

THE MAGAZINE OF THE HEBREW UNIVERSITY OF JERUSALEM

SCOPUS

VOLUME 68 | 2023-2024

Sustainable Planet

Dive in!

Prof. Richard Laster passes the torch of environmental law to Hebrew University students through a unique course in Eilat

p. 22

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, the Hebrew University is an institution where excellence is emphasized; where advanced, postgraduate study and research are encouraged; where special programs and conferences attract students and academics from around the world; and where success is measured in terms of social impact. 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

23,967
students

including 13,734 undergraduates, 5,526 master students, 2,092 doctoral students, and 2,615 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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Creating a
More Sustainable Planet

This year's *Scopus* showcases the myriad ways that The Hebrew University of Jerusalem is rising to the most pressing challenge of our times: working towards a sustainable planet.

The crisis facing our planet affects so many aspects of life on earth: human health and animal welfare, agriculture and food systems, natural resources and energy, and more. As such, it must be tackled from a multitude of approaches.

Across the Hebrew University's faculties, schools, and programs, our researchers are applying their acumen to overcoming the challenges and solving the problems that plague our planet and society today. In industry, our alumni are shaping technologies and policies for a more sustainable planet.

This issue of *Scopus* features the newest projects being funded through the University's Center for Sustainability, followed by a roundtable discussion on sustainable food systems with faculty and alumni who are cultivating promising crops, investing in food start-ups, developing new products, and studying the health impacts of poor diets. This discussion will leave you with food for thought!

To further whet your appetite, the photo essay showcases food products being developed by Hebrew University researchers and alumni, under the title *From Lab to Plate*.

This issue of *Scopus* also includes two personal essays. The first recounts establishing the field of environmental law in Israel and passing the torch to students at the Faculty of Law. The second essay offers insight into a career dedicated to promoting evidence-based nutritional policies in Israel.

Next the magazine features faculty, students, and alumni working to create more sustainable and equitable cities. The focus then shifts to technology for a better future, with researchers explaining their contributions towards leaving the planet in better shape for generations to come.

The magazine takes readers behind the scenes to meet a dedicated, long-time member of the administrative staff, followed by the beloved feature, World of Friends, showcasing our Friends' activities throughout the year.

The closing article returns to the theme of food, illuminating the benefits of the Mediterranean diet.

Last year's *Scopus* featured an introduction to the UN Sustainable Development Goals (SDGs), their importance, and the ways that the Hebrew University is working to meet them. In this vein, throughout this magazine, we have noted which SDGs are being met by the researchers and projects featured.

We hope you enjoy this issue of *Scopus* and that you are inspired to join the effort towards a more sustainable planet.



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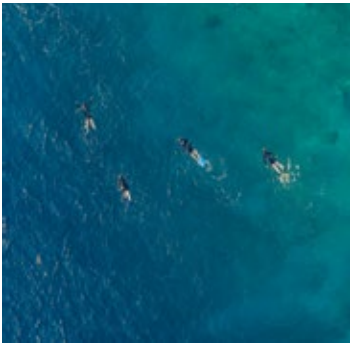
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Cover image: Hebrew University law
students snorkeling in the Red Sea during
a unique course on environmental law, led
by Prof. Richard Laster. See p. 22

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Look for this icon throughout the magazine to see how The Hebrew
University of Jerusalem is meeting the United Nations Sustainable
Development Goals (SDGs).



Interdisciplinary Research for the Planet

By Prof. Yael Mishael

Since its founding in 2021, the Hebrew University's Center for Sustainability has been busy as a bee. Taking a three-pronged approach that encompasses research, teaching, and outreach, the Center's most singular accomplishment has been cross-pollination: fostering collaboration across departments, faculties, and even campuses.

After issuing four research calls, the Center is proud to be funding six projects, two of which are featured on the following pages. These projects are bringing together researchers from history and geography to study how past civilizations coped with climate change; from social work and geography to explore ways to think globally and act locally; from geography and environmental economics to study tensions between solar farms and agriculture; and from plant science and international development to address food security. The complexity of environmental challenges requires interdisciplinary solutions. Thanks to the Center for Sustainability, Hebrew University researchers are demonstrating that cross-disciplinary research is not only possible but can also be extremely fruitful.

Another groundbreaking, interdisciplinary endeavor is the Center's new undergraduate minor in sustainability, climate, and society. The track was created by five faculties and schools: social sciences, humanities, law, business administration, and social work, and is open to their students. Students enrolled in the minor will develop an awareness and concern for environmental matters, making them environmental stewards as they enter the workforce in their respective fields.

Lastly, the Center has built a number of successful partnerships, advancing sustainability on the local, national, and international levels. The first, spearheaded by Jerusalem's Bloom-

field Science Museum and in conjunction with the Jerusalem municipality, is a citizen science project for collecting climatic data from across the city—with the goal of developing evidence-based policies. Following its launch, the project was joined by a research team from Tel Aviv University and the European Union's I-CHANGE. Additional projects include developing a survey to identify optimal rooftops for solar panels or rooftop gardens, developing Jerusalem's geographic information system (GIS), and educational activities with schools, gap year volunteers, and senior citizens.

Grappling with climate change requires us to work together and think creatively. This holds especially true in academia—often the source of much innovation, yet also where research historically takes place within a single discipline. By building bridges and working together, the Center for Sustainability is actively creating a future that is more sustainable, more collaborative, and thus more beneficial for humankind.



Prof. Yael Mishael directs the Hebrew University Center for Sustainability. She also heads the Department of Soil and Water Sciences.



Prof. Lioz Etgar (L) and Prof. Amir Sa'ar (R) in the lab.

Twice as Nice: Novel Hybrid Photovoltaic Cells

One measurement of a civilization’s technological advancement is the source of its energy. The lowest level of civilization utilizes what’s readily available, such as collecting firewood to cook or stay warm. The next level is developing techniques for extracting resources, producing energy, and storing it. Think fossil fuels, natural gas, and refineries (storage remains a challenge). An even more advanced civilization could harness the energy of its parent star—in our case, the sun. Enter the photovoltaic cell (solar panel).

Since their invention 150 years ago, solar panels have improved significantly. But the last three decades have been characterized by stagnation, with efficiency stuck at 15-20%. Now two Hebrew University professors are taking solar technology, and humankind, over this hurdle. In 2021, the Center for Sustainability awarded funding to a project proposed by Prof. Lioz Etgar (chemistry) and Prof. Amir Sa’ar (physics) for developing a better solar panel.

Lioz’s research focuses on material science, solar panels, and perovskite, a mineral compound that is a semiconductor, capable of efficiently absorbing sunlight and converting it into electricity. This research is expanding the applications of perovskite to solar windows, greenhouses, and even solar panels that can absorb artificial light and generate electricity.

“THE CENTER FOR SUSTAINABILITY IS ENCOURAGING GRADUATE STUDENTS TO UNDERTAKE RESEARCH WITH DIRECT ENVIRONMENTAL APPLICATIONS.”

Amir is an expert in silicon and has developed silicon matrices with nano-pores that can “host” perovskite, while conducting electrical currents quite well. The result is an improved solar panel with higher efficiency than current technologies.

Amir and Lioz have successfully completed a proof of concept. They are aiming for 25% efficiency without raising costs more than a few cents, compared to the silicon-based panels on the market today. Their breakthrough will be a major step away from fossil fuels and towards solar energy—advancing human civilization significantly.



The Distant Past— Up Close

The distant past is often told in broad strokes, especially in the absence of written records. Recently, a group comprising Hebrew University faculty members and other experts received funding from the Center for Sustainability to combine their areas of expertise and develop a precise and interdisciplinary model for understanding how complex societies engaged with their climates in times of yore. The team is Dr. Oren Kolodny (life sciences), Dr. Uri Davidovich (archaeology), Dr. Yonatan Goldsmith (earth sciences), Dr. Ido Wachtel (Martin Buber postdoctoral fellow), Hai Ashkenazi (Israel Antiquities Authority), and Dr. Yitzchak Jaffe (archaeology and marine cultures at the University of Haifa).

Their novel project, titled *Rethinking Climate Impact on the Sustainability*

of Complex Societies, is truly interdisciplinary. The first step is developing dynamic models for studying the influence of different processes on human populations’ resilience to climate change. For example, climate change could either lead to population decline or increase cultural innovation. Next, these models will be empirically tested by the archaeological team. They will draw upon the archaeological record of northern Israel, which is among the most studied in the world, to study fluctuations in population demography and social complexity.

In tandem, the earth scientists will organize regional paleoclimate records. Using advanced techniques, they can determine rainfall patterns with seven-year precision—a much higher

resolution than previously available. The combined archaeological and paleoenvironmental datasets will then be comparatively investigated vis-à-vis the theoretical models. Until now, most studies have focused on peak weather events and catastrophes, assuming cause and effect relations between environmental change and social collapse. The Hebrew University team is taking a radically different approach. By combining their findings, they will shed light on how societies and cultures operated and engaged with their environment on an ongoing basis—while offering a complex and hypothesis-driven way to examine human-environment interactions worldwide.



Feeding the Future:

Hebrew University Contributing to Sustainable Food Systems

As the world population grows and the climate becomes increasingly unpredictable, it is very clear that the solutions to these problems are inextricably linked. Today millions of people suffer from obesity and diabetes, while others starve; many people have access to calories but lack nutrition; agricultural practices are depleting our natural resources; and reliance on a handful of crops poses a real risk to food security. Hebrew University researchers and alumni sat down to discuss how to feed a growing world, while caring for the planet too.



Prof. Benny Chefetz:
Thank you for joining me for this discussion. For starters, please introduce yourself and share a few words on your academic journey and professional path.

Prof. Ido Braslavsky: My background in biophysics and DNA sequencing led me to the field of personalized medicine, which I am now applying to develop personalized nutrition. My other field of research is ice-binding proteins and cryobiology, which I am using to study

how to best freeze food for preservation and transport.

Prof. Zvi Peleg: I'm a plant physiologist. I use quantitative genetic tools to study crops' adaptation to climate change. As part of the effort to increase crop rotation in Israel, we are aiming to re-introduce sesame into Israel's agro-system. My interest in sesame started during a trip to Ethiopia, where I realized that while Israelis consume a lot of sesame, none is grown locally. Because its harvest is labor intensive, sesame is now grown in underdeveloped countries using traditional practices.

