INTRODUCING

NEW SCIENTISTS

25/26

GROW

OUR COMMUNITY

EMPOWER TOMORROW

Through the Weizmann Institute's global campaign, *Empower Tomorrow*, we are deepening our commitment to attracting the best scientific minds in the world. Supporting our new scientists is a top priority, with generous, flexible funding and state-of-the-art research environments that give them the freedom to ask bold, curiosity-driven questions, take risks, and follow ideas wherever they may lead. Each new investigator brings fresh possibilities, and our commitment to their success allows talent and collaboration to flourish, accelerating discoveries with far-reaching benefits for humanity.

See and hear more from our newest recruits

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LETTER FROM THE PRESIDENT

Dear Friends,

I'm delighted to introduce you to 12 newly hired scientists who have recently set up labs on campus or will soon do so. Notably, half are women. This is an impressive milestone, as expanding the pipeline of outstanding women postdoctoral fellows, whose experience positions them to be top candidates for tenure-track appointments, has been a priority for many years.

Ensuring that the brightest minds—all the brightest minds—are brought to bear on the scientific endeavor is an absolute must, given the formidable challenges faced by humanity today. The scientists you'll read about here hail from a range of disciplines and are tackling many of the biggest scientific questions.

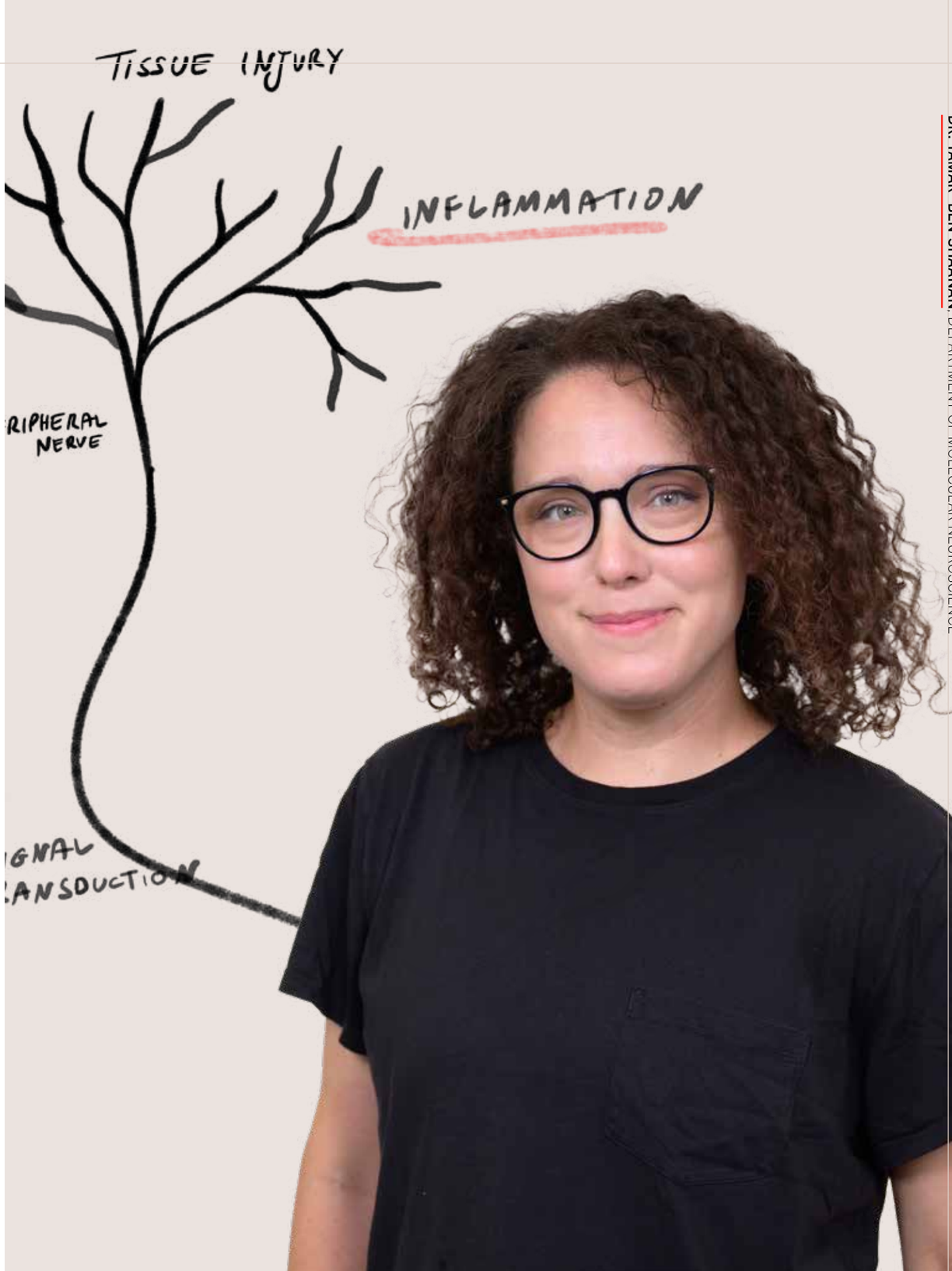
This recruiting achievement, in tandem with our highest-ever placement on the prestigious Leiden Ranking—number six worldwide—is even more remarkable given the unprecedented challenges the Weizmann Institute has confronted in the past year. Following the Iranian missile strikes in June 2025, we have been dedicated to recovering and rebuilding our campus. There is more work to do, but one of the most reliable "data points" evidencing that we are on the right path is our ability to continue to attract the very best scientists.

The emphasis on the people behind the science is a pillar of our *Empower Tomorrow* global campaign for the future of humanity, which was launched last year. I invite all of you to join us on the Empower Tomorrow journey and learn more about the Weizmann Institute and how you can help shape our future.

Sincerely,

Prof. Alon Chen
President, Weizmann Institute of Science

INTRODUCING
NEW SCIENTISTS
2025-2026



DR. TAMAR BEN-SHAANAN, DEPARTMENT OF MOLECULAR NEUROSCIENCE

The healing POWER of pain

DR. TAMAR BEN-SHAANAN STUDIES THE SURPRISING ROLE OF PAIN-GENERATING NERVES IN HEALING SKIN AND AIDING TISSUE REGENERATION

No organism navigates life unscathed—tissue damage is inevitable as we age, particularly damage to the skin, the body's largest sensory organ. Our skin contains specialized sensory neurons known as *nociceptors* that detect harm and signal pain, an unpleasant yet life-preserving sensation. But pain is more than a symptom: as innovative research by Dr. Tamar Ben-Shaanan reveals, it can also be the body's first step on the path to recovery.

According to Dr. Ben-Shaanan, who joined the Department of Molecular Neuroscience in July 2025, nociceptors are the body's hidden architects of repair. When injury strikes, they help coordinate how skin repairs itself, communicate with nearby immune cells, and even summon help from the brain and hormonal system to patch us up. Dr. Ben-Shaanan aims to understand how nociceptors communicate with skin cells—on a molecular level—with the hope of using that knowledge to help people recover faster, more fully, and with fewer scars.

Serendipity steps in

Dr. Ben-Shaanan took a brief hiatus from academia after earning her BSc in psychobiology from the Hebrew University of Jerusalem, feeling frustrated by the chasm between the work she could do studying proteins in individual neurons, and the broader mystery of conscious behavior.

"Being able to explain behavior, emotions, decision-making—we neuroscientists all strive to ask these noble questions," she says, "but it's hard to get answers with that same level of sophistication as with single cells." Then, as she puts it, "serendipity" stepped in. One of Dr. Ben-Shaanan's friends, a lab manager at the Technion-Israel Institute of Technology, called her to say, "There's a new principal investigator here, Dr. Asya Rolls, and she's doing exactly the type of science you enjoy!" One conversation later, and Dr. Ben-Shaanan, who had been exploring biotech, was drawn back into academia, pursuing a PhD in medical sciences from the Technion.

The Rolls lab studies the placebo effect—in which a patient, convinced he has received an active treatment, responds positively, even though no active treatment has been given. This phenomenon has a known impact on the brain: People experiencing the placebo effect exhibit activity in a region of the brain, known as the VTA, that is associated with positive reinforcement (and its evil twin, addiction).

Dr. Ben-Shaanan was tasked with understanding how VTA activity affects the immune system, as it must be doing something if the patient is getting better!

Now **this** was a question she could sink her teeth into. She used a chemogenetic approach known as *D*esigner *R*eceptors *E*xclusively *A*ctivated by *D*esigner *D*rugs (DREADDs) that, as the name implies, involves engineering component proteins in neuron receptors so that they are activated by certain synthetic drugs—but not by the body's natural molecules. This technology

> "IN ISRAEL, YOU CAN BE MORE OF A DREAMER."

allows researchers to turn specific cell populations on or off to study their function in the brain.

In this case, Dr. Ben-Shaanan and her colleagues used DREADDs to show that increased VTA activity triggered increased activity of antibacterial and anti-cancer immune cells. It was striking proof of the mind-body connection—and the power of positive thinking.

Separating pain from injury

For her postdoctoral work at the University of California, San Francisco, Dr. Ben-Shaanan focused on the immune system's ability to aid recovery, particularly in cases of skin damage. Working with legendary immunologist Prof. Jason Cyster, she found that nociceptors in the skin affected cellular activity, ultimately promoting hair regrowth in both healthy and wounded skin.

Through her innovative work, she developed a model that separates pain from injury and was able to trigger nociceptors to send "ouch!" messages to the brain without causing actual harm to the skin. Furthermore, triggering nociceptors awakened a cellular pathway involving skin cells that prompted hair growth and regeneration post-injury.

At the Weizmann Institute, Dr. Ben-Shaanan uses single-cell RNA sequencing, proteomics, and DREADDs to determine how neurons, skin cells, and immune factors interact to either signal or dampen inflammation and regeneration in painful scenarios, and how painful perceptions can herald the onset of recovery.

These findings could lead to new therapeutic approaches for promoting wound healing, minimizing scarring, and alleviating chronic pain syndromes.

