patients.

Sara first encountered Hebrew University through graduates of the International Master of Public Health program (IMPH), while teaching at the Mongolian School

of Public Health at the National University of Medical Sciences. “They were impressive and confident, truly experts in public health,” she recalls. She decided to follow in their footsteps to Jerusalem.

It was her first time outside of Mongolia. Sara arrived at Hebrew University with a Mongolian colleague, who was also her roommate and confidante. She enjoyed the program's diversity, the monthly hikes, and the Shabbat dinners at her professors' houses.



“Nothing is impossible. Thanks to the IMPH program, I grew strong enough in my heart to challenge Mongolian cultural taboos surrounding physical handicaps.”

Every day, she trudged up the stairs leading from her dormitory to school – without saying a word.

Yet in the summer heat, something went wrong. The prosthetic leg stopped working and Sara developed a horrible rash. Terrified, she eventually approached the program’s Prof. Yehuda Neumark. He was shocked to learn Sara’s secret – and immediately found a

repair lab. He encouraged her to share her story. Sara began opening up to her classmates, but as the year came to an end, she packed her bags and returned her secret to its hiding place.

In 2013-2014, while on a year-long research fellowship in New York, Sara first encountered Achilles International, a non-profit that encourages people with disabili-

ties to participate in mainstream athletics. Around the same time, some American friends had helped Sara with her prosthesis, obtaining expensive replacement parts and even entering her into a sweepstakes, which she won – earning her two brand-new prosthetics: one for walking and one for running. She decided to accept the invitation extended by her Achilles International friends, and began training for the New York City Marathon.

In April 2014, after her first marathon, with Prof. Neumark’s words still ringing in her ears, Sara decided the time had come. She posted on Facebook, along with a photo: “It feels strange posting a picture of my leg for the first time in my life ... I just finished running 5 kilometers in Manhattan. Will you run with me?” Responses started pouring in.

She didn’t realize it at the time, but her Facebook post marked the start of two revolutions. First, Mongolians had never seen running as a recreational activity. Some people even asked Sara whether non-handicapped people could run! And second, Sara began changing how Mongolian culture views people with disabilities.

Sara is truly unstoppable. She ran in the New York City Marathon in 2014, and a year later organized the first marathon in Mongolia. She ran in New York again in 2017, and in Berlin in 2019. She founded and heads three NGOs: Achilles Mongolia, Let’s Run Mongolia, and Let’s Hike Mongolia, which combined have 7,000 members on Facebook.



Tikkun Olam Without Borders

Dr. Tomer Malchi was born in Israel, grew up in the United States, and returned to Israel three years after completing his BA at Cornell. He had developed an avid interest in water, which led him to pursue a second bachelor's degree, this time in Soil and Water Sciences, working with Prof. Moshe Shenker and Prof. Benny Chefetz at the Robert H. Smith Faculty of Agriculture, Food and Environment. In his second year, Tomer had a slight turn of heart, and found himself enamored with all things soil, a love that lasted through his doctoral studies - and beyond.

Dr. Tomer Malchi (right) inaugurating a new mango orchard at AITEC Dodoma, Tanzania, which will be used to demonstrate new varieties, new agronomic methods, and new technologies.

Towards the end of his bachelor's degree, Tomer became involved in the international organization Engineers Without Borders (EWB). He was on the team that established the national headquarters in Israel, and he founded the Rehovot branch. Using EWB as a platform, Tomer worked to create opportunities for Smith Faculty alumni to gain hands-on experience in Israel and Ethiopia. Projects included working with youth, water purification systems, and establishing a demonstration farm to train Ethiopian farmers on Israeli technologies. "We had no idea what we were getting ourselves into," Tomer recalls.

Soon the Ethiopian government reached out, asking that they scale up their agricultural activity. Along with co-founders Ben Cohen and Yair Keinan, Tomer departed from EWB and founded CultivAid. Soon they were working across Ethiopia, with partners ranging from the Ethiopian government, local NGOs, the Joint Distribution Committee, Israel's Ministry of Foreign Affairs, universities, the private sector, and the United Nations Industrial Development Organization.

Today, the scope of CultivAid's programs is quite impressive. They work in four countries in east Africa. Over 100 Israelis have participated in their internship program, and thousands of Ethiopian agronomists have completed various training programs. In Tanzania alone, a new program with the Don Bosco Technical Institute of Dodoma will train 150 students annually on Israeli agricultural technologies.

CultivAid is truly a multifaceted organization. Through training, demonstration sites, and research, they lead the way, introducing agricultural technologies ranging from drip irrigation, greenhouses, and meteorological stations. Their demonstration plots are lush with a variety of vegetables, and their orchards are home to mangoes, avocados, apples, and grapes. They develop nutrition-sensitive agriculture and help farmers improve the quality and quantity of the produce they bring to market, strengthening the agricultural economy and regional development.