Article continues on p. 12



Moderator: Prof. Benny Chefetz, Director of the Hebrew University Center for Sustainable Food Systems—FOOJI.

Prof. Benny Chefetz is an environmental chemist and the former dean of the Robert H. Smith Faculty of Agriculture, Food and Environment.

Prof. Nurit Argov-Argaman is a faculty member at the Department of Animal Sciences. She holds the Women's League for Israel Senior Lectureship in Nutrition. She founded Wilk in 2018.



Prof. Ido Braslavsky is a faculty member and head of the Institute of Biochemistry, Food Science and Nutrition. He is the co-founder of SavorEat and Microlce.



Dr. Yaniv Elkouby is a faculty member at the Faculty of Medicine and the co-founder of ForSea.



Prof. Efrat Monsonego Ornan is a faculty member at the Institute of Biochemistry, Food Science and Nutrition. She formerly headed the Hebrew University School of Nutrition.



Prof. Zvi Peleg is a faculty member at the Smith Institute of Plant Sciences and Genetics in Agriculture and the founder of MaxSum.



Amir Zaidman is the chief business officer of The Kitchen FoodTech Hub, founded by Israel's Strauss-Group. Amir holds an executive MBA from the Hebrew University.



ROUNDTABLE DISCUSSION

Dr. Yaniv Elkouby: I'm a developmental biologist, an expert in embryology. I'm also a diver—I love the peacefulness of being underwater, communing with the stunning wild. Oceans are the basis for our planet's health. I decided to apply my embryology skills to cultivating lab-grown fish, in order to reduce fishing and contribute to restoring ocean habitats.

Prof. Efrat Monsonego Ornan: I began studying nutritional science, and then pivoted into researching skeletal development. Humans are unique in that we truly are omnivores, and what we eat depends on behavior, education, culture, policy, and more. My research focuses on the impact of ultra-processed foods, which are increasingly prevalent today.

Prof. Nurit Argov-Argaman: For my doctoral research, I studied the metabolism of fat in dairy cows. During my postdoc, I shifted my focus to fats in milk. Since then, I've focused on the synthesis, excretion, and structure of milk lipids, with the aim of improving their health properties. A few years ago, industry representatives inquired about the possibility of lab-grown milk, which led me to found Wilk along with Yissum, the Hebrew University's tech transfer company.

Amir Zaidman: My career has largely centered around innovation, spanning medical technology companies, venture capital funds, and food start-ups. In 2014, I was invited to help establish The Kitchen FoodTech Hub, one of the first hubs to specialize in foodtech investing. It's been a great way to have a lasting impact on the world.

Prof. Benny Chefetz:

Let's shift to talking about the challenges. In your opinion, what are the biggest food-related challenges today, both globally and locally?

Dr. Yaniv Elkouby: The world's human population is growing, while our food sources are dwindling. In the oceans, overfishing affects the delicate balance of the underwater food chain, leading to further population stress. On land we see depleted soil, contaminated water, and an extreme climate, making it harder to grow sufficient quality crops.

Amir Zaidman: The challenges Yaniv described directly translate into two immediate problems. First, millions of people are starving, hungry, or experiencing food insecurity. And even if they have food, calories might trump nutrition. Second, the global food system is damaging our health and the planet. Humankind is at a tipping point, and we must act. I believe in the power of technology to develop solutions for improving human and planetary health.

Prof. Efrat Monsonego Ornan: Globally, there is no consensus what constitutes healthy food, and we need to define it. Of course, there is plenty that we know is *not* healthy. We must establish criteria for evaluating the new foods and production technologies that Amir mentioned. A lifelong healthy diet enables people to lead healthier and more productive lives, and we must ensure that the current wave of innovation is leveraged for good.

Prof. Nurit Argov-Argaman: Milk is a perfect example. It has 2,500 components, and the vast majority cannot be replicated in a lab. In addition, there is the question of cost. Milk alternatives, such as soy- or nut-based drinks, are 30% more expensive. We should select our alternatives wisely.

Prof. Ido Braslavsky: Of course, working towards food security doesn't only mean developing new foods. Smart agriculture is utilizing artificial intelligence to grow more with less, while also reducing waste. Apps may help us shop better, buying only the groceries we need.

Prof. Efrat Monsonego Ornan: Locally, I see a different challenge. Israel is so multicultural. Broadly speaking, traditional ways of cooking and eating are healthy, so we have a strong starting point. We need to go back to our roots, rather than move towards unhealthy and processed foods.

Prof. Zvi Peleg: True, Israelis have culinary diversity. But as a plant scientist, I do not see this diversity reflected in our fields. We are growing a limited number of crops, which is not sustainable and jeopardizes our food security due to an

over-reliance on imports. For example, Israel imports ~70,000 tons of sesame seeds a year! Producing that here would support local farmers, reduce the carbon footprint, and provide consumers with a healthy and natural source of essential nutrients such as iron, calcium, protein, and more.

Prof. Benny Chefetz:

What directions for research and training do you think are necessary to overcome these challenges?

Prof. Efrat Monsonego Ornan: The nature of science is that we are always striving to close gaps in our knowledge. Sometimes one gap closes, and another opens. The gaps I see today are understanding the environmental

factors that influence the nutritional value of crops, better understanding genetically modified crops, and helping the public understand the connection between poor diets and disease.

Dr. Yaniv Elkouby: We need to further develop methods for cultivating meat and associated technologies. A lot of know-how already exists within universities and other research institutions. History shows that bottom-up transformations are most successful. Basic science combined with commercial innovation results in tremendous impact. In other words, there must be support for academics who wish to translate their research into the development of new foods or new food technologies.

Amir Zaidman: I couldn't agree more. Academic programs in biotechnology need to rise to the challenge and offer

their students direct routes into the food industry. Academic institutions should also be promoting research into alternatives to open fields such as indoor farming, vertical farming, and even aeroponics.

Prof. Ido Braslavsky: Many of these farming methods rely on artificial intelligence, which can also be harnessed for bio-monitoring devices that make personalized food recommendations or optimize the supply chain. In addition, we must develop better preservation methods, specifically cryopreserving cultivated meat, in order to maintain its nutritional value.

Prof. Nurit Argov-Argaman: Since traditional farming won't just disappear, we need to better understand climate change and animal production efficiency, product quality, and farm animal welfare, so that livestock



The planetary health diet, as outlined by EAT.

continue producing. More specifically we need to better understand cows, which are evolutionary geniuses. They convert low quality food (i.e. grass) into high quality, nutrient-rich food. We need to learn more about this process and how to make it more efficient, while minimizing land and water use, reducing methane emissions, and lessening its environmental impact.

Prof. Zvi Peleg: It's not only animal productivity—we urgently need to breed crops better adapted to a changing climate. Sesame is one such crop: nutritious, healthy, and adapted to a hot climate. But it's an “orphan crop,” meaning there is very little research on it. This is a huge challenge for scientists.

Prof. Benny Chefetz:

So many directions, the next frontier is surely food research. Let's now discuss your own work. Could you explain to our readers how you are addressing the challenges described above?

Prof. Zvi Peleg: Sesame capsules open upon ripening, scattering their seeds on the ground. On a side note, this is the origin of the phrase *open sesame*. Because of this, sesame is manually harvested while green. We developed new cultivars that hold the seeds, thus enabling the adoption of advanced agricultural practices such as mechanical harvest.

I also identified the best time, depth, and density for planting, along with the ideal watering and fertilizing schedules. Worldwide, farmers produce about 258 lb/acre, while my crop yields 2,300-2,600 lb/acre—a ten-fold increase! I hope these advances will bring sesame back to Israel, where it can be grown and harvested locally and profitably [see photo, p. 19].

Prof. Nurit Argov-Argaman: In the lab, I showed that milkfat is influenced by many different conditions that affect the liver, digestive tract, and muscles. To focus on the unique processes of mammary glands, I developed a model capable of maintaining live mammary gland cells outside of the animal, in a culture vessel. I continue to research ways to cultivate millions of these cells in bioreactors to generate and excrete milk.

Prof. Ido Braslavsky: My research into freezing, in particular utilizing strategies found in nature to control ice, led me to develop methods to cryo-preserve tissue. We founded Microlce, a company that develops high-precision evaluations of substances that modify ice growth, to help other companies advance their own science.

Additionally, Prof. Oded Shoseyov, Racheli Vizman, and I founded SavorEat, with the goal of providing personalized nutrition. Our burgers are 100% plant-based; our Robot Chef can currently adapt for protein and fat preferences, and we're working on other adaptations. Perhaps in the future, our Robot Chef will connect with your smart watch, read your metabolic signs, and produce a burger that is not only delicious, but also fits your health needs [see photo, p. 19].

Dr. Yaniv Elkouby: I co-founded ForSea with Dr. Yiftach Nachman (Tel Aviv University) and our CEO, Roee Nir. We are using my expertise in embryology to grow fish meat in the lab. We naturally direct stem cells towards becoming edible cells, which are primarily muscle, with some fat and connective tissue. This process occurs naturally in developing embryos, as they execute self-assembling tissue formation programs.

Our approach simplifies the process, uses up to 90% less growth factors, and does not require scaffolding to re-create the meaty texture, because what grows is real meat. Our platform can be adapted for any fish. The first release will be cultivated eel and the next products are already in the pipeline.

Amir Zaidman: I'm pleased that ForSea is part of The Kitchen, along with other companies that arose out of the Hebrew University: Better Juice, Meatologic, and others.

I see my role at The Kitchen as an enabler, connecting these front-line heroes with venture capital and helping bring their products to market. But not all innovation is created equal. The Kitchen carefully evaluates which start-ups to accept. Each one must solve an environmental or health problem, whether generating less pollution or waste, or promoting health. Our motto is *Doing Good by Doing Food*.

Prof. Efrat Monsonego Ornan: Ten years ago, the idea that ultra-processed foods negatively impacted skeletal development was met with resistance. Eventually, I published my first study in *Bone Research*, a partner of *Nature*.

Recently, I've studied how an ultra-processed diet affects adolescent rats. I found that their bones are weaker, sicker, and more brittle, compared to rodents who ate unprocessed food. Supplementing their diet with vitamins and minerals improved the situation, but their bones remained measurably weaker, and their kidneys were damaged.