Returning home

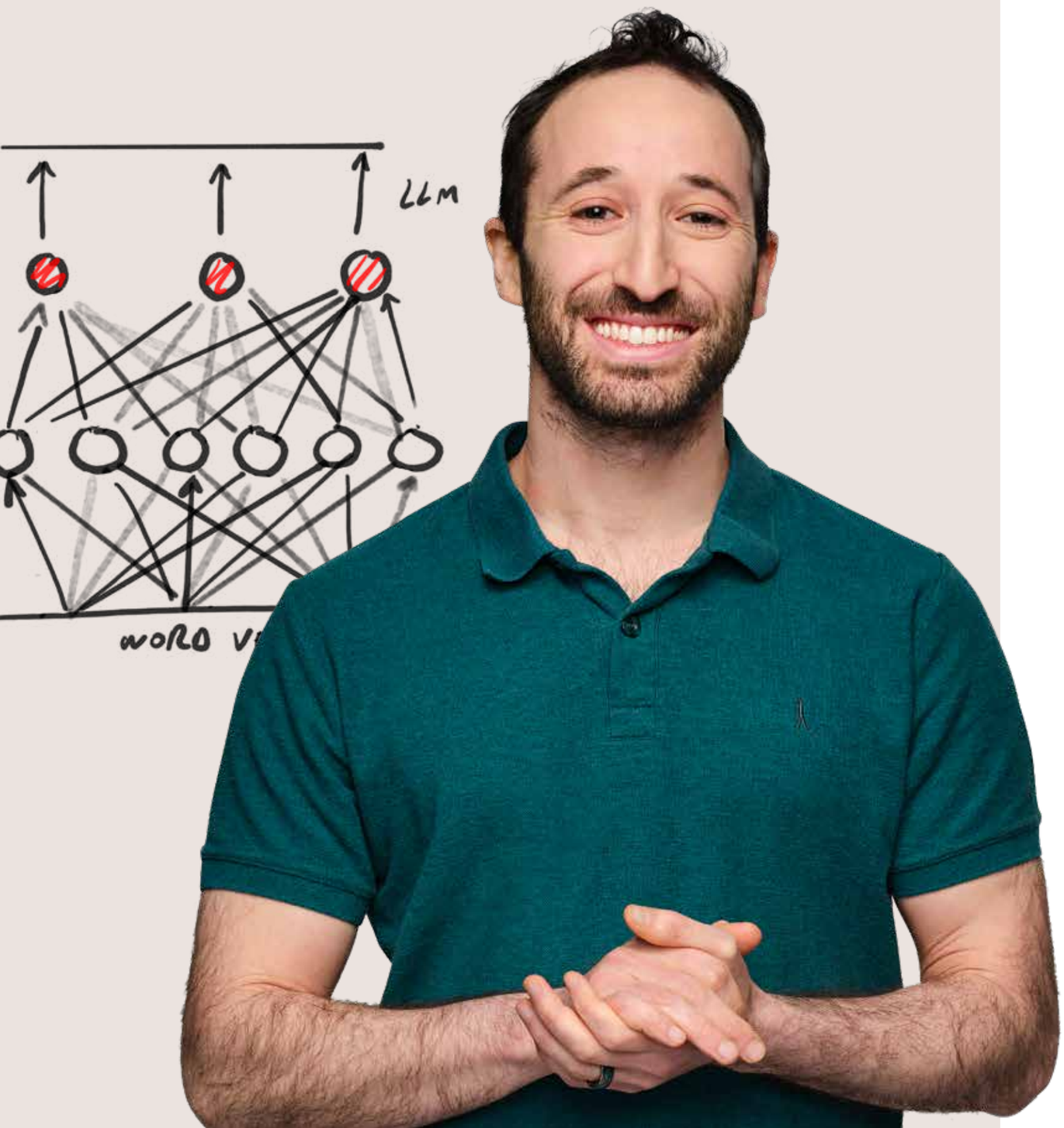
Multiple factors brought the Netanya-native back to Israel, particularly her eldest daughter's enlistment into the Israel Defense Forces and desire that Israel, not the United States, be her home. Dr. Ben-Shaanan also felt a longing to return home.

Although she had enjoyed a wonderful experience in California, she reflects that, unlike in the US, where there is pressure to be highly publication-focused and results-oriented, "In Israel, you can be more of a dreamer." Especially at the Weizmann Institute, she adds, where curiosity is celebrated.

Dr. Ben-Shaanan is married and has two children and a Labradoodle.

EDUCATION AND SELECT AWARDS

- BSc, Hebrew University of Jerusalem (2005)
- MSc, Hebrew University-Hadassah Medical School (2007)
- PhD, Technion-Israel Institute of Technology (2018)
- Postdoctoral Fellow, University of California, San Francisco (2018-2025)
- Fulbright Postdoctoral Fellowship (2018)
- Zuckerman Faculty Scholar (2025-2026)
- Co-inventor of two patented methods related to neural inhibition and modulation



OPEN-SOURCE LANGUAGE MODELS

DR. LESHEM CHOSHEN IS WORKING ON COLLABORATIVE DEVELOPMENT OF LARGE LANGUAGE MODELS

Will computers one day "think," react, and interact with humans using language? Dr. Leshem Choshen, a new principal investigator who will join the Department of Computer Science and Applied Mathematics in September 2026, is helping make that happen.

Born and raised in Jerusalem, Dr. Choshen attended the Hebrew University Secondary School and later earned his BSc in computer science from the Hebrew University of Jerusalem. Both his MSc and PhD degrees, also completed at Hebrew University, focused on natural language processing (NLP)—a pillar of artificial intelligence research in which computers are taught to interpret, manipulate, and comprehend human language. While still a student, he worked on NLP research at IBM Israel.

Now a postdoctoral research fellow at the Computer Science and Artificial Intelligence Laboratory (CSAIL) at the Massachusetts Institute of Technology, he is working on a key aspect of NLP—large language models, which take a prompt and use probability to predict the most likely next word, and then the next, until they generate a response. Large language models (LLMs) are trained on vast amounts of existing written material—"10,000 human lives' worth of text," as Dr. Choshen puts it.

While he hopes that his artificial intelligence research will "make a lot of things easier and more efficient," he is not without concerns. "If you have one technology that does everything, the person who controls the technology has immense power… They'll use the technology for their own interests," he muses.

Decentralizing power

This awareness is part of what drives Dr. Choshen's deep commitment to collaborative models and development. He compares his work on collaborative LLMs to open-source computer code, which is constantly evolving thanks to input from researchers, developers, and users.

"We used to find information using Google, but Google didn't control the information itself. Now you have one source of information—a single answer to your question. By slightly skewing the answer, you can influence people's opinions. That's a lot of what is leading me to look at shared ownership, shared creation. These decentralize the creators' power," he explains.

Dr. Choshen is married to Michal, a lawyer. Once they return to Israel, they will likely begin the next chapter of their life in Weizmann campus housing, although whether they stay in Rehovot will depend partly on where she finds work.

With several job options open to him in Israel, Dr. Choshen ultimately opted for Weizmann. In his discussions before taking the position, he was impressed by the Weizmann Institute's willingness to allocate resources to pure scientific research. He also appreciates the flexibility he will enjoy, in terms of what and when to teach to students, the freedom to reach out to industry, and the collegiality on campus—"there is a sense that people like each other," he says.

Social science

Dr. Choshen is an active and enthusiastic social media user. Originally, he began posting simply because he noticed that there was very little science content in Hebrew. Then he realized that social media was fundamentally changing how knowledge was being disseminated, and he began posting items about his own work and that of colleagues.

He also has an experimental cooking channel on Instagram, combining food preparation with scientific explanations.

Social media is a "very strong tool in a world that is flooded with information. It's a way to influence [people]," he says.

"I aspire to create links between people."

DR. LESHEM CHOSHEN APPRECIATES THE FLEXIBILITY HE WILL ENJOY, IN TERMS OF WHAT AND WHEN TO TEACH TO STUDENTS, THE FREEDOM TO REACH OUT TO INDUSTRY, AND THE COLLEGIALITY ON CAMPUS—"**THERE IS A SENSE THAT PEOPLE LIKE EACH OTHER**," HE SAYS.

EDUCATION AND SELECT AWARDS

- BSc (2016), MSc (2017), PhD (2022), Hebrew University of Jerusalem
- Postdoctoral Fellow, MIT Computer Science and Artificial Intelligence Laboratory-CSAIL (2023-2026)
- Pat Goldberg Memorial Best Paper Award from IBM (2018), Clore Scholars Programme (2019), Blavatnik Award for Most Promising PhD (2023), Fulbright Postdoctoral Fellowship (2023), Rothschild Postdoctoral Fellowship (2023), Best Dissertation Award from the Israeli Association for Artificial Intelligence (2023)

Stopping Cancer's Spread

HOW 'NICHE' RESEARCH BY **PROF. NETA EREZ** MAY SAVE LIVES

Can science transform cancer into a chronic, manageable disease? According to Prof. Neta Erez, the newest member of the Department of Systems Immunology, the answer to this question depends largely on how well we can learn to fight metastasis—the spread of cancer cells from the primary tumor to distant "niches" in other parts of the body. Metastatic relapse after initially successful treatment is heartbreaking and is the most common cause of cancer-related death.

"For most tumor types, once cancer has metastasized, there is no effective medical treatment," says Prof. Erez, whose work has led to discoveries related to metastasis as it occurs in breast cancer and melanoma, among other tumor types. "In my lab, we examine the very beginning of this process, in hopes of finding a way to prevent metastases from taking root."

Early beginnings

Prof. Erez grew up in Ness Ziona, not far from the Weizmann campus. The daughter of a biology teacher, she remembers examining onion layers and plant leaves through a simple microscope her mother brought home from school. She began her studies at the Hebrew University of Jerusalem's Faculty of Agriculture in Rehovot, where she planned to study animals. Then, a summer job in the lab of physician-scientist Prof. Irun Cohen at the Weizmann Institute sparked her fascination with immunology. Embarking on a master's degree at Weizmann, her first rotation was in the lab of Prof. Adi Kimchi, who "blew her mind" by introducing her to the molecular biology of cancer.

"From that moment on, I knew I wanted to be a research scientist," Prof. Erez recalls, adding that having two female advisors—Prof. Kimchi during her graduate studies and Prof. Varda Rotter, who, together with Prof. Cohen, supervised her PhD—had a significant impact on her.

"I was lucky to have role models of women who successfully combined family life with outstanding research," Prof. Erez says.

"This served me well as I left for San Francisco to pursue a postdoctoral fellowship, which can be a kind of glass ceiling for women in science. Navigating the challenges of combining science and motherhood, I returned to Israel at the end of my postdoc with my two small children. Becoming a successful scientist sometimes requires all the stars to align."

Continuing collaborations

In 2010, Prof. Erez was hired as an Assistant Professor at Tel Aviv University's Faculty of Medicine, rising through the ranks to become a Full Professor in 2021. While there, she developed unique murine models that enable the characterization of organ-specific dynamics contributing to metastasis progression and affecting response to anti-cancer therapies. Currently serving as the President of the Israeli Society for Cancer Research, Prof. Erez was recently named the President of the US-based Metastasis Research Society, a position she will hold from 2026 to 2028. She is also the co-author of three patents related to innovative immunotherapy compounds and treatment methods.

> "BECOMING A SUCCESSFUL SCIENTIST SOMETIMES REQUIRES **ALL THE STARS TO ALIGN.**"

As she joins the Weizmann Institute faculty, Prof. Erez looks forward to continuing longstanding collaborations. In the wake of the ballistic missile strike on the Weizmann campus in June of 2025, the Institute is renting temporary lab space for Prof. Erez in the nearby Science Park until her permanent building on campus is fully repaired and operational.