"Our model has proven successful – even without our physical presence, our programs have continued throughout the pandemic. This is proof that providing knowledge and skills is what matters most. We are training people to make a difference. We're not like other NGOs that come and go. We're here to stay."



Greenhouse seedling nursery production at AITEC Kallamino, Ethiopia. This important practice improved production and vegetable cultivation in the region.





ALUMNI WORTH FOLLOWING

And they're off! Hebrew University alumni are busy creating a more equitable Israeli society, revolutionizing driver assistance technologies, and developing and promoting alternative proteins. Catch them if you can!



A Protein Unto the Nations

While Nir Goldstein's path to Hebrew University was quite straightforward, his route into the world of foodtech and alternative proteins was more circuitous.



Hebrew University runs in Nir's blood. His grandfather Yerach studied physics in the early 1950s, and his father, Noam, studied economics in the 1980s. Aspiring for a meaningful career, Nir began studying law and then joined an honors program where he concurrently earned an MBA. He wanted to become an influencer, a decision-maker.

As a student, Nir developed an interest in patents. He began working at the Ministry of Justice and completed his internship in the field of intellectual property, working on a number of patent cases in the food industry. He then joined

Israel's largest management consulting firm, but a few years later left to establish a foodtech division at a different company.

In 2019, Nir's phone rang. It was the Good Food Institute (GFI), an international nonprofit think tank that promotes innovation in the field of alternative proteins. Nir was being asked to found and manage their Israeli affiliate office, one of only six worldwide. He readily accepted.

Israel is an alternative protein powerhouse, with over \$600M invested in 2021, second only to the United States. GFI Israel is advancing the field across the

“Solving the climate crisis requires a paradigm shift in our food system. Together with GFI Israel, I’m working to advance alternative protein science, policy, and markets to tackle the biggest challenges of our time: getting to net-zero carbon emissions, feeding ten billion people, protecting global health, and enabling animals and ecosystems to recover and thrive.”

board, working with government, academia, and the business sector. Within Israel, Hebrew University is leading the way with twelve labs already conducting cutting-edge research into alternative proteins, and twenty-seven more that want to begin. Five Hebrew University researchers have received GFI grants. In addition, GFI Israel developed the first academic course on plant-based proteins, cultivated meat, and fermentation – especially for Hebrew University. Following its inaugural run at the Robert H. Smith Faculty in Rehovot, the course traveled to nearly 20 universities worldwide.

With Israel as a global leader in the field, it should come as no surprise that when Nir served cultivated meat to former Prime Minister Benjamin Netanyahu and current President Isaac Herzog, they became the first heads of state to taste the future – literally. Prime Minister Naftali Bennett asked Nir to debrief him before meeting with President Joe Biden, and even shared Nir's slides with the American leader. In 2021, Nir was invited by President Herzog to join Israel's delegation to the Glasgow COP26 Climate Conference, where he presented GFI's work to the group.

Nir and his team are developing innovative global strategies to promote alternative proteins, working with the Israel Innovation Authority, the World Bank, and the United Nations Food and Agriculture Organization. He is currently working with the Ministry of Foreign Affairs to put alternative proteins at the forefront of the mission of Israel's diplomatic corps – spreading the word that the food revolution is well underway in Israel.



Left to right: Stephanie von Stein, Hila Goldenberg, Alla Voldman, Nir Goldstein, and Bruce Friedrich (Founder & CEO of the Good Food Institute).



Nir Goldstein at the United Nations, celebrating Israel's 74th Independence Day through food tech.



Enjoying Israeli delicacies at the United Nations – plant-based eggs by Yo! Egg



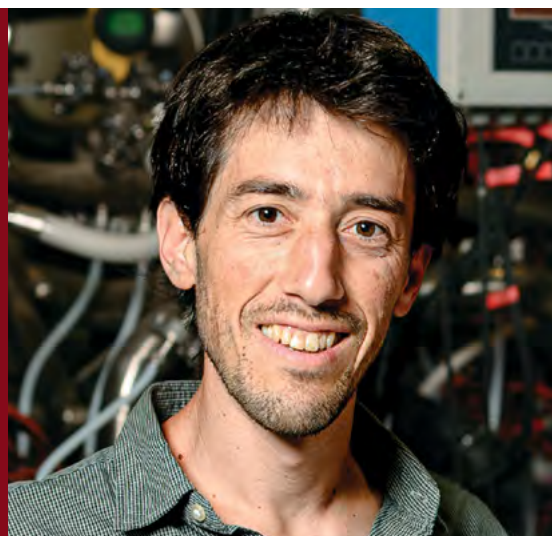
What are alternative proteins?