Part of the challenge remains communicating the dangers of an ultra-processed diet, to help people make healthier choices. The food industry spends inordinate amounts of time and money “educating” us to eat ultra-processed foods, even to our detriment.

Prof. Benny Chefetz:

Imagine the year is 2050 and you are sitting in the campus cafeteria. Glancing around, what food will you be excited to see? Is there anything you'll be dismayed is still around?

Amir Zaidman: I would love to still see hummus. It's tasty and a very Israeli food. If made right, it has only three ingredients: chickpeas, tahini, and water. And, of course, some seasoning such as garlic and lemon juice. In fact, the Hebrew University is already improving hummus! We are replacing preservatives with unique food protection proteins developed by Prof. Zvi Hayouka and marketed by Prevera [see p. 46].

Prof. Zvi Peleg: I hope Amir's hummus is made with Israeli tahini! From locally grown sesame seeds, of course.

Prof. Nurit Argov-Argaman: I hope that tried-and-true foods don't vanish, including hard cheeses and yogurt. The real thing. Yogurt is probiotic, and cheese is rich in calcium, helping women and growing children build and maintain bone density. It would be a mistake to stop eating dairy altogether.

Prof. Ido Braslavsky: I would love to see fresh produce that was grown on the cafeteria's rooftop or nearby. The more food we can grow or produce on-site, the better. Combined with smart delivery systems, people in the city can partially feed themselves, barter for products, or just enjoy the freshest food possible.

Also, sophisticated advances in food manufacturing will hopefully give me the option of having a device like the Robot Chef automatically deliver the perfect meal to my plate, containing food that takes into consideration both the environment and my health.

Dr. Yaniv Elkouby: I want to see cultivated fish, of course. Every single lab-grown fish that replaces a fish grown or caught in nature is clean profit for the planet. The oceans and the earth will benefit.

Prof. Efrat Monsonego Ornan: Recently EAT, a global non-profit dedicated to transforming our global food system, issued their Planetary Healthy Diet. It is a truly flexitarian plan, allowing people to tailor their diets based on taste or cultural preferences. Half the plate is vegetables, and the other half is divided between other types of food [see image on p. 13]. I see this as the model for the future. Less naming of specific foods, and more the ratio between different kinds of food.

Prof. Benny Chefetz: Before wrapping up, I'd like to jump into the discussion. Each and every one of us can have an impact right now by making different choices at every meal. My biggest takeaway from the EAT report is the need to significantly reduce our consumption of red meat along with developing technologies that reduce the industry's footprint: using less water and land, generating less carbon and methane. Meat accounts for nearly 50% of all greenhouse gases from food production; a single pound of red meat requires, on average, 15,000 pounds of water. We can and *must* do better. The easiest solution is cutting back meat consumption, to positively impact the planet and climate right now. But this is not enough. We at the Hebrew University need to lead in developing out-of-the-box solutions, transforming not only the meat industry but the entire food system. This is the main goal of the Center for Sustainable Food Systems—FOOJI.

Prof. Benny Chefetz:

I'd like to thank you for this thought-provoking and appetite-inducing discussion. I hope our readers will be inspired to try new foods or think about their own diet from a global perspective.

“EACH AND EVERY ONE OF US CAN HAVE AN IMPACT RIGHT NOW BY MAKING DIFFERENT CHOICES AT EVERY MEAL.”
- BENNY CHEFETZ

From Lab to Plate

Over the course of human history, the way humans have fed themselves has changed radically. The shifts have transformed us from nomadic hunter-gatherers to farmers, giving rise to sedentary communities. Thousands of years later, farmers began using chemical fertilizers and machinery to increase their yield, while the third shift, the Green Revolution, introduced even more agricultural technologies alongside genetically modified crops that proved resilient to disease and drought.

Today, humankind is taking its fourth leap forward: the FoodTech Revolution. If previous shifts improved existing methods, the FoodTech Revolution is something else entirely, often detaching the meal on your plate from its traditional source.

Meat cells can be cultivated in a lab, vegetable proteins can be processed to match the texture and nutritional value of meat, and fermentation can be harnessed to create everything from new superfoods to natural food colorings.

Hebrew University faculty members and alumni are at the forefront of the FoodTech Revolution, while also continuing to improve traditional crops using sophisticated methods. In the following pages you will see, and almost taste, crops, ingredients, and food that our faculty and alumni are developing—providing better and more nutrition for humankind in the 21st century.

1



1 | Macaroons prepared with Egg'n'Up, a plant-based egg substitute. This revolutionary product provides the food industry with a 100% clean-label, allergen-free, and versatile product capable of foaming, leavening, emulsifying, and more—just like a real egg. Egg'n'Up is enabling manufacturers to create better products, offering consumers better choices, and helping animals and the planet. Egg'n'Up was co-founded by SavorEat in 2021.

2 | Kinoko-Tech's proprietary fermentation platform combines legumes and fungus to grow a nutritious and tasty product that can be made into anything: vegan burgers, snack bars, dim sum—the sky is the limit. Kinoko-Tech requires little resources, creates zero waste, and can grow anywhere. The start-up won the Hebrew University's inaugural Asper Prize in 2022.

2





3

3 | Phytolon creates natural food coloring through fermentation, resulting in a safe, natural, and stable product that has been patented in the USA, Europe, Israel and elsewhere. The company was co-founded by Hebrew University alumnus Dr. Halim Jubran (with Dr. Tal Zeltzer and Dr. Guy Polturak), who earned his PhD in biochemistry at the Hebrew University. Halim also sits on the University’s Board of Governors.



4

4 | SavorEat has developed a plant-based burger and Robot Chef that creates the perfect burger experience, without any of the environmental or health downsides. The plant-based burger is free of preservatives, allergens, and gluten, and can be tailor-cooked and adapted for personal health and taste, texture, and more. SavorEat was co-founded by Prof. Oded Shoseyov, Prof. Ido Braslavsky, and Racheli Vizman in 2018 (see p. 10).

5 | Tahini and sesame oil produced from sesame seeds grown by Prof. Zvi Peleg on the Joseph Marguleas Experimental Farm in Rehovot. Until the 1960s, sesame was the second largest crop grown in Israel, but production moved abroad due to high labor costs. Zvi aspires to re-introduce sesame to Israel as a profitable crop, adapted to mechanized harvest (see p. 10).



5

6



7



6 | Wonder Veggies, co-founded in 2022 by Prof. Oded Shoseyov and Prof. Betty Schwartz (Hebrew University), Dr. Lilach Iasur-Kruh (Braude College), and entrepreneur Danny Weiss, is developing the first-ever technology and formulations for growing probiotic fruit and vegetables. This new and exciting category of probiotic produce is meeting the growing demand for healthier food, while combining three trends: plant-based food, functional food, and gut health.

7 | ChickP, founded by Prof. Ram Reifen in 2019, produces the world's first 90% pure plant protein, extracted from chickpeas. The protein's flavor and color are nearly undetectable, yet it is packed with nutrients and extremely versatile—capable of emulsifying, gelatinizing, and whipping. A perfect plant-based substitute for dairy and eggs, ChickP can be used to make hard and soft cheeses, ice cream, yogurt, and drinks that taste and feel like animal-based products.

8 | Teff, a nutritious cereal crop native to Ethiopia, is adapted to hot, dry weather. In recent decades, teff has become popular as a gluten-free super-food. Prof. Yehoshua (Shuki) Saranga has studied its genome and developed the best agro-practices for growing the grain in Israel. Pictured here is Shuki in a teff field on the Joseph Marguleas Experimental Farm in Rehovot (also see *Teff Love* in *Scopus* 2022, p. 21).

8

The Birth of Environmental Law in Israel

By Prof. Reuven (Richard) Laster



Hebrew University law students celebrating the conclusion of the Green Eilat course.



Prof. Reuven (Richard) Laster earned a PhD in environmental law from the Hebrew University in 1975, at a time when there were no courses in environmental law. He has taught intermittently at the Hebrew University since 1974.

I was born in Richmond, Virginia, where my great-grandfather arrived in the 1880s. I was proud of being both Jewish and a native Richmonder. My parents were very active in the community; my father, a lawyer, became the first Jewish judge in Virginia. My mother worked as a social worker until WWII, when she took over the duties of the home. She was very popular in Richmond and headed up the Inter-Faith Council, among other groups that needed her help and guidance.

I earned my BA at the University of Virginia, JD at Richmond Law, and LLM at

Harvard Law School, before coming on *aliya* in 1970. I completed ulpan in Arad and then moved to Jerusalem, where I began a doctorate in environmental law. In 1974, I began my career as legal advisor to the newly created Environmental Protection Service. Five years later, I opened a law practice and began teaching environmental law at the Hebrew University's Department of Geography, Institute of Environmental Sciences, and Faculty of Law.

For many long years, I was Israel's sole environmental lawyer. I used my skills, often against entrenched ideas, to make a paradigmatic change in such varied areas as re-structuring Israel's Drainage Authorities to align political boundaries with geographical basins; representing workers

exposed to dangerous substances, which led to the revision of various regulations; and spearheading the efforts to revitalize the Kidron river which runs from Jerusalem's Old City to the Dead Sea. The plan was eventually adopted by the Israeli government and the Palestinian Authority—the only major infrastructure project approved by both parties.

In 2021, I received an email from fourth-year Hebrew University law student Inbar Druyan. I did not know her, nor did I fully realize, at the time, what repercussions were to follow.

Inbar was enamored with Eilat and its environs, especially its coral reserve. She asked me to teach a course on environmental law—in Eilat,



on Eilat. Something that had never been done, and I wasn't even sure how to go about it. But I never refuse a student initiative, although I knew this was an unusual and expensive proposition for the University.

Money was found and the Faculty of Law and the Inter-University Institute for Marine Sciences in Eilat agreed to host the course. As I wracked my brain for ideas, I recalled my experiences working for Ralph Nader in the late '60s as a "raider," investigating the Federal Trade Commission (FTC).

In our first meeting with Ralph, he explained his "research interview" method. Every day, each "raider" interviewed two FTC employees; we typed up the interviews in eight copies, which were distributed among the team. By the end of three weeks, we knew more about the FTC than its employees. At the end of the summer, each "raider" wrote a chapter for a book, which was published as *The Closed Enterprise System* (ed. Mark Green). I decided to use the same approach in Eilat. I would convert the students into raiders, investigating Eilat's claim to be a "green city."