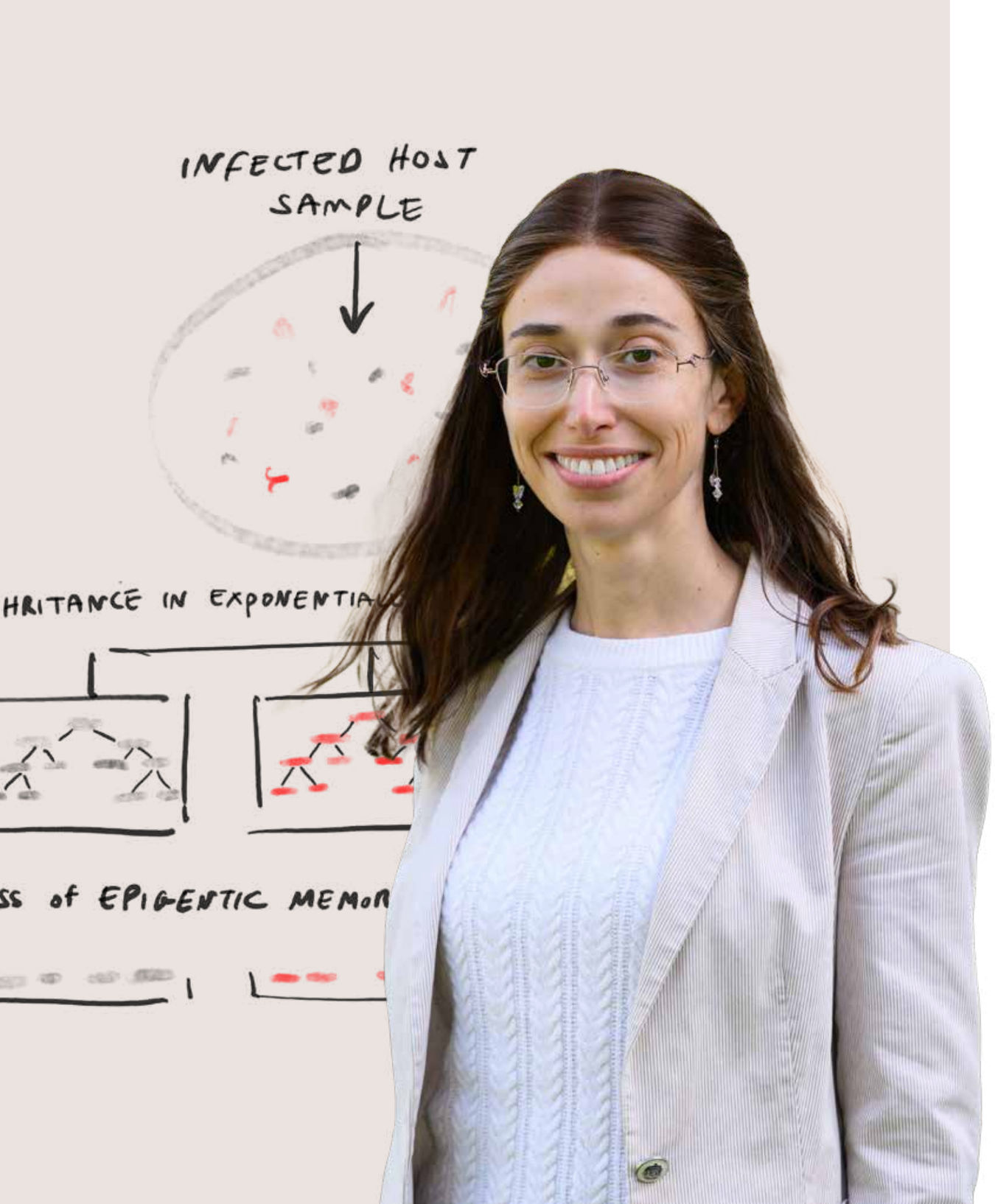
"I've done joint research with a number of Weizmann scientists and am very excited to join them in Rehovot," she says. "Not only will this give me access to the Institute's terrific infrastructure, but it will also open up new opportunities as I become part of this great cancer research community once again."

EDUCATION AND SELECT AWARDS

- BSc, *magna cum laude*, Hebrew University of Jerusalem, Faculty of Agriculture (1992)
- MSc, *magna cum laude* (1997) and PhD (2004), Weizmann Institute of Science
- Postdoctoral Fellow, Weizmann Institute (2004-2005) and University of California, San Francisco (2005-2010)
- European Research Council Starting Grant (2015), Tel Aviv University Dean's and Rector's Awards for Excellence in Teaching (2016, 2019, and 2023), *Nature* Research Award for Mentoring in Science (2020), Melanoma Research Alliance Established Investigator Award (2021), Kadar Award for Outstanding Research from Tel Aviv University (2024)

APPOINTMENTS

- Assistant Professor (2010-2018), Associate Professor (2018-2021), Full Professor (2021-2026), Tel Aviv University
- Vice Dean for Excellence in Preclinical Teaching & Mentoring, Tel Aviv University (2022-2026)



The Hidden States of Bacteria

DR. RAYA FAIGENBAUM-ROMM IS UNCOVERING WHY IDENTICAL BACTERIA BEHAVE DIFFERENTLY—AND WHY SOME TREATMENTS FAIL

Dr. Raya Faigenbaum-Romm felt the pull of discovery early. "I remember being attracted to science and to making discoveries from a young age," she recalls. But curiosity alone wasn't enough. She wanted her work to have an impact on human health. "I became especially interested in translational science," she says. "I wanted my research to connect to real clinical problems."

Born in Russia, Dr. Faigenbaum-Romm and her family moved to Israel when she was four. At Shevach-Moffet, a Tel Aviv high school focusing on science and technology, she studied chemistry and computer science, while taking courses at Tel Aviv University. After high school she served for two years in Israel's Military Intelligence before completing her undergraduate degree in computer science and chemistry at Tel Aviv University. Later, her graduate work on cancer drug development gave her biological tools and confirmed her interest in biology. But it was during her PhD in Prof. Hanah Margalit's lab at Hebrew University that Dr. Faigenbaum-Romm found her calling: bacteria. What captivated her wasn't simplicity but astonishing hidden complexity.

RNA sleuthing

The challenge was capturing that complexity at scale. Bacteria use small RNAs as molecular switches, binding to messenger RNAs to turn genes on or off as they shift between environments—especially crucial during infection. When Dr. Faigenbaum-Romm began her PhD, only about 150 small RNA-mRNA interactions had been identified, each through individual studies. Drawing on their computational and experimental expertise, Dr. Faigenbaum-Romm and her colleagues developed RIL-seq (RNA interaction by ligation and sequencing), capturing all interactions simultaneously. Applied to *Escherichia coli*, it revealed 2,800 interactions— expanding the known regulatory network 18-fold. Their study was published in *Molecular Cell* and in *Nature Protocols*, and the technique became widely adopted.

The heterogeneity problem

During postdoctoral work with Prof. Nathalie Balaban at Hebrew University's Racah Institute of Physics, Dr. Faigenbaum-Romm addressed a discrepancy: classical microbiology assumed bacteria from the same patient behaved uniformly, but emerging evidence suggested genetically identical bacteria could exhibit different behaviors—especially in antibiotic resistance. The challenge was identifying these differences and their clinical relevance.

Dr. Faigenbaum-Romm and colleagues developed Microcolony-seq, based on a key insight: during active division, bacteria "remember" their behavioral state. The method isolates tiny colonies formed by single bacteria dividing. RNA sequencing of these colonies revealed something remarkable: though the colonies appeared identical, their genes were expressed differently, leading to differences in phenotypic states. Their findings were published in *Cell* in 2025.

Applying Microcolony-seq to bacteria from a *Staphylococcus aureus* (staph) bloodstream infection, Dr. Faigenbaum-Romm worked with colleagues at Hebrew University to uncover three distinct subpopulations of bacteria from a single patient, each with different RNA patterns reflecting different virulence levels, highlighting the diversity of bacterial behavior in infections.

"We've been treating bacteria in an infection as if they're all the same," she notes, "but we observed that they can coexist in different states." This hidden diversity may explain why treatments fail—antibiotics usually target one subgroup while others evade treatment and survive—and suggests that future precision treatments could be designed to target all subpopulations.

> "I WANTED MY RESEARCH TO CONNECT TO **REAL CLINICAL PROBLEMS**."

Both sides of the conversation

Drawn to Weizmann's creative, collaborative, and professional environment, and the ability to turn ideas into experiments, Dr. Faigenbaum-Romm is joining the Institute's Department of Immunology and Regenerative Biology in the spring of 2026. She plans to use computational and experimental tools in microbiology and immunology to study both sides of the host-pathogen conversation: how immune systems respond to multiple bacterial subpopulations and what mechanisms drive this heterogeneity in the bacteria.

Dr. Faigenbaum-Romm's collaborative experiences have shaped her vision for her lab culture. "I want to create an environment where group members feel comfortable sharing their ideas, discussing unexpected results, and asking questions," she shares.

Her work sets a new path forward for the fight against infections: bacteria are not uniform populations but consist of diverse communities that have often been overlooked. Recognizing and addressing this new discovery may ultimately lead to more effective treatments for infectious diseases.

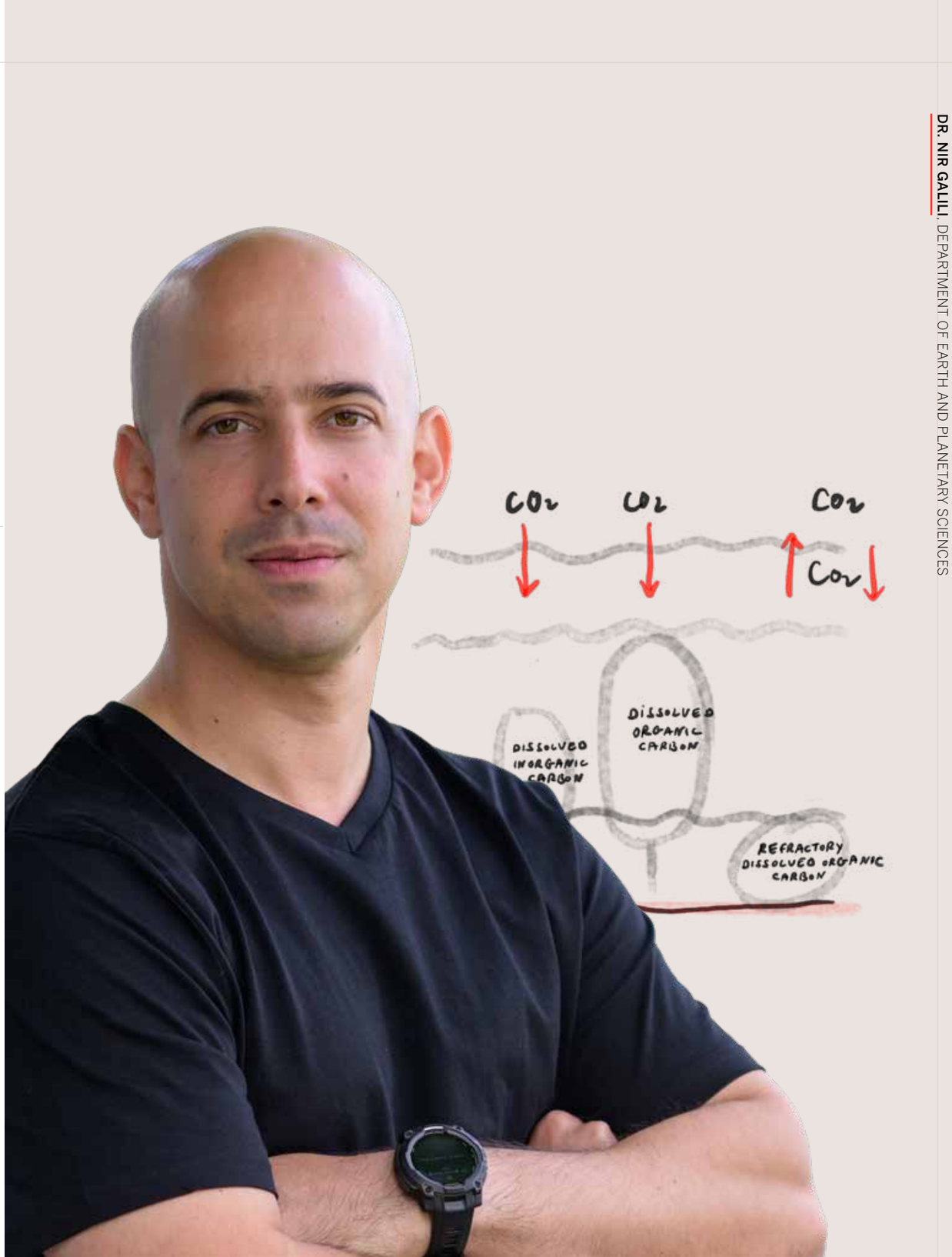
Dr. Faigenbaum-Romm lives with her husband and three children in the central city of Modi'in. In her free time, she enjoys running, reading, and spending time with her family.

EDUCATION AND SELECT AWARDS

- BSc, *magna cum laude* (2011), MSc (2013), Tel Aviv University
- PhD, Hebrew University of Jerusalem (2020)
- Postdoctoral Fellow, Faculty of Medicine, Hebrew University (2020)
- Postdoctoral Fellow, Racah Institute of Physics, Hebrew University (2021-2024)
- EMBO Postdoctoral Fellowship Award (declined due to COVID-19) (2020), Hebrew University Post-Doctoral Scholarship for Excellent Female Students (declined due to COVID-19) (2020), Emily Erskine Endowment Fund Post-Doctoral Researcher Fellow (2021), EMBO Poster Award at The New Microbiology Course (2025)

APPOINTMENTS

- Research Associate, Racah Institute of Physics, Hebrew University (2024-2026)



Telling The Earth's STORY

DR. NIR GALILI INVESTIGATES HOW A 'MINERAL ARCHIVE' CHRONICLES ANCIENT CLIMATE

How the Earth's climate has changed over time is a big story, but interestingly, a critical part of this story is encoded in something extraordinarily small: the layers of minerals that build up around grains of sand as they roll back and forth in shallow seawater over thousands of years. This minuscule "mineral archive" is the focus of geochemist Dr. Nir Galili, the newest member of the Weizmann Institute's Department of Earth and Planetary Sciences.