The field of alternative proteins aims to replace animal-based products such as meat and dairy with alternatives created from plants, fungi, microorganisms (e.g. algae), or cultivated animal cells, which is meat grown and harvested in a lab, rather than from animals (see p. 50). Today, animal-based products are costly – in terms of the amount of land, water, and energy required. As the world population grows and entire countries adopt a higher standard of living, the consumption of animal-based products continues to rise. Ultimately, the alternative protein market strives to do more with less – to feed more people higher quality food, using a small fraction of the resources required to produce animal-based products. Hebrew University faculty and alumni are leading the way, making Israel a global leader in the field.



Growing the Entrepreneurial Spirit: Algae for a Hungry World

Yonatan Golan chose to study chemistry and physics at Hebrew University. Although originally less drawn to physics, he found himself immensely enjoying the experimental side of his studies: following protocols and taking measurements in the lab, writing programs to analyze his data, and eventually developing and conducting his own experiments.



Yonatan Golan, Co-founder and CEO of Brevel

He surprised himself by deciding to continue his studies and pursue a master's degree in physics. Although he struggled through the theoretical courses, he found reprise in his research, conducted in Prof. Eilon Sherman's experimental biophysics laboratory. Yonatan studied T-cell membranes by observing the proteins on their surface, and eventually published his findings in *Nature Communications*. "Receiving such external recognition of my research really lifted me up, solidified my faith in my abilities."

For a few years, Yonatan and his brothers had been tossing around ideas about starting something together. One brother, Matan, was wrapping up medical school at the Hebrew University's Faculty of Medicine. The other brother, Ido, had been the chief engineer at an algae biotech company. Together, they started a company and named it Brevel, honoring their grandfather's entrepreneurial spirit – he'd founded and grown the Brevel motor company back in the 1930s. They were joined by a former colleague of Ido's, whose background is in biology.

Yonatan and his team got to work, seeking ways to grow more, better, and cost-effective algae, with the intent of marketing it to the food industry as a fast-growing, nutritious, and eco-friendly food source. (For more information, see sidebar on p. 61).

A bit of background: Algae can be grown outdoors, in natural sunlight, resulting in a slow-growing, high

"My studies at Hebrew University helped make me who I am today. I gained crucial skills that are serving me as a scientist: critical thinking, understanding processes, analyzing data."

quality, yet labor-intensive product. Alternatively, it can be fed sugar and grow bountifully within bioreactors, which must be sterile and dark – but the lack of sunlight affects the nutritious quality of the algae, and sterilization is costly.

The Brevel team eventually re-designed the bioreactors and valves, registering three patents. Today Brevel is the first and only company in the world to grow algae using both natural sunlight and sugar, producing algae that is high quality and low-cost, using scalable methods. Brevel is running pilots with food companies in Israel and abroad, and is working to establish its first factory, which will be located in the southern town of Kiryat Gat. Looking ahead, Yonatan hopes to begin full-scale production by 2024. "Brevel is in this for the long run," he says. "We're establishing a new industry in Israel. I'm proud and excited to see the impact that Brevel will have, both locally and globally."

Brevel has won numerous awards, including first place in MassChallenge in both Israel and Switzerland. The company was also selected for the Google for Startups Accelerator: Sustainable Development Goals (SDGs). For more information about the SDGs, see page 82.

Bridging the Divide:

Urban Planning for *Haredim* in the 21st Century



Benzi Rakov leading a tour of a residential construction project for the *haredi* community

*“At Hebrew University, I learned from the finest. My education is enabling me to represent *haredi* interests and culture in the planning and development processes, while bringing the professional language of planning back into the *haredi* community.”*

When Benzi Rakov first became involved in his local planning and building committee back in 2009, he could never have guessed what a turn his life would take. He started as assistant to the chairperson, gathering public comments and tracking the development of 10,000 residential units. Benzi lives in Beit Shemesh, and these were its boon years – growing from a small town into a large city, where today over two-thirds of the population identify as ultra-Orthodox (*haredi*).

Benzi realized he was constantly hearing two languages. One, the language of planners and developers, and the other, the language of the *haredi* community. Benzi decided to get an education. He earned a BA at a small college, and then started an MA in public policy at Hebrew University. When he discovered the urban and regional planning track, he extended his studies by three semesters, becoming the first *haredi* urban planner in Israel.



Benzi began organizing tours, taking anyone who would listen – planners, academics, local authorities – to visit *haredi* neighborhoods and towns to see first-hand what ultra-Orthodox urbanism looks like, for better and for worse. “The *haredi* community is different,” he says. “If the average Israeli family is 3.4 people, *haredi* families range from 5.4 to 7.5 people.” Understanding the differences, including those between different *haredi* sectors, is key to the planning process – from the requisite number of elevators and classrooms to anticipating wear and tear to buildings.