To do this we needed smart and motivated law students, so we marketed the course. Inbar was relentless. During the summer of 2022, she posted flyers and scheduled a lecture for me to introduce the course to students. There was only

room for 19 students in the course. When 34 showed up for the lecture and 54 applied, I knew the chosen cohort would be willing to work hard.

This became evident as we held two full-day lectures before the semester even began. For the "official" opening, we invited the mayor of Eilat to lay out his vision for the city, which became the basis for the students' investigations. They chose subjects of environmental concern, such as the legal regime protecting the corals, renewable energy, and Eilat's planning and building code.

On December 5, 2022, we arrived in Eilat for five days. From 8am-8pm we heard scientific lectures, met with experts on local environmental problems, interviewed the mayor and his staff, and met with some of Eilat's polluting companies. The site visits solidified the students' impressions, the lectures helped them better understand scientific data, and free time provided camaraderie and opportunities to exchange data or just relax.

On the fourth and fifth days, the students delivered their oral presentations and three weeks later, their written reports. These will be produced as a book and presented to the mayor. The students had fully grasped the challenges, while developing tools to improve the city's environment. I felt an



"Being in Eilat, meeting stakeholders, and doing our own research to develop legal solutions to environmental challenges was an experience unlike any other I've had at the Hebrew University!"

- NIV MEIRSON



"We fully engaged with nuanced questions of sustainability. In the morning, we'd go diving among the coral reefs, then stay up late formulating legal ways to protect it."

- INBAR DRUYAN



"Thanks to the Green Eilat course, the environment is now my top priority. Prof. Laster helped me develop critical thinking skills that are serving me well in my legal career."

- AMANY SBEHAT



Student-investigators meeting with the Mayor of Eilat, Mr. Eli Lankri.

"THE UNIQUE EILAT COURSE IS ONE MORE STEP TOWARDS ESTABLISHING A CLIMATE CHANGE AND ENVIRONMENTAL LAW CLINIC."

immense sense of pride, seeing their transformation into Israeli "raiders" and know these skills will serve them in their future careers.

The unique Eilat course is one more step towards establishing a Climate Change and Environmental Law Clinic as part of the Faculty of Law's Clinical Legal Education Center (CLEC), similar to the existing clinics through which law students advocate for marginalized populations, youth at risk, diversity, and more.

Indeed, CLEC has already undertaken several pilot projects, led by Law Dean, Prof. Tomer Broude, including cases

focused on deep-sea mining and fossil fuel subsidies. It joins several other environmental courses and projects at the Faculty of Law, such as a project at the Minerva Center for Human Rights devoted to incorporating the UN Sustainable Development Goals into policy.

My life's mission has been creating, teaching, and advocating for environmental law, and I'm thankful and proud to be passing on the torch to Hebrew University students, even if it requires a five-day detour to Eilat.

the Impacting Nutrition of a Nation

By Dr. Dorit Adler

It all started with a book. I was studying for my BSc in nutrition science and had just finished reading *Diet for a Small Planet*. The book's lengthy bibliography drew me to the library, where I began reading through the sources and discovered what evidence-based science looked like. My identity as a scientist was born.

My next two degrees were in public health, also at the Hebrew University. Throughout my career, I have never stopped advocating for healthy, evidence-based policies. I've carried the message of science through leadership positions at Hadassah and a variety of governmental, public, and civic society organizations, both in Israel and the United Nations.

Yet my greatest pride is serving as president of the Israeli Forum for Sustainable Nutrition (IFSN), which comprises professionals and researchers from disparate fields who together advocate for healthier food and food policies. For the first six years, we were all volunteers—for the sake of objectivity. We agreed to only raise money that

was free of conflicts of interests, which turned out to be very difficult.

SUGAR: IT'S NOT ALL SWEET

Unbelievably, international studies have shown that Israel is one of the top consumers of sugar and sweetened beverages per capita, especially by teenagers and lower socioeconomic populations, and even often babies. Even our excellent health care system can't fix this. As a result, Israel has the highest rate of diabetic amputations of all OECD countries. This burdens the health care system while reducing productivity and quality of life.

The economic costs are staggering. Here in Israel, treating diabetes and



Dr. Dorit Adler holds a BSc in nutrition science and a master and doctorate in public health, all from The Hebrew University of Jerusalem. She has worked at the Ministry of Health, Hadassah Medical Center, and the Israeli Council for Nutrition Security, and volunteered with the Israeli Diabetes Association's Food Committee and as co-chair of the Israeli President Climate Forum. She is a member of the Ministry of Health's Women's Council and the UN Food Systems Summit Champion Network. She served as the scientific curator for the exhibition *The Planet is on Your Plate* at the Steinhardt Museum of Natural History in Tel Aviv.



obesity costs over NIS 20 billion (over \$5 billion) and 10,000 people die of nutrition-based illnesses each year. The pandemic revealed another “cost” of poor diets, as two thirds of the underlying conditions associated with severe COVID-19 were nutrition-based, including diabetes, hypertension, and heart disease.

A decade ago, I became involved in promoting a tax on sweetened beverages, which became law in 2022. Within a short period, sales dropped by 12%. But a year later, the new government repealed the tax. I was devastated. The data shows that half of Israel’s most disadvantaged populace (1.2 million people), is diabetic or pre-diabetic. Among the ultra-Orthodox, diabetes rates are 1.5 times higher than the national average.

Why aren’t politicians making data-driven decisions, especially when people’s health and lives are on the line? This doesn’t make sense.

The IFSN also pushed for advisory labels on food packaging. The icons, which debuted in 2020, indicate high levels of sugar, salt, or fat (red labels) or denote a healthy choice (green label). Now the IFSN is taking this further by developing, with the Ministry of Health, a national program for women, infants, and children to educate new parents on the importance of establishing healthy eating habits during the first 1,000 days of life.

NATIONAL FOOD SECURITY

I see a political system unconcerned with waning national food security, especially as national brands are sold to foreign investors.

One area of concern is the fact that Israel imports 80% of its calories, largely in the form of sugar, oils, and grains. The sugar ends up in ultra-processed food, while the grains and oils are split between livestock feed and ultra-processed food and bread. A big part of these calories can be reduced for the sake of our health and the planet.

In addition, the ongoing war in Ukraine is a reminder that more than one hundred countries

rely on the grain produced by a mere eight countries, including Russia and Ukraine. Whether war or climate, we see how instability in one region is affecting the nutrition of tens of millions of people worldwide.

I strongly believe that Israel needs to diversify the foods it grows and consumes. We should aim for a versatile agricultural economy, based on healthy and sustainable crops that can easily adapt to anticipated shortages and incentivize farmers to fill the gaps. The state should also incentivize the import of healthy and sustainable foods that don’t grow here.

But not all is doom and gloom. The Hebrew University is emerging as a game changer. Look at the work being done by Prof. Zvi Peleg, who is develop-

ing sesame varieties adapted to local, mechanized harvest [see p. 10, 19], and Prof. Yehoshua Saranga, whose research is bringing teff, a nutritious grain native to Ethiopia, to Israeli fields [see p. 21]. There is hope.

ROLE MODELING HEALTHY CHOICES

When I worked at the Hadassah Medical Center (1987-2014), I pushed to improve the food environment and choices available to staff and patients. It was a double win: patients, especially those with nutrition-based illnesses, were exposed to healthier choices, and the hospital staff actually lost weight and improved their eating habits.

The IFSN has taken the same approach to the Ministry of Social Welfare’s food assistance program. A portion of the funds is now earmarked for healthy foods and recipients receive fresh produce on a regular basis.

VISION FOR THE FUTURE

If nothing changes, we are heading towards a major crisis. Other countries provide a cautionary tale: an increasingly sick population, lost productivity, and ever-growing costs of care. To get Israel on the right track, I am working to improve

access to two things: better nutrition and reliable nutritional data.

The first simply means developing better policies. I was recently part of a broad-based group that published a position paper calling for a basic healthy, sustainable, and affordable “basket” of foods the public should be encouraged to consume through price regulation, subsidies, and differential taxes. We know that poor diets today are costly tomorrow, so why not invest now—and give people a better life?

In terms of increasing access to better nutritional data, policymakers and practitioners should have

easy access to the most objective, up-to-date scientific data coming out of public institutions rather than information provided by industry and lobbyists.

I studied at Israel’s best public university and my entire career has been at public institutions. I have used my skills and knowledge to serve the public, being guided by evidence rather than narrow interests. I have many reasons to feel proud, but most of all, I am proud to have followed my conscience, taking an evidence-based approach to nutrition and public health!



Red labels warning consumers of high salt, sugar, or fat content. The green label indicates a healthy choice.

What is Urban Innovation & Why Does it Matter?

By Prof. (Arch.) Rafi Rich

During the 2008 recession, large global companies competed to invent the “smart city,” utilizing the connectivity of new gadgets to serve urban populations and create a better world. Yet the multimillion-dollar platforms that were developed for cities across the globe fell short of creating substantial value for the cities.

The main reason for this failure was the misconception that technology alone would make cities more efficient, sustainable, and inclusive. In fact, cities need much more: innovative urban models that challenge existing processes, ideas, and policies, along with improving civic engagement and collaboration between stakeholders.

Urban Innovation aims at creating synergy between new ideas, technology, and access to data—with the goal of assisting mayors, civil servants, and communities to be better prepared to face everchanging urban stresses, while promoting inclusive and sustainable urban growth.

Urban Innovation draws on community strengths, existing leadership, and brave management.

Urban Innovation means asking the right questions, sharing information between residents and the city, and co-creating solutions that don't leave anyone behind.

In 2019, the Hebrew University's Faculty of Social Sciences founded the Jerusalem Centre for Urban Innovation (JCUI), focused on creating sustainable and equitable models for futureproofing our cities.

I have the honor of serving as the Centre's executive director alongside Prof. Noam Shoval, its academic director.