"In my work, I examine how minerals preserve information about temperature and other climate-related dynamics," says Dr. Galili, adding that he was first introduced to this topic while pursuing his doctorate at the Weizmann Institute under Prof. Itay Halevy. "In ancient times, the Earth's oceans could reach temperatures higher than 100 degrees centigrade. In my PhD research, I used chemical methods to examine the iron oxide—rust—in rock samples gathered from where the ocean used to be. The oxygen isotopes we identified allowed us to measure ocean temperatures at the time the rust formed."

During a four-year postdoctoral fellowship at ETH Zürich in Switzerland, Dr. Galili continued to investigate how rock-encased minerals could help scientists establish a timeline for changes in ocean temperature. Soon, however, he began to wonder if one category of his samples could reveal even more.

"The rocks we studied were packed with ooids, tiny bead-shaped structures that, when split open and examined under the microscope, are shown to be made up of multicolored mineral layers that formed around a single grain of sand over a long period of time," he explains, adding that he had a hunch the oxygen isotopes trapped in these layers might also shed light on how much carbon was sequestered in the ocean during different historical eras.

"The carbon dissolved in the ocean exists in balance with carbon in the atmosphere, including CO_2, a greenhouse gas associated with climate change," he says. "If our experiments were successful, it would establish ooids as a new—and very beautiful—model for studying ancient climate patterns."

The prestigious journal *Nature* recently reported that Dr. Galili and his team at ETH were indeed successful. "By characterizing the oxygen isotopes present in natural ooids, and by comparing this data with ooids synthesized in the lab, we created a paleoclimate proxy—a mechanism for identifying climate conditions prevalent at specific points in the very distant past. This is a completely new approach that could help us answer some very big questions about climate evolution."

Every setback is an opportunity

Dr. Galili was wrapping up his postdoc and preparing for his return to Rehovot when two Iranian missiles slammed into the Weizmann Institute in June 2025. Two buildings took direct hits, and many others sustained tremendous damage, including the Sussman Family Building for Environmental Sciences, where he was slated to open his new lab.

"Some of our infrastructure was up and running when the missiles hit, and some equipment essential to our work was completely destroyed," he says. Thankful for the immediate support of faculty colleagues who shared their workspace and resources, he also points out that in science, every setback is an opportunity.

"Getting back on track will take time, but in science, you play the long game. Five years from now, I know I'll be grateful for the time I have today to explore new scientific questions, and hopefully, overcome exciting new challenges."

> "GETTING BACK ON TRACK [FOLLOWING THE MISSILE STRIKE] WILL TAKE TIME, BUT **IN SCIENCE, YOU PLAY THE LONG GAME**."

Podcasting journey

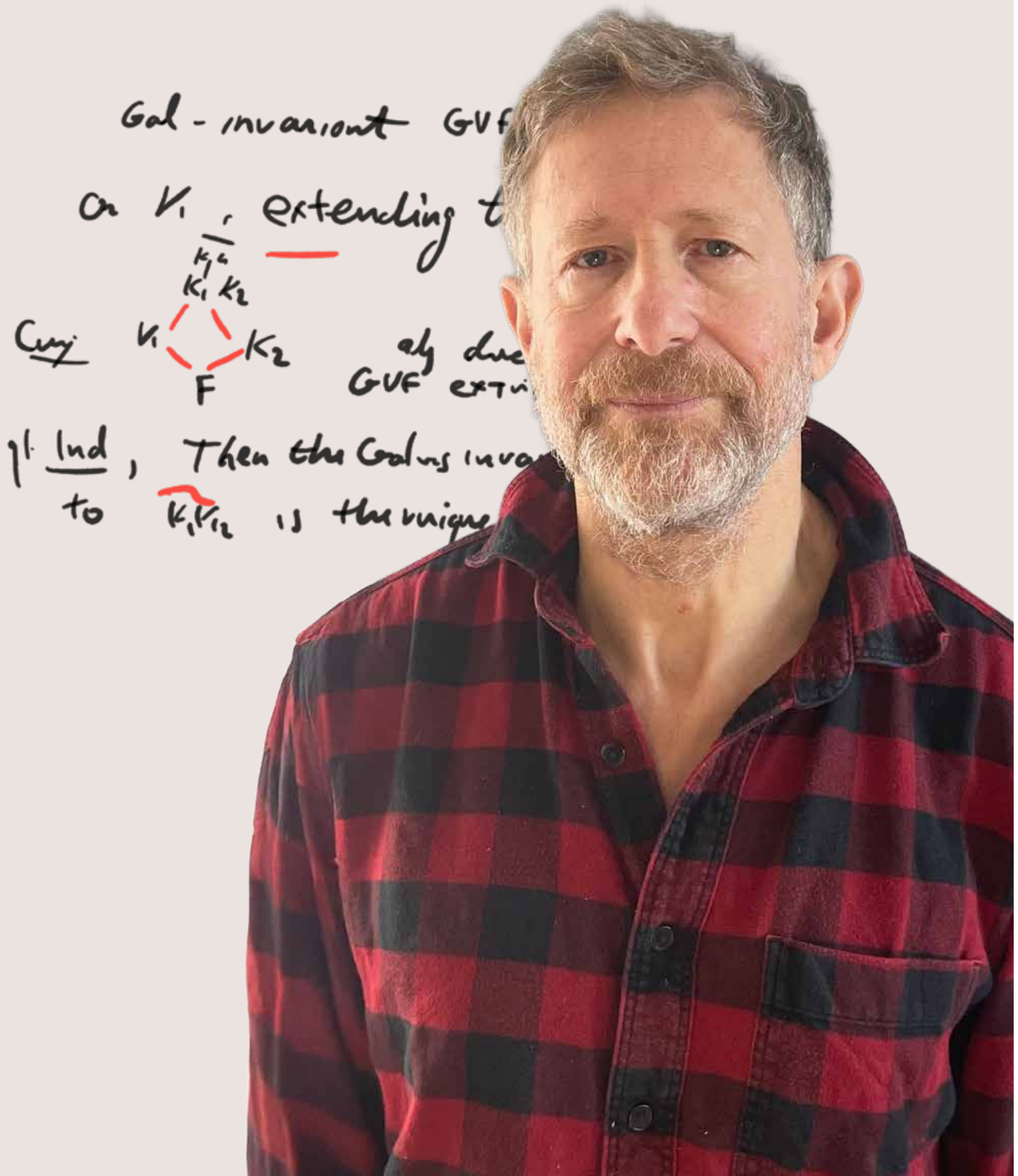
Outside of the lab, Dr. Galili hosts a family-friendly podcast together with his young children. Called *Journey to the Center of the Earth*, it aims to introduce the next generation to the wonders of Earth science. Inspired by Dr. Galili's passion for science education, the venture also served to strengthen his ex-pat kids' Hebrew language skills.

"We were abroad for four years during my postdoc, and I didn't want our children to forget their Hebrew," he says, adding that the podcast was his oldest daughter's idea, and that an English version of the podcast is planned.

"Giving my seven-year-old and my four-year-old the microphone and having a conversation about science, we produced a podcast that reflects how kids understand the world. Sure, it requires a few more 'takes' than it would if I had been interviewing an adult, but the results are worth it!"

EDUCATION AND SELECT AWARDS

- BSc, *magna cum laude*, Ben-Gurion University of the Negev (2011)
- MSc (2016), PhD (2021), Weizmann Institute of Science
- Postdoctoral Fellow, ETH Zürich (2022-2025)
- Peretz-Grader Award for Young Researchers from the Israel Geological Society (2020), Prof. Israel Dostrovsky Prize of Excellence from the Weizmann Institute and the Israel Atomic Energy Commission (2021), ETH Zürich Career Seed Award (2023)



Bridging Mathematical Worlds

PROF. EHUD HRUSHOVSKI USES LOGICAL FRAMEWORKS TO UNLOCK MATHEMATICAL MYSTERIES

When Prof. Ehud (Udi) Hrushovski was in grade school in Jerusalem, his teacher used a grid of squares and vertices to show that 5 x 4 equals 4 x 5, also known as the property of commutativity. Most students likely nodded and moved on. But young Udi was captivated— and suspicious.

"I was amazed," he recalls. "I wondered if they were cheating me by counting vertices instead of squares. It was a striking thing." That childhood moment of wonder became the defining characteristic of Prof. Hrushovski's career, over the course of which he has built a reputation for seeing what others miss—hidden structures and unexpected connections that transform entire fields of mathematics.

Finding symmetry in unexpected places

Prof. Hrushovski is a world expert in model theory, a branch of logic that studies the relationship between mathematical languages and the structures they describe to solve mathematical problems. His inspiration comes from the ability to solve a problem or answer a question.

"It's like when you see an autostereogram [a picture with a hidden 3D image] and at first glance there is nothing, but you have a feeling there is something there, and then suddenly it appears," he explains. "I love being able to see what is there."

Though he initially thought he would study philosophy, a gap year at Oxford University opened his eyes to the beauty of mathematics. A friend told him about Prof. Saharon Shelah—one of the greatest mathematicians of the century—and his groundbreaking work in Jerusalem. Intrigued, Prof. Hrushovski chose to attend University of California, Berkeley, where he completed both his undergraduate studies and PhD under Prof. Leo Harrington, diving deep into Prof. Shelah's theories.

Prof. Shelah created a way to organize all possible mathematical models into distinct classes—from "well-behaved/stable" to "chaotic/unstable". As Prof. Hrushovski studied this theory, he noticed more familiar structures and patterns, or symmetries, that weren't apparent before and could be used to explain puzzling behaviors within the model.

This breakthrough, the subject of his PhD thesis, transformed Prof. Shelah's stability theory into a more powerful tool for geometric insights.

Prof. Hrushovski has since gone on to use logic tools to solve other longstanding problems in the fields of geometry and number theory—disciplines that often seem worlds apart. His methods, including the influential Hrushovski constructions, are used by mathematicians worldwide.

PROF. UDI HRUSHOVSKI USES LOGIC TOOLS TO SOLVE LONGSTANDING PROBLEMS IN THE FIELDS OF GEOMETRY AND NUMBER THEORY—DISCIPLINES THAT OFTEN SEEM WORLDS APART. HIS METHODS, INCLUDING THE INFLUENTIAL HRUSHOVSKI CONSTRUCTIONS, **ARE USED BY MATHEMATICIANS WORLDWIDE**.

Math and poetry

Prof. Hrushovski's intellectual curiosity was nurtured from an early age. His father, Prof. Benjamin Harshav, was a renowned literary theorist and poet who fled Vilnius as a child during World War II, fought in Israel's War of Independence, and created the comparative literature department at Tel Aviv University, later moving to Yale University. Though Prof. Harshav initially studied math and physics, he eventually chose literature because, Prof. Hrushovski recalls, he felt that, at the time, "poetry is more important to the nation."

"He had an enormous influence on me," Prof. Hrushovski reflects, "in terms of his approach to language and learning, and how to view science." He still remembers how his father taught him to sum geometric series in grade school, and how he approached literature with a mathematical sensibility. "His point of view on literature was abstract, and he loved analyzing the music of poetry, which is quite mathematical in itself."