Benzi has seen how bad planning leads to bad outcomes. First, the *haredi* community starts moving into adjacent neighborhoods, resulting in friction with the general population. Second, illegal construction runs rampant, with people building and expanding wherever possible. Considering that the *haredim* will need an additional 200,000 residential units over the next two decades, Benzi believes in a three-pronged approach: existing *haredi* centers must undergo massive urban regeneration, building up rather than out; constructing new *haredi* cities; and parts of new residential projects must be earmarked for *haredim*.

Today, Benzi is a fellow at the non-profit Haredi Institute for Public Affairs, overseeing the field of housing. He is currently working on a position paper disproving the claim that *haredim* are a financial drain upon cities. His research shows that while they pay less into municipal coffers, they also consume fewer services.

Advancing Systemic Change for Ethiopian Israelis

Born in Addis Ababa, Tirsit Legesse Bishaw remembers her community's longing for Jerusalem. Not Israel, but Jerusalem, or Yerusalem, as Ethiopian Jews call the city. Gradually, five of her older siblings made *aliya*. When Tirsit was 11, her mother decided to reunite the family and made *aliya* with her three youngest children. With her older siblings to take them in, Tirsit bypassed the experience of an

decided to continue her academic career in the field of criminology. She began her master's degree immediately after graduating.

Today Tirsit is the Vice President of Program Development and Partnerships at *Olim Beyahad*, an NGO that promotes the integration of Ethiopian Israelis into the workforce. She is leading the way, focusing on the education-academia-employment continuum, working to inspire young Israelis of Ethiopian descent to enter academia, while also encouraging universities and employers to level the playing field.

To this end, Tirsit has participated in various Knesset committee meetings, and is currently working on two projects: with the Ministry of Education, training talented teachers of Ethiopian descent so that they can advance into leadership positions. "There are currently 600 Ethiopian-Israeli teachers, but only two principals throughout the entire country," Tirsit laments.

The second project, with the Ministry of Economy and Industry, is encouraging public and private sector employers to hire and promote Ethiopian Israelis. To date, nearly 1,300 people have graduated *Olim Beyahad's* programs, and 87% of them have secured quality employment. "Each gainfully employed person is an inspiration to their families and communities," reflects Tirsit. "I hope that by the time my children grow up, they won't encounter glass ceilings or barriers."



"I'm a woman of Ethiopian descent with two degrees from Hebrew University. Wherever I go, I shatter stereotypes. I am proof that you can aim for the stars and succeed. At the same time, we need systemic change: creating opportunities for people from different backgrounds to realize their academic and professional potential."

absorption center. "I landed straight into Israeli society. It was an immersive experience," she recalls.

During high school, she became interested in politics, foreign affairs, and diplomacy. With

the yearning for Jerusalem running through her veins, she headed straight to Hebrew University and began studying political science. Over the course of her studies, Tirsit



Seeing into the Future: TriEye

Two Hebrew University alumni and a professor walk into a bar. It sounds like the beginning of a joke, but it's actually the beginning of a technological revolution.

Alumni Avi Bakal and Omer Kapach, along with Prof. Uriel Levy, are developing sensors that will make driver assistance systems infinitely more accurate and affordable. “Our goal is, and always has been, to save lives,” Avi says.

Omer arrived at Hebrew University in 2009. “I’d always been drawn to solving problems through technology, and the computer engineering and applied physics program offered a diverse yet powerful set of skills that would serve me professionally,” he recalls.

That same year, Avi began studying electrical and computer engineering with a minor in applied physics. “Hebrew University has a strong record of contributing to global science and developing applica-

tions that benefit society,” he says. “This is where I wanted to be.”

Avi completed an undergraduate research project in Prof. Levy’s lab and continued to his master’s degree there. Prof. Levy is a global leader in nanophotonics, or nano-optics, which is the study of how light behaves on the nanometer scale. Together, they realized the immense commercial potential of Prof. Levy’s academic findings.

Omer had been working for a large, global technology company, but never stopped dreaming about founding his own start-up. Through friends, he heard that Avi was in the process of setting up a venture. They met up. “It felt like a good team, which is crucial for building something from the ground up,” Omer reflects.



TriEye's SEDAR (Spectrum-Enhanced Detection and Ranging) simultaneously provides both SWIR high-definition image-data and a detailed depth-map in all visibility conditions.

In late 2017, TriEye was born. The company develops and produces shortwave infrared (SWIR) sensors. Today, an individual SWIR sensor can cost thousands of dollars. Using proprietary technology that enables reliable and scalable mass-production, TriEye is able to produce a SWIR sensor at a mere fraction of the cost.