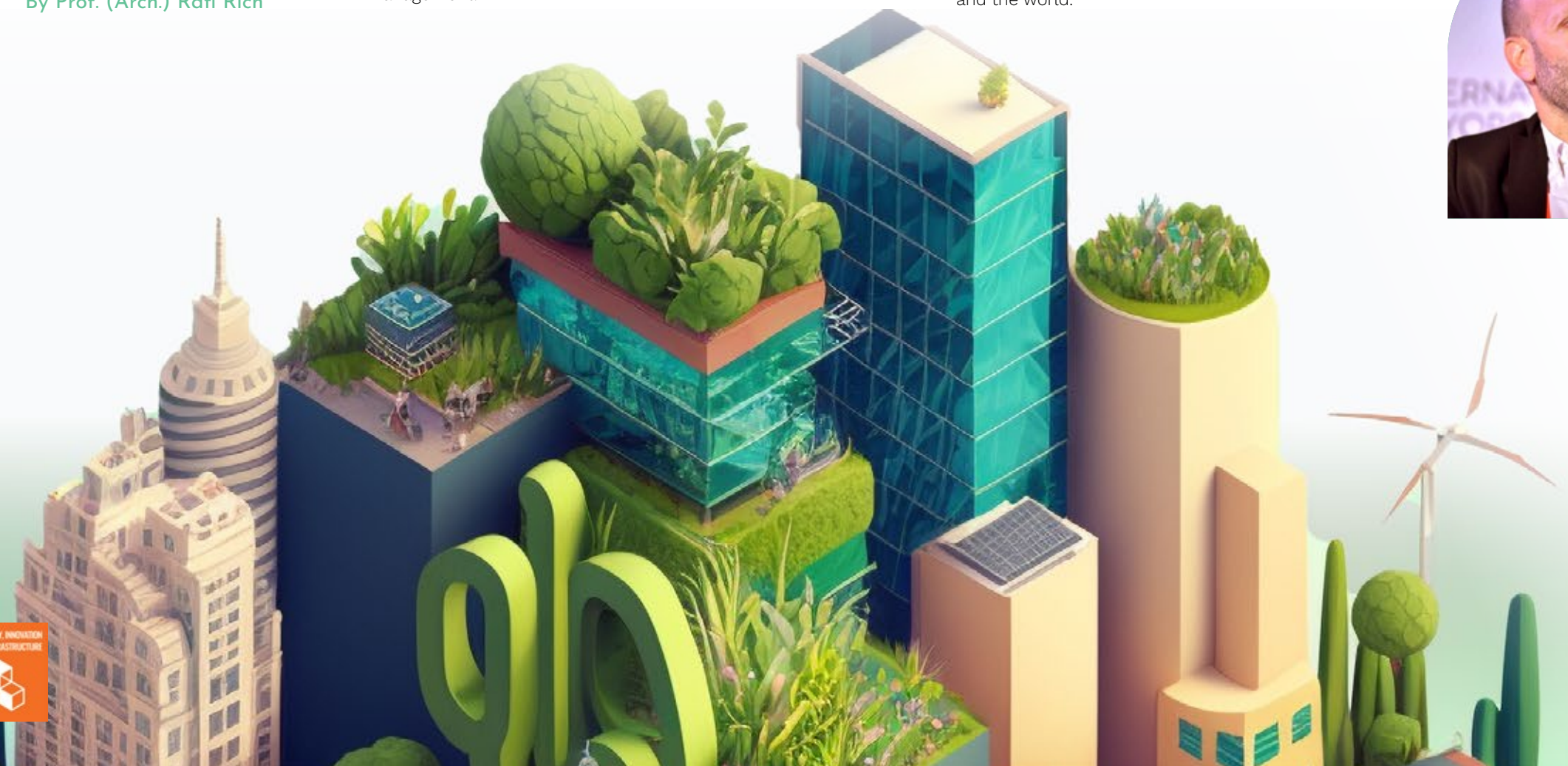
JCUI utilizes the Faculty of Social Sciences' strong academic departments, including urban planning, public policy, sociology, psychology, and economics to understand urban data, create new policies and tools to improve and localize service delivery and infrastructure, and create new sustainable economic growth models for our cities.

JCUI offers a unique international graduate program in smart cities and urban informatics, academic courses on smart infrastructure and urban innovation, research labs focused on planning, data, and urban health, newly founded urban impact labs in Jerusalem and Sakhnin, and a living lab on the Mount Scopus campus, to promote the University as a breeding ground for urban technologies and new ideas.

Through all these, the Hebrew University is playing a major role in forging a better urban future for Israel, the region, and the world.



Prof. (Arch.) Rafi Rich is the executive director of the Jerusalem Centre for Urban Innovation. He has twenty years of experience teaching, researching, and advising cities and governments in four continents, and was the former senior director for building for the Israeli Ministry of Interior. He is a founding member of the Israeli Green Building Council.



Making Great Cities Even Smarter



“I’VE SEEN HOW AT-RISK COMMUNITIES SUFFER FROM UNEMPLOYMENT. SUSTAINABLE PLANNING BENEFITS THEM, FIRST AND FOREMOST, BUT IT TRULY SERVES EVERYONE ELSE TOO!”

- DARA PANTER

When five international Hebrew University graduate students heard about the YoungCity Hackathon, they knew they had to join. With backgrounds spanning finance, construction, public policy, NGOs, and community development, they had arrived at the Hebrew University from across the globe to earn a master’s degree in smart cities and urban informatics.



L-R: Cheryl English (Marshall Islands), Tanya Prins (South Africa), Ahmed Sanduka (Jerusalem), Maxim Prokhovnik (new immigrant from Russia), Dara Panter (USA)

On the big day, they joined 150 other students from across the city to apply their accumulated experience to identifying challenges and developing solutions for improving Jerusalem’s urban environment. They decided to focus on employment. Ahmed had been an employment coordinator in East Jerusalem, Maxim was struck by how high unemployment was in the capital, and Tanya had seen first-hand the impact of large-scale unemployment in South Africa. They were motivated and ready.

Their solution: a digital, skill-based platform to help people overcome barriers to entering the job market. Among the platform’s many features: instantly translating job offerings into relevant languages (e.g., Arabic, Hebrew, and English);

sharing knowledge and opportunities to up-skill, such as language courses, matching younger workers with more experienced ones, and helping applicants map out a path to their dream job. The platform is extremely local, making it scalable to any context. The platform can even match the skill sets of retired professionals to the current market. Ahmed says: “The platform utilizes skillsets, not CVs. Users will be able to connect, recommend, and learn from each other—all locally.”

The group received top recognition from the Hebrew University’s Unit for Diversity and Inclusion, honoring both the diversity of the group itself, and their contribution to creating a more equitable and diverse workforce in Jerusalem.

The Hebrew University and ASPER-HUJI Innovate are proud partners of JLM Impact, the consortium that is managed by the Hebrew University’s Center for Innovation and Entrepreneurship, which organized the YoungCity Hackathon. JLM Impact encourages a culture of innovation and entrepreneurship in—and for—Jerusalem through hackathons and other cross-consortium events. This was the consortium’s fourth annual hackathon.



Greening & Cooling Up Down Cities



Peleg Bar-On grew up in a city, but always enjoyed spending time in green spaces within the built environment, such as parks and community gardens. This cemented his decision to study agroecology at the Hebrew University, where he was selected for a Schulich Leader scholarship. Over the course of his studies, he enjoyed learning about hydroponics and other precision agricultural technologies, and even led a workshop on urban agriculture in Rehovot.

During his third year, Peleg participated in an exchange program in Sydney, Australia, where he joined a local vertical farming start-up. “I learned the market inside-out,” he says. “I networked and gained a global perspective.”

Today, Peleg is the co-founder and CEO of BioShade, which develops modular, autonomous hydroponic systems that can be installed anywhere in a city: on walls, rooftops, or shading elements. Rapidly growing plants increase urban biodiversity, host pollinators, improve air quality, increase available shade, and create pleasant, cooler micro-climates within the city.



Rendering of a BioShade installation.



The Urban Clinic

The Urban Clinic at the Hebrew University nurtures urban leadership and local knowledge for just and inclusive cities. The Clinic's fellows and graduates develop better public spaces, affordable housing, and sustainable transport policies in West and East Jerusalem and nationally.

The Clinic is based within Israel's largest and most diverse graduate program in urban planning, at the Hebrew University's Faculty of Social Sciences.

Working with students, professionals, activists, and community organizations, the Clinic leads pilot projects in partnership with public and private sector professionals, offers hands-on courses, internships, training workshops, and conducts comparative international research.

Meet three students who became involved with the Urban Clinic while earning their master's degree in urban planning at the Hebrew University!



Tharaa Kirresh
REVSON SCHOLAR

Tharaa is a Palestinian from East Jerusalem. She holds a BSc in architectural engineering from Al-Najah University in Nablus and directs the Urban Clinic's scholarship program for Arab students.

“As a child, I lived close to the Hebrew University, but it always felt like a distant, forbidden dream. When I was offered a scholarship to earn an MA in geography & urban and regional planning, I couldn't believe it! It finally seemed within reach.”

“The Urban Clinic is a space where we encounter the ‘other,’ are encouraged to listen and learn from each other, and even work on projects together.”

“The Urban Clinic is a home for people with different viewpoints. We learn to speak and listen to each other. Instead of seeing planning as a zero-sum game, we learn to engage in dialogue.”

“There is a lack of planners within the ultra-Orthodox community, resulting in neighborhoods that don't meet our specific physical and cultural needs. I suggested that the Urban Clinic develop a peer-learning network for ultra-Orthodox planners, which I now lead!”



Racheli Rottenberg
MOELIS FELLOW

Racheli is an ultra-Orthodox Jewish Israeli from West Jerusalem. She holds a practical engineering degree in architecture and an LLB and works as an architect in the Jerusalem municipality.



Merav Stein-Horovitz
DIRECTS THE MOELIS JERUSALEM FELLOWS PROGRAM AT THE URBAN CLINIC

Merav is a Jewish Israeli from Kibbutz Beit Zerah. She holds a BA in geography and is a certified tour guide.

“The Urban Clinic supported my efforts to think both creatively and pragmatically, working with diverse people to develop skills and tools to shape the city for their needs, from the perspective of social justice.”

“Jerusalem is more than a physical city—it's an idea. I love how the same space means different things to different people. Through my work at the Jerusalem Intercultural Center, I have seen how community organizing, improving infrastructure, and police trainings can reduce vandalism and violence.”





What Makes Municipalities Green?

Doctoral student Yonat Rein-Sapir in the community garden of Kibbutz Kramim, where she lives.

It all began in 2017, when Yonat Rein-Sapir heard the Kfar Saba municipality was distributing free cloth diapers to new parents. She had shelled out hard-earned money for her own children’s cloth diapers, and began wondering: why do some municipalities make environmentally friendly choices, while others do not?