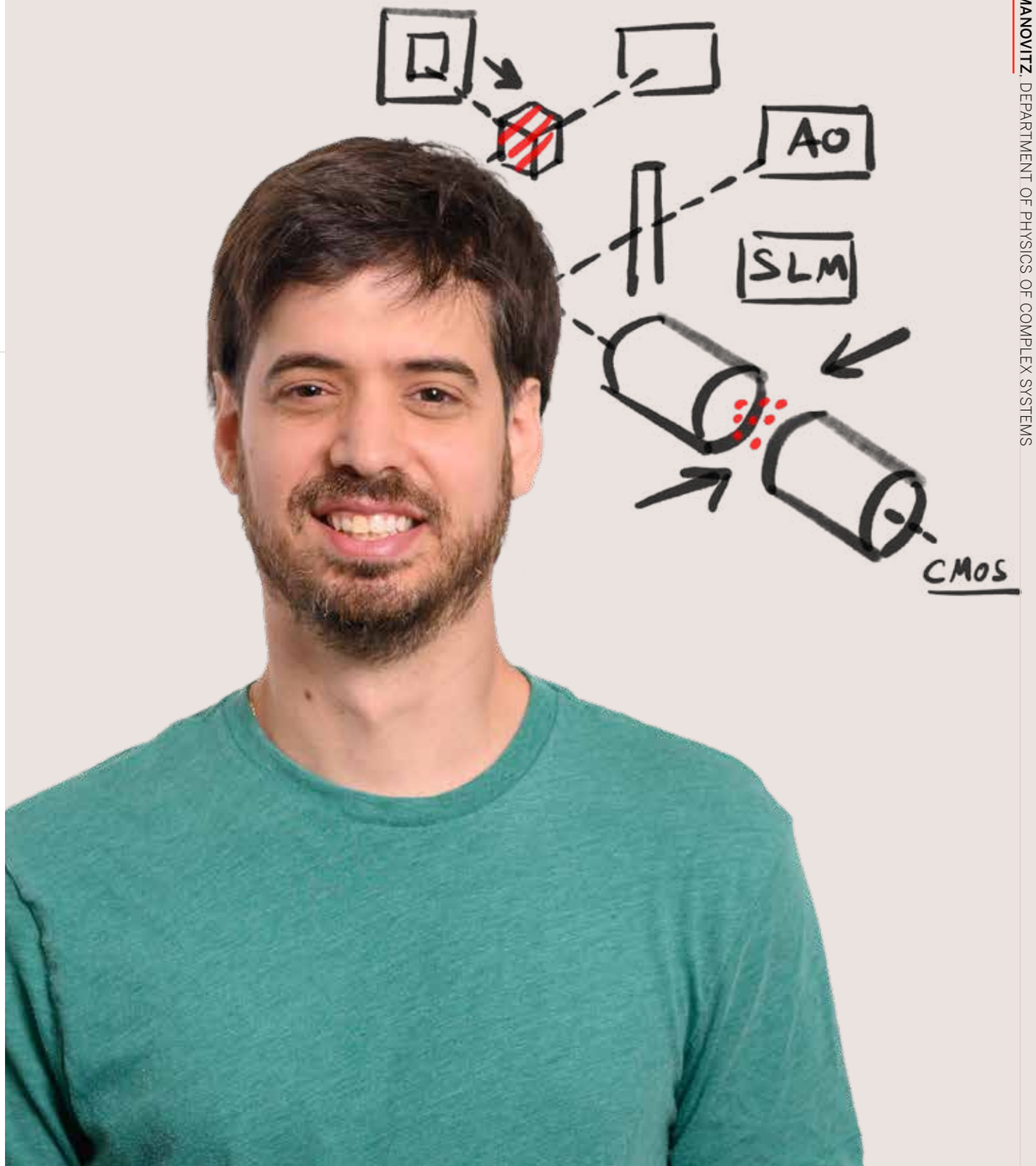
At the Weizmann Institute, Prof. Hrushovski will continue to use language and proof systems to expand the reach of model theory, focusing on how new mathematical areas fit within logical frameworks. Working to enlarge the domain that math models can cover, his research builds frameworks that can become powerful analytical tools. Throughout it all, his goal remains constant: to uncover what's hidden and show that the right logical tools can illuminate truths that were there all along.

EDUCATION AND SELECT AWARDS

- BA (1982), PhD (1986), University of California, Berkeley
- Karp Prize from the Association for Symbolic Logic (1993, 1998), Erdős Prize from the Israel Mathematical Union (1994), Rothschild Prize (1998), Heinz Hopf Prize from ETH Zurich (2019), Shaw Prize in Mathematical Sciences (2022).
- Fellow, American Academy of Arts and Sciences (2007), Fellow, Israel Academy of Sciences and Humanities (2008), Fellow of the Royal Society of London (2020)

APPOINTMENTS

- Visiting Assistant Professor, Princeton University (1987-1989)
- Assistant Professor, Massachusetts Institute of Technology (1990-1994)
- Professor, Hebrew University of Jerusalem (1994-2016), Albert Einstein Chair (2000-2016)
- Merton Professor of Mathematical Logic, University of Oxford (2016-present)



ATOMS BEWARE: It's a TRAP

DR. TOM MANOVITZ USES PRECISION LASER SYSTEMS TO TRAP AND MANIPULATE ATOMS, SHEDDING NEW LIGHT ON QUANTUM PHENOMENA

It takes extraordinary focus to hold a single atom in place and then use it to ask some of the biggest questions in physics. That same focus has shaped Dr. Tom Manovitz's path as an experimental physicist at the forefront of quantum science. Now, in a full-circle moment, he is returning to the Weizmann Institute—his alma mater—after four years in Prof. Mikhail Lukin's group at the renowned Max Planck-Harvard Research Center for Quantum Optics.

In October of 2025, Dr. Manovitz joined the Department of Physics of Complex Systems at Weizmann, where he previously earned both his graduate and doctoral degrees under the supervision of Prof. Roee Ozeri. His research harnesses finely tuned lasers to isolate individual atoms in a vacuum, organize them in precise arrays, and study their dynamics under the strange and powerful laws of quantum physics.

"We're working at a level where intuition often fails," he says. "But with the right tools and enough precision, you can begin to see these phenomena clearly and even start to control them—at least to an extent where new behavior may emerge."

For Dr. Manovitz, this control is not an end in itself; rather, it is a gateway to exploring complex many-body systems and advancing novel approaches to quantum computing.

The science-humanities duality

Drawn from a young age to numbers and patterns, Dr. Manovitz found that physics didn't just offer answers—it raised profound questions about how the world works. "I've always been drawn to the parts of science that touch on philosophy," he says.

That curiosity led him to the Amirim Honors Program in the Humanities at the Hebrew University of Jerusalem, where he studied physics alongside literature, history, and philosophy. "Amirim encouraged a kind of intellectual freedom. It taught me to think of science as part of a much larger conversation."

During his graduate studies at Weizmann, he continued to explore both the technical and the reflective sides of science. Alongside his intensive lab work, he organized a lecture series on the history and philosophy of science and volunteered for a longstanding independent organization that brings Weizmann students and faculty into high school classrooms in Lod to teach math and physics.

Exploring the great unknown

At Harvard, Dr. Manovitz joined one of the world's most competitive experimental quantum groups, developing atomic systems designed to investigate quantum behavior and support the development of next-generation quantum computing technologies. He contributed to several major projects, resulting in back-to-back publications in *Nature*.

"I've had an incredible opportunity to work alongside brilliant experimental and theoretical physicists, pushing the boundaries of our field together," he shares.

His newly launched lab at Weizmann will leverage high-resolution laser arrays to trap and manipulate neutral atoms at the quantum level. The platform allows for exceptional control over atomic interactions and will serve as a testbed for exploring questions in quantum information and the collective behavior of complex quantum systems.

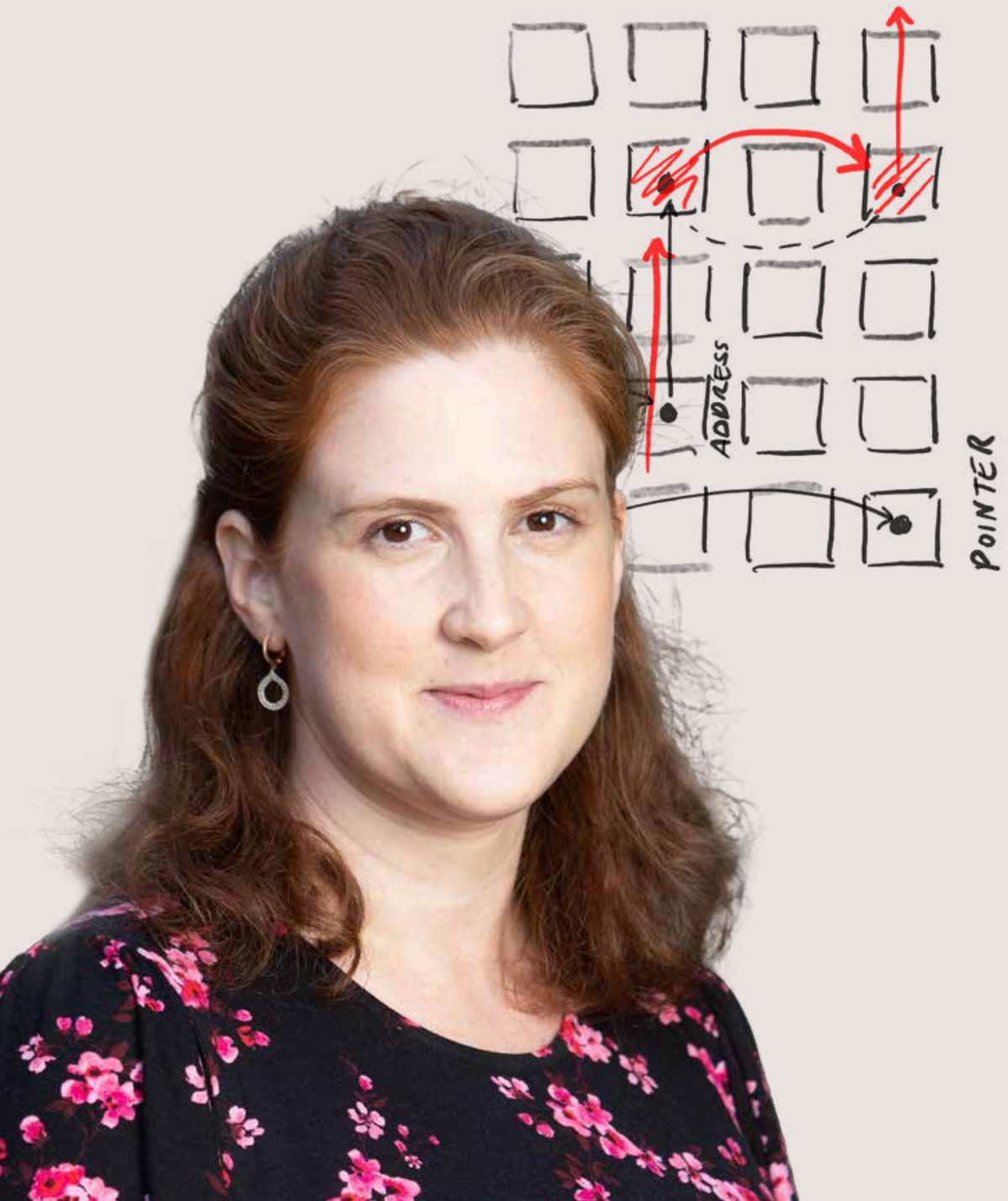
"There's a deep connection between the experimental craft and the theoretical questions we want to explore," he says. "I hope to create a space where both are valued equally."

He also sees his role as extending beyond the research itself. "My goal is to build a lab culture that is collaborative, curious, and thoughtful. I want people to feel they can take intellectual risks and go beyond what is known or accepted."