Moreover, other sensors currently on the market don't perform adequately in adverse weather and lighting conditions such as rain, fog, and the glare of sunrise or sunset. Taking a different approach to production, TriEye successfully overcame the challenges of price and performance. They are currently working with leading manufacturers and producers in the automotive industry and working to introduce their sensor to other industries: consumer electronics, health, biometrics, and the inspection of production lines. To date, they have completed three rounds of funding, totaling over \$100M investment.

Prof. Levy says that TriEye is a dream come true. "The company's technology is based on a decade of nanophotonic research. Developing commercial products that implement academic achievements – all while enhancing society – is one of my primary goals. It is a real joy conducting basic research to overcome a scientific challenge, which is then translated into a life-changing piece of technology!"



TriEye co-founders, left to right: Prof. Uriel Levy, CEO Avi Bakal, and VP R&D Omer Kapach

“Scientific research can often feel like a Sisyphean task. But Hebrew University rigorously trained us to define our research question, analyze existing data, identify the potential for progress, and understand the importance and positive impact of our work. We also developed a flexible mindset, creativity, and daring.”

- Avi Bakal & Omer Kapach

Reflecting on the last few years, Avi feels immense satisfaction. “I love tackling complex problems. Photonics and semiconductors are new fields, and any progress advances our understanding by leaps and bounds.” Omer is proud of all they've accomplished in less than five years. “We set out to produce an infinitely more accurate sensor at a fraction of the cost – and succeeded!”



TriEye's Raven sensor





LEADING LOCALLY

Hebrew University students and alumni are leaving their mark by empowering teenage girls, fostering medical entrepreneurship and innovation, volunteering with high school students, advocating for the environment, and helping people obtain gainful employment.

Finding a Cure for Imposter Syndrome

Ask Dr. Roni Postan Koren what she's been up to over the last few years, and you'd think that medical school was just a side gig. Not to imply that she didn't take her studies seriously – she did. So much in fact, that she recently began her residency in cardiac surgery.

During her first year, Roni became involved with the Ein Kerem student union, and in her second year coordinated the union's academic affairs. When the head of the union suggested that she replace him the following year, she shrugged it off. When he sent others to try to persuade her, she didn't take much heed. Eventually Roni relented – she ran and won!

Initially, Roni suffered from imposter syndrome: “Any minute now, they'll realize who I actually am. I'm only 24, why should anyone take me seriously?” But soon enough she was off. At the year's end, Roni looked back at all she'd accomplished and realized she'd almost missed out – primarily because she hadn't believed in herself. Academic literature revealed she wasn't alone. “Research shows that around age 12, girls begin to lose their self-confidence,” Roni comments. “Women tend to attribute their failures to internal causes, and their success to external causes. They blame themselves and develop a fear of failure.”



Dr. Roni Postan Koren

This led her to establish *Shavot* (Hebrew for *equal* and *worthy*) together with her husband, Eldad (a fellow Hebrew University alumnus and former head of the University-wide student union). What began as a small pilot in Jerusalem has now grown into a non-profit that works with over 1,000 girls in 13 municipalities and regional councils across Israel. Participants in *Shavot's* year-long program gain positive self-esteem by setting goals, effectively conducting self-feedback, and meeting with

inspirational women. Participants meet after school in a group setting, facilitated by their mentor, a female university student.

Shavot was enjoying moderate growth when the pandemic struck. When reports started trickling in of girls who were upset because their Bat Mitzva celebrations were cancelled, *Shavot's* staff decided to organize a large online Bat Mitzva party. Word spread, and over 1,200 girls, along with their families, participated in breakout sessions

facilitated by 200 volunteers. They heard greetings from pop-stars, celebrities, and even then-President of Israel, Reuven Rivlin.

Riding on this success, *Shavot* organized the first Israeli Girl Week – also held online. They recruited over 500 female volunteers who shared their inspirational stories with the students. Teachers received lesson plans for helping their students prepare and reflect on the event. Concurrently, *Shavot* conducted a nationwide survey and published the first Israeli Girl Report. By the time the second Israeli Girl Week rolled around, they had to cap their volunteers at 1,500 – enthusiasm was so high. Over 50,000 students, boys and girls, participated in the week, which was kicked off with a festive reception at the President's Residence, hosted by First Lady Michal Herzog.

Shavot was Roni's gateway into the world of entrepreneurship, and words such as "innovation" and "technology" began creeping into her vocabulary. Back at medical school, she'd just begun her clinical years. Working in the hospital, with patients, she realized the distance between her two worlds. "Why aren't medical students talking about innovation?" she wondered. "Hospitals are full of technology, why aren't we identifying potential for improvement and developing solutions?" Roni met with the dean, Prof. Dina Ben-Yehuda, who supported Roni's ideas. This led Roni to join forces with fellow medical student Tommy Jacob and organize the first Jerusalem Medical Technology Hackathon.