With a BA in business administration and Middle Eastern studies and an MA from the Federmann School of Public Policy and Government, Yonat returned to the Hebrew University for her doctorate, under the guidance of Prof. Eran Feitelson (geography). First, she undertook an international comparison between Israel and Switzerland. In Israel, local government is given very little leeway to make decisions, whereas in Switzerland, which is a confederation, local government enjoys much more autonomy.

Nonetheless, Yonat found that the structure of local government had no bearing on environmental initiatives. In Israel, motivated officials were able to develop and implement environmental programs, driven to brand their municipality as “green” or in the interest of connecting with global trends.

On the other hand, in Switzerland, local leaders were happy to meet benchmarks without having to think too much outside the box. In both countries, large, globally orientated cities (e.g. Geneva, Zurich, Tel Aviv) had more environmental activity.

Back at home, Yonat conducted nationwide surveys that found a strong correlation between the size, stability, and strength of municipalities and their ability to carry out environmental initiatives. High socioeconomic status definitely helped, but was not the sole determining factor.

Yet when her research shifted to the interview stage, and she met with representatives from smaller municipalities, Yonat found many were carrying out environmental initiatives—just by different names. In the Arab and ultra-Orthodox sectors,

framing environmental initiatives in cultural or religious terms increased the likelihood of their success.

“Smaller, less globally oriented municipalities were not talking about the climate crisis, but rather solving local problems: cleaning up construction debris, banning disposable dishes from nature sites, and more.”

In recognition of her achievements, Yonat has received the David Amiran Scholarship; a scholarship from the Israeli Smart Transportation Research Center; an excellence scholarship from the Advanced School of Environmental Studies, and a scholarship from the Swiss Friends of The Hebrew University of Jerusalem, among others.

Yonat is currently wrapping up her thesis and looks forward to a career that bridges academia and public policy.





Technology for a Better *Future*

By Yam Atir

The climate crisis is an undeniable reality that we are all experiencing in one way or another. However, this historic turning point must not become a leadership crisis. Unfortunately, our current decision-making mechanisms are ill-equipped to handle these challenges. The future of our planet and the well-being of future generations will depend on our ability to disrupt these mechanisms and shape a better future.

As a member of the Youthwise Advisory Board of the Organisation for Economic Co-operation and Development (OECD), I had the privilege of being part of a group of disrupters who sought to change the way top-level decisions are made. Our goal was to inspire others to consider the future when making global decisions today.

The concept of a “disrupter” originated in the tech world, where innovators and entrepreneurs constantly create new realities through their groundbreaking ideas and patents. These individuals offer a model of leadership that is creative, proactive, and inspiring, guiding us towards a better tomorrow.

The Hebrew University is a prime example of a “disruptive” institution that constantly innovates in technology, agriculture, medicine, and more.

“WE ARE THE FIRST GENERATION THAT FULLY UNDERSTANDS THE CLIMATE CRISIS, AND THE LAST GENERATION THAT CAN ACTUALLY DO SOMETHING ABOUT IT.”

In the following pages, you will meet some of the leaders who are creating a better future through their scientific and technological breakthroughs in three fields: food, resource management, and health and education. Their work showcases what is possible when we harness technology to shape our reality. The conversation about the future is here; will you join us?



Yam Atir holds a BA in political science, strategic communication, and conflict resolution from the Hebrew University. During 2021-22 she served on the OECD's inaugural Youthwise Advisory Board. In 2021, Forbes Israel Magazine included her in its “30 Under 30” list. Today she is VP of Strategy and Government at the Start-Up Nation Policy Institute.



Back to the Future Climate



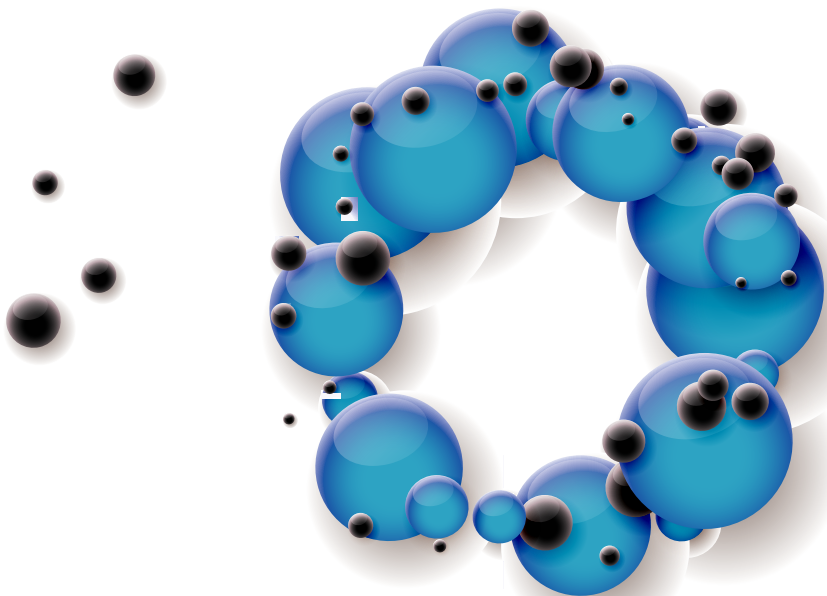
Dr. David Helman is preparing for the future. Specifically, how to feed a growing population living on a hotter and drier planet with higher levels of greenhouse gases in the atmosphere.

One of his current research projects, Wheat-DryFACE, uses a Free Air Carbon Dioxide (CO₂) Enrichment (FACE) system, which he installed on the Joseph Marguleas Experimental Farm in Rehovot. By releasing CO₂ into the immediate area of his crops, he can simulate atmospheric conditions as they are projected to be at the end of the century.

Along with international doctoral student Gabriel Mulero (Nigeria) and master student Marisol Cervantes (Mexico), David is using state-of-the-art technology, remote sensing tools, and numerical modeling to understand how two wheat varieties cope with these conditions, measuring water use, energy balance, plant physiology, the quantity and quality of the crop, and more.



L-R: Graduate students Gabriel Mulero and Marisol Cervantes with Dr. David Helman in the field.



Bio-Inspired Materials: Food of the Future



Dr. Gali (Galit) Fichman is one of the newest faculty members to join the Institute of Biochemistry, Food Science and Nutrition. During her doctoral and postdoctoral studies, she developed innovative gel materials with a wide range of medical applications, such as drug delivery, antibacterial therapy, and more.

Now, she has joined The Hebrew University of Jerusalem as a Zuckerman Faculty Scholar to further her research in the direction of food. “My gels, which are peptide-based, are essentially a giant playground for researchers across fields. You can design them for any purpose,” Gali explains.

An edible version of her gel could help create appetizing textures for futuristic foods, optimize nutrient or probiotic delivery into our bodies, or even provide effective scaffolding for growing cultivated meat, which is projected to be a key food source in the future.

“I want to translate my findings to develop advanced gel materials for food and health care,” Gali says. “The Robert H. Smith Faculty is the right place to be!”

Cutting Meat: The Vegan Way



Mohammad Ghosheh grew up in Jerusalem. He earned a BSc in biomedical engineering at Izmir Katip Çelebi in Turkey, where he won several prestigious research grants, developed two medical devices, and registered several patents.

He returned to Jerusalem for graduate studies in bioengineering and joined Prof. Yaakov “Koby” Nahmias’s lab. While participating in the BioDesign program, he developed a sensor for safer endoscopies, which has successfully completed animal trials and is moving toward clinical trials on humans.

During his doctoral studies, Mohammad’s side-project resulted in Moon Steak, a start-up he founded together with Prof. Nahmias. Together they hold several patents on the proprietary materials and technology for producing plant-based whole cuts that closely imitate the texture and flavor of whole cuts of red meat.

“THE HEBREW UNIVERSITY’S BIOENGINEERING PROGRAM IS BOTH CHALLENGING AND IMPRESSIVE. I AM THANKFUL THAT THE NEUBAUER FOUNDATION AWARDED ME A FELLOWSHIP, ALLOWING ME TO FULLY DEDICATE MYSELF TO MY STUDIES!”



Full of Energy



Today's batteries operate along the same electro-chemical principals of the first batteries, developed two hundred years ago. But Dr. Daniel Sharon (chemistry) is proving that it can be done better. His research group is working to develop batteries that are increasingly efficient and eco-friendly, benefitting industry, consumers, and the environment alike.

First, he's working to increase batteries' storage capacity, reducing the need for frequent re-charging. Common (liquid) batteries become unstable when highly charged, while materials capable of storing high levels of energy are less safe. To that end, Daniel has developed a completely solid and entirely stable battery that can withstand impact and high temperatures.

Second, as the world transitions to renewable energy sources (e.g., solar, wind), the need for greener utility-scale storage is imperative. Daniel is developing a sea water battery—utilizing a non-toxic and readily-available natural resource to store large amounts of energy, with extremely promising results to date.

Another Person's Treasure



Prof. Oded Shoseyov (plant sciences and genetics in agriculture) founded Melodea to commercialize the eco-friendly, plastic-free packaging product he developed, which is based on cellulose nano crystals (CNC). Cellulose is the primary building block of plant cells, and Oded's proprietary method can extract CNC from waste (e.g., wood pulp, paper) and transform it into a protective barrier that can be integrated into packaging.

Melodea's advantages are manifold. First, the coatings are lightweight, durable, and comply with FDA and EU food contact regulations. Second, they do not require the extraction of new natural resources and can be easily recycled or composted after use. By reducing the amount of plastic used and garbage created, Melodea is part of the shift away from fossil-fuels and towards renewable products.

"I feel fortunate to work with my former students at Melodea," says Oded. "We are bringing scientific innovation to replace laminated plastics—one of the most polluting materials on earth."

It's All a Game



Hebrew University Business School Dean, Prof. Nicole Adler, is an applied game theorist. She simulates markets and then studies how changes in the rules are likely to affect outcomes.

Her current research examines the rules necessary to minimize aircraft emissions. As other industries grow more environmentally efficient, aircraft will be responsible for an increasing share of greenhouse gases. Alternative approaches have failed to take off: batteries are too heavy, man-made fuels are prohibitively expensive, and emission-trading schemes have been met with international resistance.