EDUCATION AND SELECT AWARDS:

- BSc, Hebrew University of Jerusalem (2013)
- MSc (2016) and PhD (2021), Weizmann Institute of Science
- Postdoctoral Fellow (2021-2025), Harvard University
- Amirim Interdisciplinary Honors Program (2010-2013), Israel Council for Higher Education Fellowship in Quantum Science and Technology (2021-2023), Weizmann Physics Faculty Prize for Outstanding Experimental Research (2021), Harvard Quantum Initiative: Prize Postdoctoral Fellowship (2021-2025), Sir Charles Clore Prize for Outstanding Appointment as Senior Scientist in the Experimental Sciences (2025)

"MY GOAL IS TO BUILD A LAB CULTURE THAT IS **COLLABORATIVE, CURIOUS, AND THOUGHTFUL**. I WANT PEOPLE TO FEEL THEY CAN TAKE INTELLECTUAL RISKS AND GO BEYOND WHAT IS KNOWN OR ACCEPTED."



Getting INTO the "MIND" of the MACHINE

DR. TAMAR ROTT SHAHAM IS DEMYSTIFYING AI NEURAL NETWORKS

Is it possible to get an artificial intelligence system to reveal its most closely held secrets? Dr. Tamar Rott Shaham, a recent recruit to the Weizmann Institute's Department of Computer Science and Applied Mathematics, believes the answer lies in treating AI systems not as inscrutable black boxes, but as scientific objects that can be studied, tested, and probed. Her research develops new methods for systematically investigating how modern neural networks operate—and how their behavior can be improved.

"Everyone is talking about the coming AI revolution, but the process is already well underway," says Dr. Rott Shaham, who is set to arrive on campus in the fall of 2026 after she completes her postdoctoral fellowship at the Computer Science and Artificial Intelligence Laboratory (CSAIL) at the Massachusetts Institute of Technology.

As a postdoc, she developed methods to understand, control, and enhance AI models, with a particular focus on neural networks—machine learning models used in many of today's most capable AI systems.

Operating in the background of many essential technologies, neural networks are computational tools capable of learning complex patterns and rules from data and using these to guide their behavior on new, unseen inputs. As Dr. Rott Shaham explains, these networks go far beyond determining what movies Netflix will suggest for Saturday night.

"AI models increasingly play a role in decisions that affect everything from healthcare to finance to national security, and in some cases solve problems better and faster than humans can," she says. "Yet despite their success, we still don't fully understand how these models represent information internally, or how that information is used when they encounter new situations. Because of these gaps in our knowledge, we are limited in our ability to enhance the performance of neural networks or prevent undesired outcomes. This reduces trust and can even create risk."

AI you can rely on

To address this problem, Dr. Rott Shaham and her MIT colleagues created an AI model capable of interrogating and de-mystifying neural network function. What's unique about their approach is that, rather than chronicling the chain of events that allows neural networks to make specific individual decisions, the model reveals the fundamental structures, logic, and syntax that allow such computational behaviors to emerge in the first place.

"Our model mimics investigations done by human scientists," Dr. Rott Shaham explains. "It generates hypotheses about how a neural network might be functioning, then tests the hypotheses by initiating experiments and tracking network internal operations and outputs in real time. Ultimately, this approach might contribute to technologies capable of diagnosing neural networks' potential failures, hidden biases, or unexpected behaviors, even before a model is deployed. This would represent a significant step forward in AI research by making AI systems more understandable and reliable."

“The goal isn’t to claim complete understanding,” she emphasizes. “It’s to make the process of studying these systems more systematic, rigorous, and scalable. That’s an important step toward building AI systems we can rely on.”

“By opening the black box of neural networks, it becomes possible for computer scientists to ‘borrow’ mechanisms that enable specific functions,” she says. “This expands the toolbox available to human designers.”

A question-driven kid

Dr. Rott Shaham was raised in a small town in northern Israel, where her family life gave her early exposure to both science and technology.

“My mother, a PhD, worked in biological research, and my dad was a mechanical engineer,” she says, adding that she was always encouraged to ask how things worked, how they might be taken apart, and how they could be put back together. “I was a question-driven kid. This is something that still accompanies me in my work as a research scientist.”

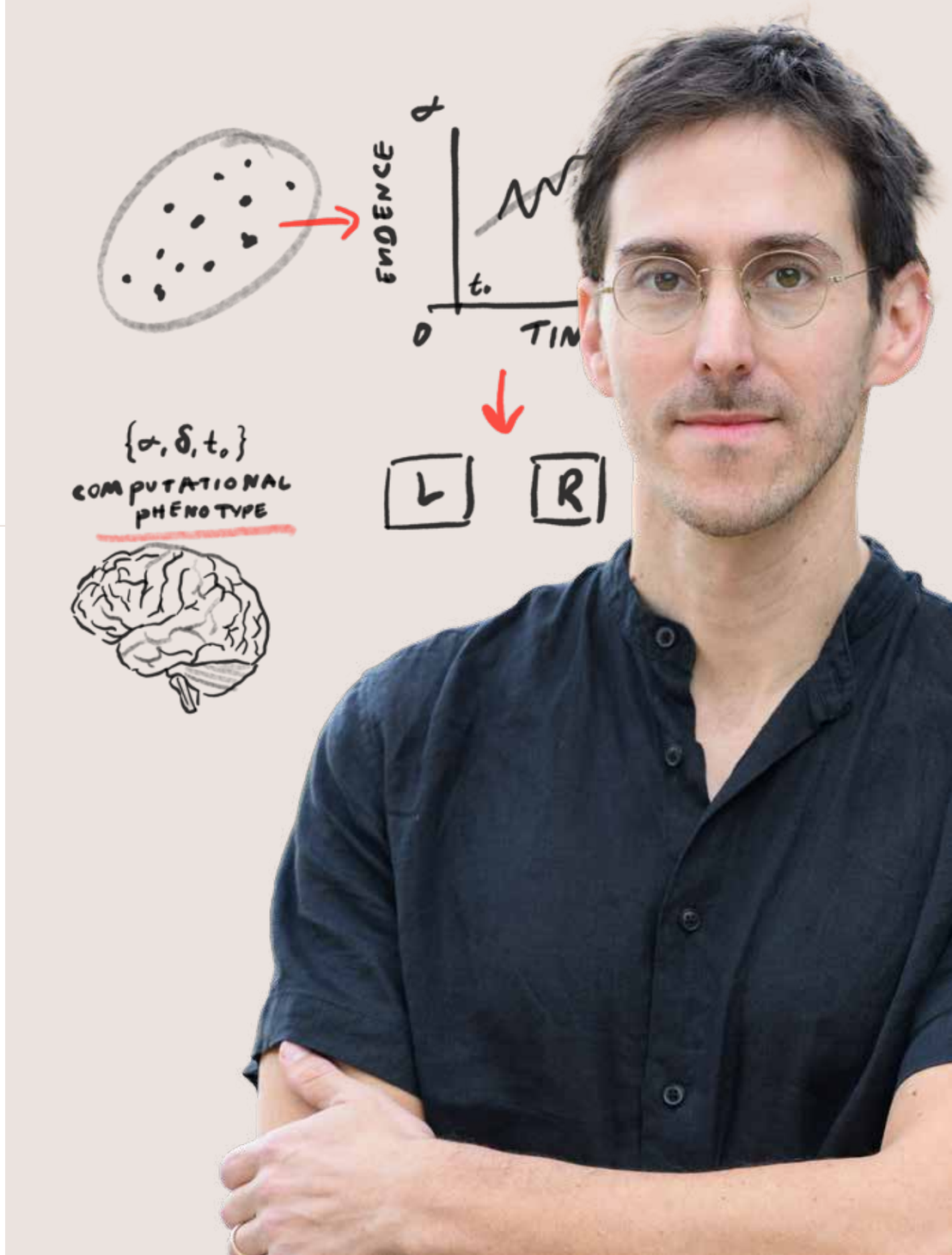
In recent years, the Weizmann Institute has launched several programs designed to promote the integration of AI into scientific research of all kinds, and Dr. Rott Shaham couldn’t be happier to be part of the process.

“Weizmann is a collaborative environment that actively encourages cross-disciplinary research,” she says. “I’m particularly interested in applying these tools beyond AI. For instance, researchers who study biological brains and those who study artificial neural networks often confront similar challenges: both seek to understand complex systems that learn from data. There is significant potential in bringing these perspectives together.”

> “WEIZMANN IS A COLLABORATIVE ENVIRONMENT THAT ENCOURAGES **CROSS-DISCIPLINARY RESEARCH**. I’M PARTICULARLY INTERESTED IN APPLYING THESE TOOLS BEYOND ARTIFICIAL INTELLIGENCE.”

EDUCATION AND SELECT AWARDS

- BSc (2015) and PhD (2022), Technion-Israel Institute of Technology
- Postdoctoral Fellow, Computer Science and Artificial Intelligence Laboratory (CSAIL) at the Massachusetts Institute of Technology (2022-2025)
- Women Techmakers Scholars Program by Google (2019), Eric and Wendy Schmidt Postdoctoral Award for Women in Mathematical and Computing Sciences (2022), Best Paper Award Marr Prize at the International Conference on Computer Vision (2020), Adobe Research Fellowship (2020), Rothschild Fellowship from Yad Hanadiv (2021), Zuckerman STEM Leadership Program (2022)



GOING CEREBRAL

DR. ROEY SCHURR CONSTRUCTS MODELS OF HUMAN COGNITION TO UNCOVER HOW THE BRAIN'S ARCHITECTURE SHAPES EACH PERSON'S UNIQUE COGNITIVE STYLE

Some scientists begin their careers with a single defining passion. For Dr. Roey Schurr, the path has always been shaped by a steady curiosity about how people differ, how they learn, and how their inner worlds take form. His journey through multiple disciplines, from physics to computational modeling, equipped him with the intellectual tools he now applies to a central question in neuroscience: what determines the differences between individual minds?

Born in Jerusalem in 1986, Dr. Schurr is the middle child in a family of five siblings, including an identical twin who is pursuing a PhD in linguistics. He grew up in an environment where learning felt expansive rather than prescribed, and attended Givat Gonen High School, which placed a strong emphasis on both the sciences and the humanities, where he gravitated toward mathematics. He imagined this would be his life's work and even enrolled in university-level mathematics courses while still in high school. But something was missing.

"Pure math felt too detached from the physical world," he recalls. "I wanted my work to stay connected to more tangible experiences."

After serving in a Military Intelligence linguistic unit, he enrolled at the Hebrew University of Jerusalem to study physics and cognitive sciences. It was there that he began to formulate the questions that had lingered since his youth: how the brain encodes experience, how cognition varies from one person to another, and how structure and function shape each other across time.

A bridge from physics to the mind

As part of the direct PhD program at Hebrew University's Edmond and Lily Safra Center for Brain Sciences, Dr. Schurr joined Prof. Aviv Mezer's group, drawn to his approach to studying the human brain at different scales and to the promise of a young, exploratory lab. He recalls the atmosphere as open and understanding, the kind of place where unexpected results were viewed as opportunities. That spirit shaped his PhD, which centered on method development in MRI, while also making room for a curiosity-led histology study that was published in *Science* in 2021.

During his PhD, Dr. Schurr also met Prof. Yuval Hart in the Department of Psychology, who introduced him to computational models of cognition—the bridge he had long been looking for between physics and the mind.

Seeking to delve deeper into this field, Dr. Schurr then joined Harvard University as a postdoctoral fellow, working in the group of Prof. Samuel Gershman in the Department of Psychology and Center for Brain Science—an environment he describes as "remarkably creative."

There, he encountered new ways of thinking about behavior, deepened his work in computational modeling, and immersed himself in a research culture that valued bold questions as much as technical rigor. The experience, he says, expanded both his toolkit and his sense of what cognitive science could be.

Coming home

Dr. Schurr returned to Israel in September of 2023, driven by the pull of family and a desire to return to the Israeli research ecosystem. Once back, he resumed his postdoctoral training with Prof. Hart at Hebrew University.