"The experience mattered more than the end result," she reflects. "This was the first time that medical students and practitioners met with technologists, business people, product designers – they experienced identifying a problem, breaking it down, and working together to develop a solution." This led to a partnership with ASPER-HUJI Innovate, through which Roni was involved in additional medical innovation programs, developing a BioMed MBA program for Hebrew University students of medical fields, running campus events, and more.

"The year that I headed the Ein Kerem student union taught me so much. First, I realized the potential of my impact. Even as a student, I accomplished more than I ever dreamt possible. I learned to appreciate my abilities and realized how much I love activism – working to improve the world around me."

It is thus no surprise that in 2022, the Peres Center for Peace and Innovation granted Roni a Medal of Distinction, while Forbes Israel included her in their "30 Under 30" list. In the years ahead, Roni's hands will be quite full – between her residency and raising her and Eldad's twin daughters. But beyond that, it's clear to her that her worlds must collide – bringing entrepreneurship, innovation, and activism into the world of medicine.



Launching Israeli Girl Week at the President's Residence. From left to right: Maayan Arzi-Mlinarski, Dr. Roni Postan Koren, Shai Eluk, First Lady Michal Herzog



The cover of the report published in conjunction with Israeli Girl Week

From East Jerusalem to Uganda – and Back

Amira Jabr was born and raised in East Jerusalem. She had always been curious about other countries, politics, and development. Therefore, she decided to follow her passion and study international relations and English literature at Hebrew University.



Amira at a workshop for high school students at the birthing center in Luwero, Uganda



As her Hebrew was very weak, she began with the Rothberg International School's Hebrew language program. Although her academic journey was challenging on many levels, Amira persisted. This was where she wanted to be.

After her studies, Amira began working with NGOs, eventually working for the Joint Distribution Committee (JDC) on employment among Arab women in Israel. This was more than a job – Amira had personally experienced nearly every challenge imaginable: the language barrier, being a political and cultural minority, and lacking the skills to secure a job. Ready for her next challenge, she knew she wanted to enter the world of development. It was during this period that Amira first heard about Glocal, Hebrew University's master's program in international development.

Although Amira was returning to the same campus, she was in an entirely different place. She had gained professional confidence and experience. She shared a common language with her Israeli and

international colleagues: the language of community development. Amira loved Glocal; learning about development from a multifaceted approach, critically thinking about development, and, of course, being part of a diverse, multinational cohort. "Glocal opened my eyes to the fundamentals of development and, most importantly, to viewing development with a critical eye," Amira says.

After completing her Glocal internship at a birthing center in Uganda, Amira was interested in researching the politics of birthing. She decided to write a thesis, exploring how the Israel-Arab conflict impacts the reproductive choices of Palestinian women in East Jerusalem.

After graduating from Glocal, Amira returned to the field of employment, first working for a JDC-affiliated employment center in Lod, and then moving back to Jerusalem, where she now works for the municipality as the Coordinating Director of Employment Programs in East Jerusalem.

“Nearly two-thirds of families in East Jerusalem live in poverty. By offering language courses, developing partnerships, and running interventions, I know that I can positively impact the lives of many East Jerusalem residents and their families.”

Empowering Students to Make a Difference

Gal Danoch is studying in an accelerated BA-MA program, earning a bachelor's degree in geography and Middle Eastern studies and a master's degree in urban planning. Currently in the last year of his undergraduate studies, Gal is generously supported by the Israel Scholarship Education Foundation (ISEF). "Neither of my parents had a college education," Gal says. "A friend told me about the ISEF program and I applied."

Gal grew up in Ashkelon and had been active in Hashomer Hatzair, an Israeli youth movement. He



"My parents always wanted me and my siblings to get an education, and thanks to ISEF, this is possible. I'm fortunate and thankful to have been chosen for the scholarship."

continued down the path of informal education during his gap year, his military service, and beyond, when he moved to Jerusalem and trained as a tour

guide, earning a license to lead school field trips.

ISEF scholarship recipients are required to volunteer, and thus it was no surprise that Gal chose to mentor two high school students through the Bridge to Academia program. The following year, Gal became the program's coordinator. "For the first time, I had a system-wide perspective. I had to deal with a lot of bureaucracy, but I gained confidence and learned to recognize my abilities," he recalls.

Bridges to Academia holds an annual program-wide volunteer day, but Gal decided to take a less centralized and more empowering approach. Working in small groups, mentors and mentees chose and coordinated their own volunteer projects. "I offered guidance, but the success is truly theirs. One group volunteered with the homeless, another group went to a retirement home. Each group picked something relevant to them."