Nicole is taking a fresh approach: together with doctoral and postdoctoral researchers, she created a two-stage game in which regulators adjust the rate of a carbon tax, while airlines adjust their output to maximize profit. Preliminary findings indicate that rather than imposing a global fuel tax, governments should compete against each other, with the funds raised going towards research and development of technologies capable of reducing emissions.

Mitigating Climate Change—Naturally

Three Hebrew University alumni are leveraging the Earth's natural systems to solve the climate crisis. Specifically, they are working to reduce the amount of carbon dioxide (CO₂), a common greenhouse gas, in the atmosphere. Last year, Ram Amar and Kobi Kaminitz (Talpiot, an elite IDF training program in technology under the auspices of the Hebrew University) and Eitan Brettler (MBA) founded Rewind, which restores the earth's carbon balance by burying biomass such as horticultural and agricultural by-products at the bottom of the Black Sea.

How does it work? Living plants absorb carbon dioxide. When they die and decompose, the CO₂ is released back into the air. Rewind has developed unique technology for sequestering biomass 1.2 miles deep, on the oxygen-free floor of the Black Sea, where it will never decompose or release CO₂.

Having run a number of successful experiments in Israel, Europe, and the Black Sea, Rewind is poised to scale up and remove billions of tons of CO₂ from the atmosphere—thus combatting climate change.



L-R: Eitan Brettler, Kobi Kaminitz, and Ram Amar in a boat on the Black Sea.



A Healthy Transition to Motherhood



Dr. Anat Talmon (social work) doesn't flinch or look away from trauma. She delves in, researching how women who suffered abuse or maltreatment as youngsters perceive their bodies and themselves, specifically in the context of the transition into motherhood. Anat found that these women often struggle to bond with their infant, care for it properly, or even maintain their own mental health. With such severe implications, Anat developed a number of interventions and guidelines to improve the well-

being of mothers and new-borns. First, she developed a series of Zoom meetings for first-time mothers, who over the course of four sessions self-reported declining levels of distress and increased maternal self-efficacy. Furthermore, Anat has shown how screenings can accurately identify those expectant mothers most likely to struggle after giving birth. Personalized prenatal care can be extremely helpful, developing mothers' resilience before delivery, rather than treating them after crises arise.



Growing the Future



In 2015 Ayotunde Kolawole (Nigeria) graduated with an MSc in environmental quality sciences from the Hebrew University's International School of Agricultural Sciences. Since then, he has established the KAY-LAB academy and resource center, through which he is improving the lives of people in his community. "I wanted to make a quality education affordable," he says of the academy, in which fifty pupils, aged 5-11, are getting a solid start to their education.

Thanks to Ayotunde's leadership, the resource center secured grants from the Pears Foundation and the US Embassy in Nigeria to dig new boreholes, train locals to treat contaminated well water with chlorine and alum, train farmers to harvest and conserve water—thus doubling their growing season—and implement drip irrigation, and much, much more. "I am leveraging the knowledge from Israel to solve problems in my home country," he says. "The Hebrew University is second to none!"

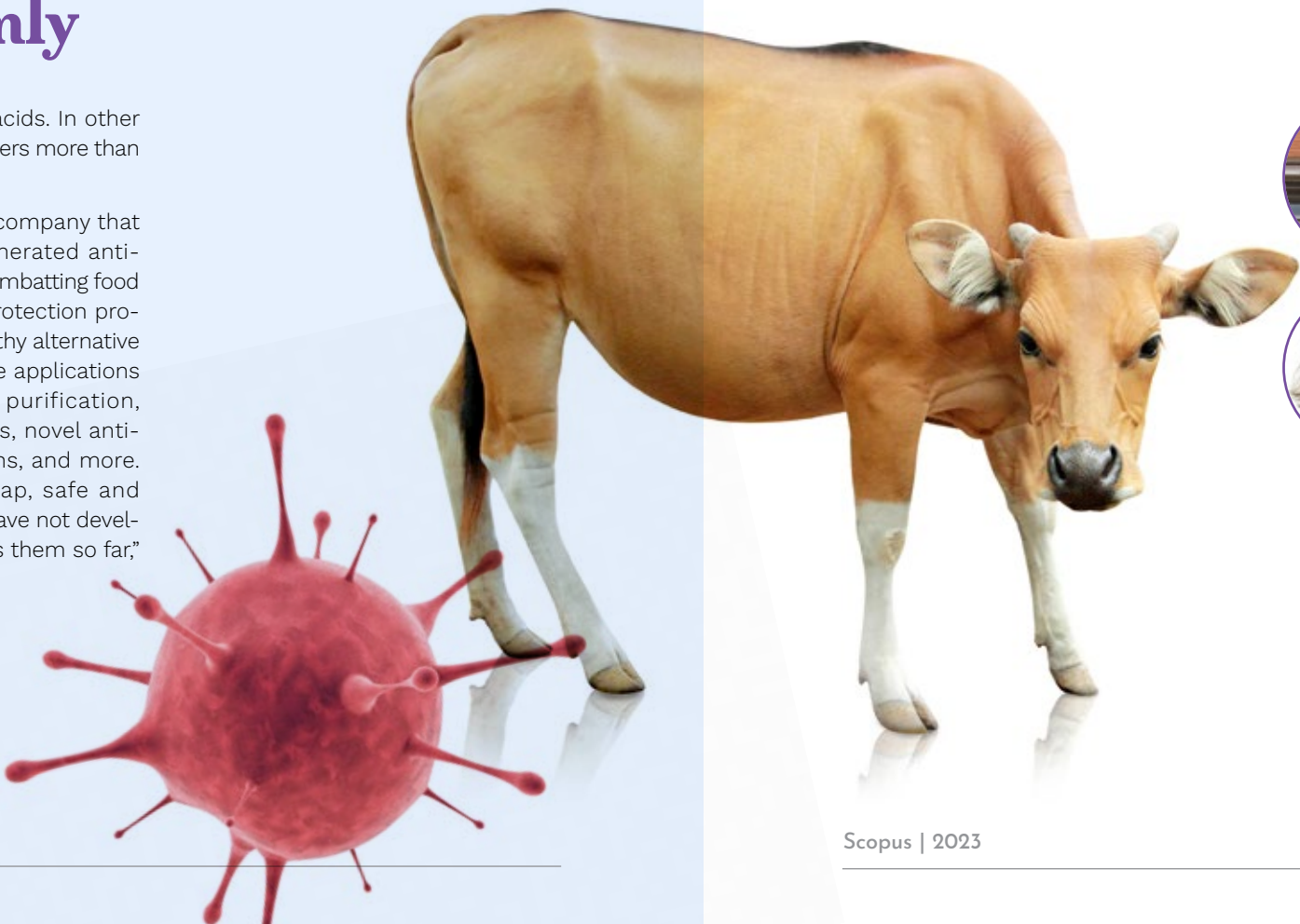


Fighting Microbes Naturally and Randomly



Our skin protects our bodies from infections, fungi, and other microorganisms. But how? Forty years ago, scientists discovered protein-based excretions (peptides) that repel and destroy pathogens. Yet despite decades of research, these peptides were never developed commercially, due to high costs and fear that widespread use would lead to bacterial immunity. Until Prof. Zvi Hayouka (biochemistry, food science and nutrition) took an out-of-the-box approach. He identified two core traits of antimicrobial peptides: a positive charge, which enables them to infiltrate the negatively charged bacteria, and over 50%

water-repellant amino acids. In other words, composition matters more than sequence. Zvi founded Prevera, a company that produces randomly generated antimicrobial peptides for combatting food spoilage. These "food protection proteins" are a natural, healthy alternative to preservatives. But the applications are even wider: water purification, fighting plant pathogens, novel antibiotic agents for humans, and more. "Our peptides are cheap, safe and effective, and bacteria have not developed resistance towards them so far," he says proudly.



A STEP towards Animal Health



Nasr Al-Qadi is a Palestinian veterinarian who trained in Nablus. When he was ready to continue his education, he enrolled in the Hebrew University's master program for veterinary public health. "People around me were impressed," he recalls. "The Hebrew University is known for its high level of training."



There he met veterinarian Michal Morgenstern who had begun the master program a few years earlier. Meanwhile, she was conducting doctoral research into the factors that influence farmers' decisions whether to vaccinate their livestock against five specific diseases.

Nasr began working with Michal, translating her questionnaires and surveying Arabic-speaking farmers, often in person. They joined STEP, a US-based program that supports Israeli and Palestinian graduate students who conduct scientific research together. "Animal diseases know no borders," Nasr says. "To keep herds healthy, we need to work together." Michal agrees, "Two nations living so close to each other, we must cooperate on matters of health."



Building the Future, Preserving the Past

Ilan Mizrachi in the construction site of the Saul and Joyce Brandman Science Laboratories Building B.

Walk through any of the Hebrew University's campuses, and you'll likely encounter Ilan Mizrachi's work. His name isn't affixed to any of his projects, but his fingerprints are everywhere.

Ilan is the Hebrew University's Head Engineer and Deputy Director of the Building and Infrastructure Division. An eighth-generation Jerusalemite, there's nowhere else he'd rather work. "The University is one of the city's gems," he says. He joined the administrative faculty twenty-eight years ago.

"University buildings need to be functional and enjoyable for students and researchers alike," Ilan reflects. "But that's not enough. Every single project must stay on budget, be completed on time, and then withstand decades of wear and tear."

A significant part of Ilan's work is balancing each of the campuses' aesthetics with the need for change.

"The campus on Givat Ram, today known as the Edmond J. Safra Cam-

pus, was originally intended for the social sciences and humanities, but today houses the experimental sciences," Ilan explains. He recently worked on a new applied physics lab that required complex ventilation ducts. "I could have run the ducts across the façade, but instead dug a subterranean tunnel, hiding them from sight," he says.

At the same time, the Goldstein Synagogue on that campus still lacks air conditioning because its installation requires boring holes in the dome, which Ilan refuses to do.

Ilan is always happy to develop creative solutions. For example, on Mount Scopus, the Jack, Joseph and Morton Mandel School for Advanced Studies in the Humanities was going to block the view from the botanical garden, so he suggested constructing the top floor, which is at garden level, out of glass. Today, the boundary between the building and garden is blurred, benefitting people inside and out.