> "ALONGSIDE MY RESEARCH, I VIEW **TEACHING AND EDUCATION AS AN INTEGRAL PART** OF MY CONTRIBUTION TO THE WEIZMANN INSTITUTE AND ITS SCIENTIFIC COMMUNITY."

In addition to his own studies, teaching has been a constant draw for Dr. Schurr—one he sees as a calling rather than a duty. He has taught linear algebra to graduate students, volunteered in programs introducing young people to brain science, and spent two years teaching Hebrew to asylum seekers in south Tel Aviv.

"Teaching is a gratifying experience for me," he says, "I see it as an opportunity to learn, and I enjoy the immediate reward of helping others reach that 'Aha!' moment." Near the end of his PhD, he even considered a combined teacher–researcher track, a reflection of how central education and instruction are to him.

"Alongside my research, I view teaching and education as an integral part of my contribution to the Institute and its scientific community," he explains.

Dr. Schurr joined the Department of Brain Sciences at the Weizmann Institute in January 2026. His new lab will explore diversity in human cognition—how individuals differ, how cognitive strategies unfold across time, and how these differences are reflected in the brain's architecture. He hopes to build a group defined by openness, curiosity, and intellectual diversity.

"I want students who think differently from me in my group," he emphasizes. "People who will push us in new and exciting directions."

EDUCATION AND SELECT AWARDS

- BSc, *summa cum laude* (2013), MSc (2016), and PhD (2021), Hebrew University of Jerusalem (2010-2013)
- Postdoctoral Fellow, Harvard University (2021-2024) and Hebrew University (2023-2025)
- Human Frontier Science Program Postdoctoral Fellowship (2022), Zuckerman Israeli Postdoctoral Scholars Program (2021-2022), Jerusalem Brain Community (JBC) Gold PhD Fellowship (2020), JBC Student-Initiated Workshop Award (2019), *Summa Cum Laude* Merit Award from the International Society for Magnetic Resonance in Medicine (2017), Rector's Prize for MSc degree, Hebrew University (2014), Amirim Interdisciplinary Honors Program, Hebrew University (2010-2013)

A MIND FOR TEACHING MATH

DR. GIL SCHWARTS IS DEVELOPING DIGITAL TOOLS TO IMPROVE COMMUNICATION BETWEEN MATH TEACHERS AND STUDENTS

"Kids are brilliant—they know a lot! We want to understand their mathematical insights and shape instruction around them," says Dr. Gil Schwarts, the newest member of the mathematics group in the Department of Science Teaching.

Dr. Schwarts studies mathematically responsive teaching—how teachers can deepen communication with students by recognizing what they already understand and building on their own ways of thinking, rather than viewing them as "empty vessels to be filled."

To shift the paradigm of how instructors respond to students' ideas and needs, she is developing digital models based on avatars that allow teachers to simulate responsiveness.

Unlike actor-based simulations, a model that has been used for a few decades in fields such as education and medicine, Dr. Schwarts' digital environments are built to be scalable and flexible, allowing teachers to practice repeatedly without the cost or complexity of live role play. Using artificial intelligence and avatars, these simulations create accessible, customizable spaces for teacher learning and professional development.

She would like to work with the Weizmann Institute's new AI Hub for Scientific Discovery, part of the Knell Family Institute for Artificial Intelligence. The Hub pairs experts in AI development with scientists and students to apply the rapidly evolving field to their research.

"Teachers can practice giving a lesson to avatars and practice being mathematically responsive. While responsiveness is an interpersonal skill, my research shows that it can be practiced in a digital environment, and teachers take what they learn into real classrooms," she explains.

Combining passions

From a young age, Dr. Schwarts was enchanted by math. "I always loved math because of the logic, the deduction. I remember myself as a high school student, thinking, 'This is so beautiful.'"

But she was equally drawn to teaching. "At age six, I would teach my friends how to read," she recalls. She was a high school teacher and tutored students for university entrance exams for many years. Toward the end of her BSc in mathematics at Ben-Gurion University of the Negev, she found herself at a crossroads—liking the idea of teaching math but also wanting to conduct research. Then she discovered she could pursue a master's degree in mathematics education at the Weizmann Institute, combining her two passions, "math, with people."

She began her graduate studies at Weizmann in 2013, completing her MSc and PhD in math education under the supervision of Prof. Abraham Arcavi and Dr. Ronnie Karsenty in the Department of Science Teaching. Her dissertation focused on the work of facilitators who lead video-based professional development for mathematics teachers.

In 2022, she was awarded the Hebrew University of Jerusalem's prestigious Mordechai Nisan Prize for Early Career Researchers in Education.

Dr. Schwarts then spent two years as a postdoctoral fellow in Prof. Patricio Herbst's GRIP (Grasping the Rationality of Instructional Practice) lab at the University of Michigan. Working at Michigan's Marsal Family School of Education, her research pivoted to the development of digital simulations, with an emphasis on how teachers manage their students' contributions to classroom discussions of mathematical work.

'Weizmann is something special'

In 2024, she returned to the Weizmann Institute to complete her postdoctoral studies, supported by the Bridge Position Program, an initiative of the Office for the Advancement of Women in Science and Gender Equality which supports women who need to return to Israel before completing their postdoctoral training abroad. She accepted a position as a principal investigator in September 2025.

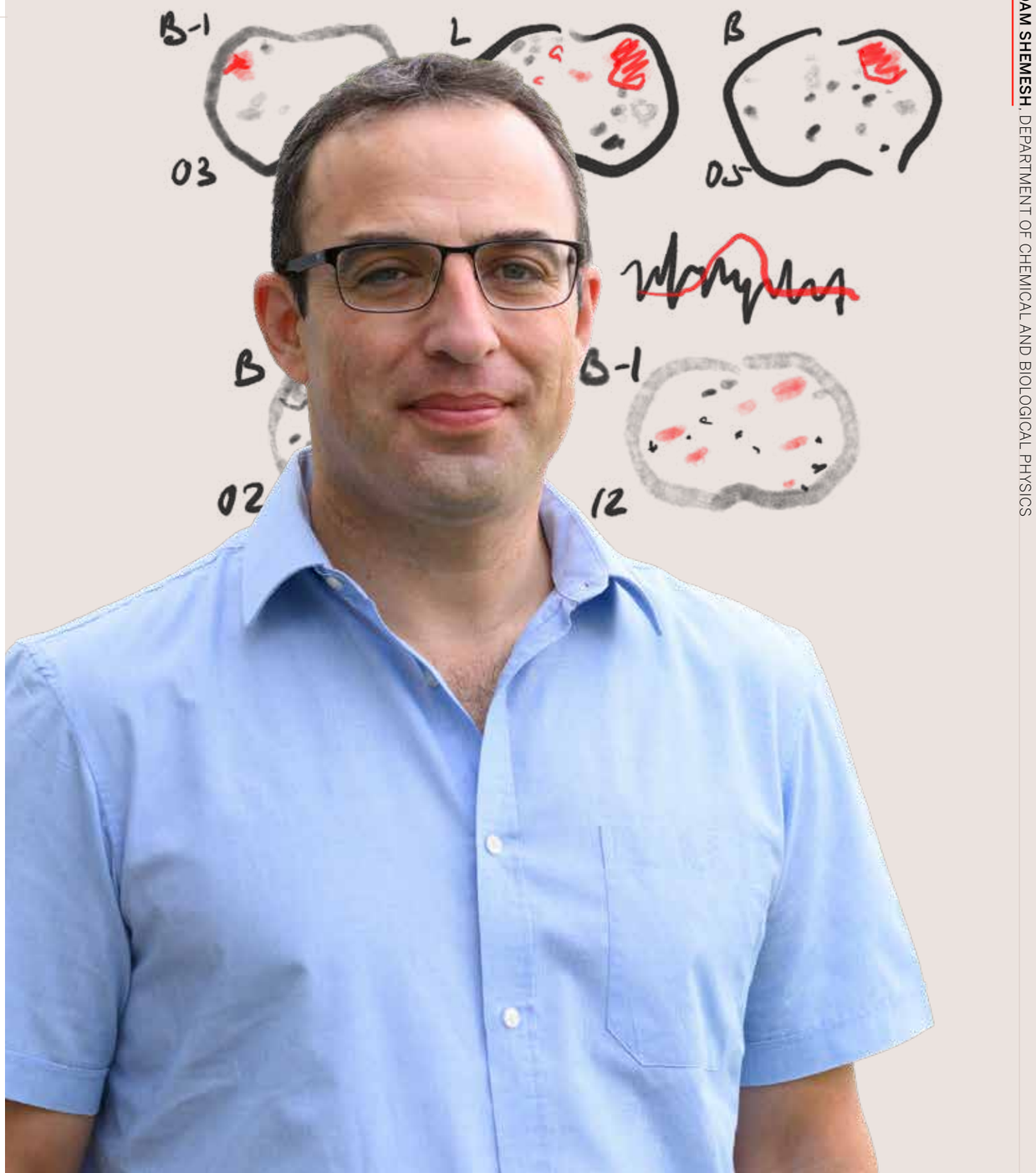
Dr. Schwarts lives in Haifa with her husband and two children, ages four and six. She commutes to campus three times a week.

"There's no place like the Institute. There's no other place that operates like this one. Even when I was at the University of Michigan, I understood that Weizmann is something special," she says.

EDUCATION AND SELECT AWARDS

- BSc, Ben-Gurion University of the Negev (2013)
- MSc (2016) and PhD (2022), Weizmann Institute of Science
- Postdoctoral Fellow, University of Michigan, Ann Arbor (2022-2023), and Weizmann Institute (2024-2025)
- Minerva Short-Term Research Grant, funded jointly by the German Federal Ministry for Education and Research and the Israeli Ministry of Science and Technology (2024), Hebrew University's Mordechai Nisan Prize for Early Career Researchers in Education (2022), Elchanan Ezra Bondi Memorial Prize for Outstanding PhD Graduates from the Weizmann Institute (2021), Ariane de Rothschild Women's Doctoral Program (2018-2021)

> "I ALWAYS LOVED MATH BECAUSE OF THE LOGIC, THE DEDUCTION. I REMEMBER MYSELF AS A HIGH SCHOOL STUDENT, THINKING, **'THIS IS SO BEAUTIFUL.'**"



RIDING THE BRAIN WAVE

THE ULTRA-FAST MRI OF **PROF. NOAM SHEMESH**

If you've ever had a medical MRI scan, you were inside a very strong magnet. But in the world of basic science, ultra-high field magnets—anywhere from two to seven times stronger than the magnets used to examine human patients—are unveiling previously invisible structures and dynamics that can be used to identify early signs of disease before symptoms appear. Ultra-high field MRI is at the heart of the work of Prof. Noam Shemesh, who is joining the Department of Chemical and Biological Physics.

Prof. Shemesh grew up in the rhythm of academic life. His earliest memories were formed on the campus of the Hebrew University of Jerusalem, where his father was completing his doctorate. He recalls being cared for by a series of overqualified babysitters, including future winners of the Israel Prize.

"I was always a curious kid," he says. "No one forced me to choose any particular path, but by the age of five or six I knew I wanted to be a scientist."

After completing his military service and a subsequent trip abroad, he enrolled at Tel Aviv University, where he earned a BSc in chemistry and went on to complete his PhD in micro-architectural MRI, an imaging approach that makes it possible to visualize structures in the brain far smaller than what standard MRI can resolve. He was then accepted as a postdoctoral fellow in the Weizmann lab of Prof. Lucio Frydman, one of the world's leading experts in using ultra-high field MR spectroscopy in animal models of disease.

"It was an amazing two-and-a-half years," he says, adding that work in the Frydman lab helped prepare him for an unexpected twist in his career path. "After giving a presentation at the Champalimaud Centre for the Unknown in Lisbon, I got an offer to establish my own lab there. Portugal was off the beaten track, but it was a great opportunity; mine was the first-ever ultra-high field MRI lab in the country, and during my time there, we were able to develop research methods that led to some amazing findings."