In addition to his ISEF responsibilities, Gal impacts Jerusalem in other ways. Last summer he volunteered to teach a 12-part Hebrew language course that a friend organized at the Shuafat community center in East Jerusalem. "The Hebrew course expanded the students' personal and social viewpoints by meeting the 'other,'" he reflects. "It opened their eyes – and my eyes – to the importance of Hebrew in obtaining higher education and quality employment."



Michal Altschuler is currently a second-year undergraduate in social work



A Regulatory Green Thumb

Michal Altschuler will go to great lengths for nature and the environment.

“Geology taught me that humans are just a speck in our planet’s history, yet we are causing disproportionate damage to the environment. As an activist, I get immense satisfaction working on the policy level. I feel that I’m at my best when I’m helping others.”

As a high school student, she participated in a nationwide geology matriculation program, learning mostly online and meeting the other students for educational hikes only a few times a year. It was thus not surprising that as a Hebrew University student, she became involved in the National

Union of Israeli Students’ subcommittee on the climate crisis, and was appointed to head the *Campus Yarok* (Green Campus) team. (Not to be confused with Hebrew University’s initiative of the same name).

Michal’s team comprises ten students, scattered across Israel. They are working to change how Israel’s Ministry of Environmental

Protection certifies campuses as “green.” Currently, campuses qualify if they meet four criteria: appointing a green council; introducing environmental courses across disciplines; using resources wisely and increasing visibility on campus; and promoting environmental projects among faculty and students.

But Michal and her team want more. They have been working closely with professionals to develop more exacting criteria, which they will present to the Ministry of Environmental Protection in coming months. To this end, Michal has met with the ministry’s Chief Scientist and presented twice in the Knesset. First, she spoke in the Finance Committee on investing in clean energy and expressed the younger generation’s disappointment and frustration that their pension funds are being invested in polluting industries. Next, Michal presented to the Internal Affairs and Environment Committee, speaking about the connection between social justice and environmental justice. In addition, Michal is working with Fossil Free Israel to shift Hebrew University’s investments away from fossil fuels and other polluting industries.

Together Again!



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After a three-year hiatus, we were excited to finally meet again in Jerusalem! The 85th Board of Governors meeting was held in June 2022, celebrating Hebrew University's accomplishments, honoring our supporters, and connecting with our Friends worldwide!

**SCAN TO
SEE MORE
PHOTOS!**



1. Gala celebrating *Leadership for Tomorrow* facing the walls of the Old City of Jerusalem
2. Celebrating Honorary Doctorate recipients and Bublick and Rothberg Prize winners: Prof. Dr. Gerard Meijer, Sigalit Landau, Prof. John G. Gager, Prof. Lee Epstein, Elliot Sacks (on behalf of his brother Rabbi Lord Jonathan Sacks, z"l), Prof. Jürgen Renn, Sami Sagol, Prof. Asher Cohen, Prof. Joshua Sanes, Prof. Jehuda Reinharz, Sylvia Soyka, Quentin Tarantino, Stanley M. Bergman, Prof. Haim Be'er, Jose Mugrabi, Joseph Neubauer, Leonid Nevzlin, Prof. Marta Weinstock-Rosin (Bublick Prize), Rabbi Yuval Cherlow (Rothberg Prize), Rébecca Boukhris
- 3-4. Prof. Haim Be'er giving the keynote address at the 2022 Convocation
5. Celebrating Honorary Fellowship recipients: Daniel Schlessinger, Jacob Rimer, Jack Mahfar, Prof. Bettina Schwarz, Barry I. Skolnick, Prof. Asher Cohen, William J. Kilberg, Leslie Shasha, Muriel Salem, Aldegonde Brenninkmeijer-Werhahn, Helen Jacobs-Lepor, Evelyn Bloomfield-Schachter, Philip Moses, Harel Beit-On (Chair, Board of Managers), Amb. Yossi Gal (Vice President, Hebrew University)





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1. Prof. Asher Cohen, Barry Skolnick, Missy Skolnick
2. Prof. Asher Cohen, Renana Levine, Schusterman Family Philanthropies
3. Prof. Asher Cohen, Sheryl Schwartz, Bradley Schwartz
4. Gail Asper, Prof. Asher Cohen, Adam Levy, Prof. Dina Ben-Yehuda, Moe Levy, Sam Levy, Sandra Soliman
5. Catherine Belais, Charles Canetti, Prof. Dina Ben-Yehuda
6. Judith Benkalifat, Moshe Illouz, Gady Ilouz, Sidney Boukhris, Evelyn Saadoun, Rébecca Boukhris, a friend of the Boukhris family, Michael Boukhris, Sylvia Illouz, Jessica Benhamou
7. Efrat Fine, Yoel Cheshin, Prof. Daphna Lewinsohn-Zamir, Ruth Cheshin, Prof. Menahem Ben-Sasson, Prof. Asher Cohen
8. Celebrating the Asper Prize winner: Dr. Amnon Dekel, Dr. Jasmine Ravid (Kinoko-Tech Co-Founder), Prof. Asher Cohen, Gail Asper
9. Yossi Makori & Michal Neuman, Prof. Asher Cohen & Gail Asper, Ayelet Cohen & Dr. Amnon Dekel
10. Gail Asper
11. Prof. Asher Cohen, Leslie Shasha