**"EVERY DAY
BRINGS A NEW
CHALLENGE!"**

Besides preserving the past, Ilan is also building the future. He oversaw the installation of photovoltaic (solar) panels across campus rooftops, enabling the University to generate 1.2 megawatts of clean energy annually.

While working on connecting the three Jerusalem campuses to the light rail, Ilan discovered that stray currents from the tracks might interfere with the operation of sophisticated scientific equipment, and adjustments were made near the Safra campus.

Yet perhaps Ilan's greatest pride was making the campuses accessible—before it was legally mandated. "I worked with a donor and with Israel's National Insurance Institute (social security) to ensure that students of all abilities could study here." He then guided other institutions across the country. "It wasn't hard, it just required a mental shift," he says proudly.





World of Friends



The Hebrew University's supporters and Friends Associations are integral partners in the development and advancement of the University. In the pages ahead you will meet some of the individuals who actively support the University and its mission across the globe.

AMERICAN FRIENDS OF THE HEBREW UNIVERSITY

1 | 53rd Annual George A. Katz Torch of Learning Award Luncheon

The American Friends of the Hebrew University's George A. Katz Torch of Learning Award Luncheon proudly honored two distinguished leaders in its legal community. Generous donors help the Hebrew University's Faculty of Law to educate future leaders, provide pro bono legal services to underserved populations in Israel, and contribute to the legal community, both locally and globally.

From left: Roberta (Robbie) Kaplan, honoree; Josh Rednik, AFHU CEO; Fran Katz, AFHU National Board of Directors; Audrey Strauss, honoree

2 | 13th Annual Bel Air Affaire

The 13th Annual Bel Air Affaire, co-chaired by Joyce Brandman, Renae Jacobs-Anson, and Helen Jacobs-Lepor and hosted at the iconic Papillon Estate in Beverly Hills, honored Dr. Jaye-Jo Portanova and Bruce Cooperman along with Cindy and Gary Frischling with the Humanitarian Torch of Learning Award. Proceeds from the evening benefitted student scholarships at the University.

From left: Justin Pressman; Beth McCoy; Dr. Norman Lepor; Helen Jacobs-Lepor; Joyce Brandman; Prof. Asher Cohen, HU President; Renae Jacobs-Anson; Dr. David Anson, Josh Rednik, AFHU CEO

3 | LEAD Cohort II

The American Friends of the Hebrew University's Leadership Empowerment and Development (LEAD) Cohort II kicked off in Palm Beach, Florida.

From left: Jeremy Schreier; Milan Chatterjee; Marissa Lepor; Jesse Levin; Gali Grant; Jesse Phillips; Michelle Bernstein; Julia Cherlow; Sammi Edelson; David Wulkan; Ariel Anson; Michael Kotick; Jillian Frieder; Spencer Anson

4 | 2023 Palm Beach Scopus Gala

The American Friends of the Hebrew University bestowed a Scopus Award upon CEO Emerita Beth McCoy at The Breakers, Palm Beach. The gala raised funds in support of the new Center for Computational Medicine at the Hebrew University.

From left: Clive Kabatznik, Chairman of AFHU's Board; Prof. Asher Cohen, HU President; Beth McCoy; Stanley and Roberta Bogen

ISRAEL FRIENDS OF THE HEBREW UNIVERSITY

5 | Event for Israeli Members of the Board of Governors

An event for the Israeli members of the Board of Governors, titled Science, Culture, and Art, took place at the Hilton Tel Aviv.

From left: Prof. Asher Cohen, HU President; Lieutenant General Aviv Kochavi, former IDF Chief of Staff and HU alumni; Michal Rovner, artist & HU honorary doctorate recipient; Amb. Yossi Gal, HU Vice President for Advancement and External Relations

6 | Hebrew University's Leading Alumni Forum

The quarterly meeting of the Hebrew University's Leading Alumni Forum hosted by Avigail Levine, Head of Marketing & Ecosystem at Samsung Next TLV, which is Samsung's investment wing in Israel.

Photographed: Members of the Leading Alumni Forum with Prof. Sara Cohen, Dean of the Selim and Rachel Benin School of Computer Science and Engineering; Prof. Dafna Shahaf (computer science); Prof. Barak Medina (former HU Rector)

BEHIND THE SCENES



CANADIAN FRIENDS OF THE HEBREW UNIVERSITY

7 | Montreal Gala Celebrating the Cultural Diversity of the Hebrew University

From left: Jonathan Goodman; Prof. Mona Khoury, HU Vice President for Strategy and Diversity; Morris Goodman

8 | Florida Reception

A reception in Florida for Canadian Snowbirds, held in April Rosenfeld's home, honoring the memory of her late husband, after whom she named the Michael Rosenfeld Fund in Alzheimer's Research.

From left: Prof. Dina Ben-Yehuda, Dean of Faculty of Medicine; Shelley Ptack; April Rosenfeld

AUSTRALIAN FRIENDS OF THE HEBREW UNIVERSITY

9 | Lunch hosted by the Australia Israel Chamber of Commerce

From left: Michael Dunkel, Australian Friends President; Prof. Asher Cohen, HU President; Mark Leibler AC, Chairman of the Australia Israel Jewish Affairs Council; Rob Schneider, CEO of the Australian Friends

BRITISH FRIENDS OF THE HEBREW UNIVERSITY

10 | British Friends Gala Dinner

BFHU's gala dinner, celebrating great young researchers and a tribute to Isaac Kaye upon his retirement as Chair and becoming President, and a welcome to incoming Chair, Alan

Jacobs. The event was held at the beautiful Claridge's Hotel, Mayfair, London.

From left: Dr. Jonathan Bohbot; Ben Stowe; Jenny Arwas; Alan Jacobs, BFHU Chair; Dr. Rana Eseed; Prof. Shy Arkin; Denise Joseph; Tony Page; Dr. Einat Albin; Derek Spitz; Prof. Nir Bar-Gil; Nigel Salomon, CEO BFHU

11 | British Friends Gala Dinner

Guest chef Eyal Shani (under the auspices of London's leading kosher caterer, BFHU trustees, Tony Page).

THE LATIN AMERICAN FRIENDS OF THE HEBREW UNIVERSITY

12 | Shasha Summer Symposium

The event was jointly organized by the Argentinian Friends and Uruguayan Friends.

From left: Yan Kupchik; Prof. Asher Cohen, HU President; Hector Sussman; Leslie Shasha; Gabriel Goldman

EUROPEAN FRIENDS OF THE HEBREW UNIVERSITY

13 | Hosting AFHU Mission in France

The French Friends hosted AFHU's Western Region Mission to Paris and Israel. The group visited significant sites and met with local and national leaders, including members of the French Friends of the Hebrew University.

From left: Sylvie Rousseau; François Hollande, former President of France; Michèle Anahory; Catherine Belais

14 | Hosting AFHU Mission in France

From left: Michèle Anahory; Rabbi Delphine Horvilleur; Patty Glaser; Amb. Yossi Gal, HU Vice President for Advancement and External Relations; Catherine Belais

15 | Austrian Friends of the Hebrew University

From left: Dr. Marcel Landesmann, President of the Austrian Friends and his wife, Ania; Magnus Brunner, Austrian Minister of Finance

The Mediterranean Diet

What is the Mediterranean diet?

The Mediterranean diet has its origins in the biblical diet and is based on olive oil. It can be arranged as a pyramid. At the base are fruits and vegetables, whole grains, beans, nuts, and legumes. Fish are consumed less frequently. Further up are poultry, eggs, dairy, and wine, which appear in moderate proportions. At the very top are red meat and sweets, which should be eaten sparingly.

One of the diet's mottos is *More Forks, Less Knives*. The tougher the food (e.g. hard cheese, red meat), the less it should be consumed.

The diet goes beyond food to include the Mediterranean lifestyle of being physically active, taking time to cook, and sitting down to eat together.

You specifically mentioned olive oil. Why is it so central to the Mediterranean diet?

Apparently there is a biological reason for this. Oleic acid, which is found in olive oil, is the major com-

ponent of fat tissue in our bodies. Worldwide, people's bodies contain about 50% of this fatty acid, no matter what they eat. The reason is unclear, but it may have to do with olive oil's melting point, our body temperature, and perhaps it has a role as an antioxidant.

By the way, oleic acid is also found in almonds and avocados, two other extremely healthy and delicious foods.

What are the benefits of the Mediterranean diet?

First, better health. People who consume the Mediterranean diet live longer, develop less cancer, heart disease, and dementia and, crucially, are less obese—the main cause of diabetes.

Second, the environment. The Mediterranean diet has a smaller carbon footprint. The abundance of fresh food means that meals are being consumed closer to the field. Carbon-heavy foods such as red meat are marginal, while ultra-processed foods are entirely absent.

Third, the social benefits. When people eat together, they enjoy the food more, consume less, and strengthen their social ties. This is truly invaluable.

Lastly, the economic benefits. The Mediterranean diet emphasizes local ingredients over ready-made food, thus getting more nutrition for money spent. But the diet also has long term benefits. Living longer and healthier lives increases productivity and reduces costs associated with health care.

Scopus is distributed worldwide. Could you share some tips on how our readers can adopt the Mediterranean diet, regardless of where they live?

Components of the Mediterranean diet are everywhere, but consuming it requires making the right choices. The simplest first step is setting aside time to cook and make salads. This is the opposite of fast food. Involve your children in the preparation and enjoy the meal together. Do this from an early age, to help them develop healthy eating and activity habits.

Once you've spent time and effort making a delicious meal, there shouldn't be leftovers. This too contributes to the sustainability of our planet, as globally a third of all food is wasted.

The French gastronome Jean Anthelme Brillat-Savarin said, "Tell me what you eat, and I'll tell you what type of person you are." Turns out, you can learn how a family functions by how it eats, and this also holds true for nations: Do children go to bed hungry? Do the elderly subsist on margarine and jam? The degree of food security (or insecurity) can reveal much about a nation's priorities and values.

Finally, diets should not be a list of dos and don'ts, but rather a question of quality and quantity. They should also be enjoyable and no matter what's cooking, a few splashes of olive oil are always a good idea. *Be'te'avon!*



Prof. Elliot Berry was one of the first scientists to introduce the Mediterranean diet to the public. He formerly directed the Hebrew University-Hadassah Braun School of Public Health and Community Medicine. He has worked and consulted for the World Bank and the United Nations, including the UN Food and Agriculture Organization.



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