6





1. Dedication of inscriptions on the Wall of Benefactors
2. Dedication of inscriptions on the Wall of Life



3-8. Dedication of inscriptions on the Legacy Tree

9. Dedication of inscriptions on the Wall of Founders

ASK THE EXPERT

The UN Sustainable Development Goals



Prof. Yael Mishael

Prof. Yael Mishael is the academic head of Hebrew University's Advanced School of Environmental Studies and director of Hebrew University's newly launched Center for Sustainability. Her research has developed organic-inorganic composite materials for environmental and agriculture purposes, including filtering wastewater, ensuring that harmful pollutants are not transferred to crops. Previously, she headed the Department of Soil and Water Sciences. With such an impressive résumé, we asked her to explain the United Nations Sustainable Development Goals (SDGs) to our readers.

What are the United Nations Sustainable Development Goals (SDGs), and why do they matter?

The United Nations Sustainable Development Goals are 17 broad, interconnected areas that humankind must address to ensure the healthy, sustainable, and equitable future of our species, planet, and ecosystems. As the most significant worldwide governing body, the United Nations has done a great service by creating a framework and common language for advancing sustainability.

What is the history behind the SDGs?

It all began in 1987, with the report, *Our Common Future*, which served as the catalyst for the 1992 Earth Summit and numerous climate agreements.

In 2012, twenty years after that first Earth Summit, the United Nations returned to Rio de Janeiro for the Conference on Sustainable Development, where the SDGs were developed. In 2015, they were unanimously adopted by the General Assembly.

How is Hebrew University working to meet the SDGs?

Hebrew University President Prof. Asher Cohen displayed great vision and leadership in spearheading



the establishment of the Center for Sustainability, creating a joint framework for researchers and enabling interdisciplinary projects, four of which have already been funded.

Hebrew University researchers are already conducting SDG-related research. A few examples: Prof. Lioz Etgar is addressing SDG 7 (Affordable and Clean Energy) by developing better solar panels, Dr. Yael Mandelik is addressing SDG 15 (Life on Land) by studying insect pollinators, ecosystem services, and biodiversity, and the Herrmann Institute of Earth Sciences is addressing SDG 13 (Climate Action) through *A Degree and a Half*, an evidence-based lecture series on climate science and climate change shared over YouTube.

One SDG stands out – 17: Partnerships for the Goals. Could you discuss Hebrew University's partnerships?



SUSTAINABLE DEVELOPMENT GOALS

This goal is crucial, directing “how” and not just “what” needs to be done. Hebrew University is collaborating with the government, industry, and civic society to advance SDG-related projects. We are in the process of signing a contract, through Yissum, with a major venture capital fund that is investing in green technology being developed at Hebrew University. We are also working with the Jerusalem municipality, the Ministry of Environmental Protection, and the Bloomfield Science Museum, training kids to monitor air quality and shade across the city over time.

But we’re looking even further. For example, there are now global SDG rankings of colleges and universities. To compete, you must meet SDG 17. To this end, I recently

participated in a delegation organized by the British Council for the heads of university sustainability centers from Israel and the United Kingdom.

How should our readers think about the SDGs? How do they affect our daily lives?

“Sustainability” means different things to different people, but ultimately, each of us is responsible for the decisions we make: do we take a disposable cup or pack a reusable one? When considering the Giant Pacific Garbage Patch, suddenly, a small decision has a global impact. Do you want to be part of the problem, or part of the solution?

In addition, reducing emissions and capturing carbon dioxide (CO₂) are both critical for the healthy

future of our planet. Yet neither are an explicit SDG, but rather embedded in SDG 7 (Affordable and Clean Energy), SDG 9 (Industry, Innovation and Infrastructure), SDG 11 (Sustainable Cities and Communities), and others. Ultimately, the reduction of CO₂ in our atmosphere will depend on governmental policies. As a research powerhouse, Hebrew University is already significantly contributing the research and technologies that will enable Israel, and the world, to successfully meet the SDGs.

HEAR MORE FROM PROF. MISHAEL!



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