Optical approaches

Prof. Shemesh's investigative strategy combines functional MRI (fMRI), which tracks changes in blood volume and oxygenation to reveal neural activity in the working brain, and microstructural MRI, which models water diffusion in tissue. At Weizmann, he plans to expand this toolkit by incorporating optical approaches that can record signals directly from neural tissue within the MRI scanner.

The multi-modal methodology developed by Prof. Shemesh enables the measurement of neural activity at an unprecedented speed, allowing for the detection of phenomena in animal models of disease that had never been observed before.

"In my lab in Portugal, we developed new approaches for imaging tissues and dynamics associated with stroke, Parkinson's disease, and Alzheimer's, and have even shown that we can differentiate between tumors that, using typical MRI methods, would look exactly alike," Prof. Shemesh explains, adding that this ultra-fast image acquisition also helped his team identify how different areas of the brain communicate with each other.

"When neurons fire, it could be a local phenomenon, or it might result from oscillating waves of cross-brain activity. Our fast measurements allow us to directly catch that oscillating wave and its spatial patterns for the first time."

Seeing is believing

Prof. Shemesh is looking forward to returning to Weizmann thanks to its "unparalleled excellence and critical mass of outstanding researchers." He plans to collaborate with basic science investigators who, like him, are fascinated by the biophysics of the brain, and are doing research that could produce real-world impact.

"Work in my new lab at the Institute may lead to brain imaging methods that improve disease diagnosis and clarify how tiny changes in brain structure impact behavior," he says. "With MRI, seeing is believing, and I believe that, in my lab, we'll be seeing lots of things that will lead to very interesting discoveries."

On a personal level, Prof. Shemesh is pleased to return to Israel with his family, especially in these complex times.

"Just a few days after the war erupted on October 7, 2023, I was shocked to hear many colleagues and friends make very strong anti-Israel statements. I submitted my application to Weizmann on October 12," he recalls. "Once we're settled into our new home on campus, my wife and I will have the privilege of raising our two children in a peaceful academic atmosphere, like what I experienced as a child. I am sure that joining the Weizmann community will inspire them as they grow up and eventually choose their own paths forward."

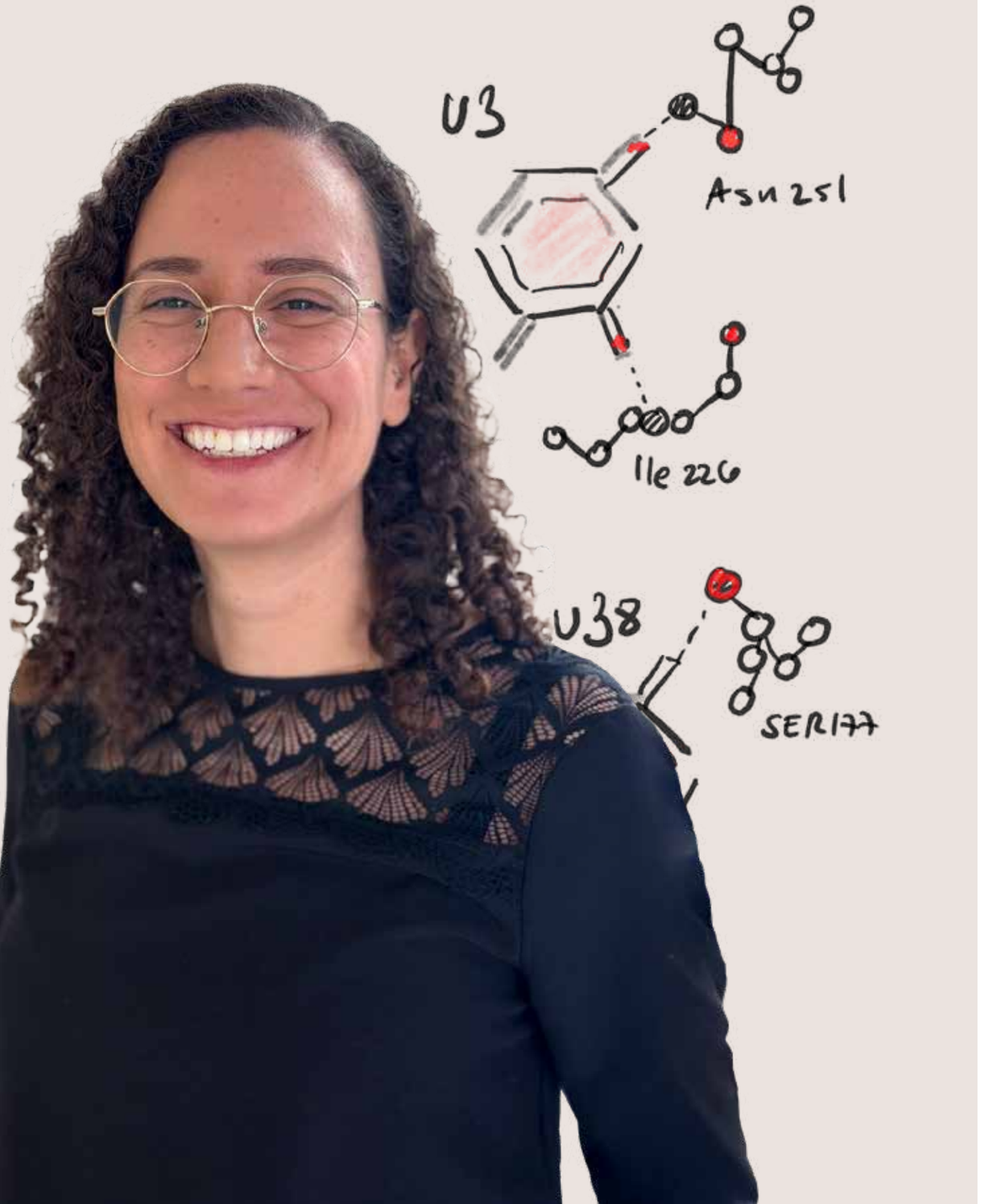
> "NO ONE FORCED ME TO CHOOSE ANY PARTICULAR PATH, BUT BY THE AGE OF FIVE OR SIX **I KNEW I WANTED TO BE A SCIENTIST**."

EDUCATION AND SELECT AWARDS

- BSc (2006), PhD (2011), Tel Aviv University
- Postdoctoral Fellow, Weizmann Institute of Science (2011-2013)
- Young Investigator Award from the International Society for Magnetic Resonance in Medicine (2011), European Research Council Starting Grant (2015), Marie Sklodowska Curie Individual Fellowship from the European Commission (2015), Portuguese Foundation for Science and Technology grant (2016), Mantero Belard Award from the Santa Casa da Misericórdia de Lisboa (2021), Israel Science Foundation's Or Fellowship for senior tenured scientists returning to Israel (2025)

APPOINTMENTS

- Principal Investigator (2014-2019), Associate Professor and Director of the Preclinical MRI Center (2019-2025), Champalimaud Centre for the Unknown in Lisbon, Portugal



DECODING The Secret Language of RNA

DR. SHAI ZILBERZWIGE-TAL EXPLORES HOW RNA AND PROTEINS COMMUNICATE TO ORCHESTRATE BACTERIAL DEFENSE SYSTEMS—FROM SINGLE CELLS TO COMMUNITIES

RNA molecules are the workhorses of biology. They act as essential messengers and regulators, guiding how cells interpret and execute life's fundamental processes. For Dr. Shai Zilberzwige-Tal, these molecules hold the key to understanding how life, particularly bacterial life, organizes, adapts, and defends itself.

As a postdoctoral researcher in Prof. Feng Zhang's lab at the Broad Institute of MIT and Harvard—one of several institutions driving progress in CRISPR genome-editing technologies—Dr. Zilberzwige-Tal sought to uncover how RNA shapes the logic and evolution of bacterial existence. Her work relies on an integrative, interdisciplinary approach to study the diverse and complex architectures of bacterial immunity—mechanisms that allow bacteria to sense threats, process information, and launch targeted defenses.

Curiosity with a cause

Dr. Zilberzwige-Tal's career has been fueled by a profound sense of purpose. Before beginning her scientific training, she served in the IDF's Medical Corps, gaining firsthand insight into the fragility and resilience of life, and developing "a deep respect for living systems in action."

She later volunteered as a paramedic with Magen David Adom, Israel's national emergency medical service, finding that fieldwork offered powerful lessons beyond medical knowledge itself.

She earned her BSc in Life Sciences at Tel Aviv University, graduating *summa cum laude*, and joined Prof. Ehud Gazit's lab as a fast-track PhD student. There she developed synthetic biology tools and engineered DNA- and RNA-based materials for medical and other technological applications.

Beyond her research, she remained an active presence on campus—serving on the TAU Student Union, mentoring high school students through the National Biology Olympiad, and teaching in youth science programs.

Science through turbulence

Joining the Massachusetts Institute of Technology in 2022 placed Dr. Zilberzwige-Tal at the center of global molecular biology. "It's inspiring to be surrounded by people who constantly find new ways to tackle deep biological questions," she says.

But the events of October 7, 2023, brought unexpected challenges. Like many Israelis abroad, she faced the strain of worrying for loved ones while maintaining family life and research in a tense academic climate. "It was a time when everything felt uncertain," she says. "Balancing research, motherhood, and concern for home was overwhelming."

> I'M FASCINATED BY HOW LIVING SYSTEMS ORGANIZE THEMSELVES. THE WEIZMANN INSTITUTE IS THE NATURAL HOME FOR THIS **DEEP, CURIOSITY-DRIVEN RESEARCH.**"

During that period, Israeli scholars across Boston formed a grassroots support network. "The sense of community we built, among Israelis and with many allies, was deeply meaningful," she says.

Even amid the turbulence, she stayed focused on science and on helping others navigate this difficult moment.

That same sense of community also led her to the Kalaniyot Fellows Program, which supports Israeli scholars at leading global institutions. She was selected as an Honorary Kalaniyot Postdoctoral Fellow for 2023-2024 and remains engaged in the organization's work.

Amid all of this, a clearer sense of direction began to emerge. "It clarified our priorities," she says. "We knew we wanted to return to Israel—to raise our children here and contribute to building the society we believe in."

Found in translation

Dr. Zilberzwige-Tal has now returned to Israel to launch her own lab in the Weizmann Institute's Department of Biomolecular Sciences. Her research will focus on the fundamental interplay between RNA and proteins as they choreograph bacterial defense, moving from the internal logic of single cells to the coordinated responses of microbial communities.

Her team will combine cutting-edge molecular biology and computational tools to map the evolution of these complex communication systems. By studying mechanisms such as toxin–antitoxin networks, they hope to decipher the molecular "language" that shapes how cells cooperate and protect themselves.

In parallel, the lab will design synthetic RNA circuits and virus-like particles engineered to sense and respond to specific signals—tools that will help them decode RNA and protein "communication" and open the door to new applications.

"I'm fascinated by how living systems organize themselves," she concludes. "Weizmann is the natural home for this deep, curiosity-driven research. I want my lab to focus on rigorous, exploratory science—digging into RNA biology and microbial behavior to build a blueprint for understanding and manipulating immunity schemes."

EDUCATION AND SELECT AWARDS

- BSc, *summa cum laude*, Tel Aviv University (2013)
- PhD, Fast-Track Program for Excellent Students, Tel Aviv University (2016–2023)
- Postdoctoral Fellow, Broad Institute of MIT and Harvard (2022–2025)
- Tel Aviv University Scholarship for Excellent Students (2018), Marian Gertner Institute for Medical Nanosystems Excellence Award (2021), Miriam Smolarz Research Excellence Award (2022), NanoSeries Early Career Research Award from the Royal Society of Chemistry (2022), Gruss Lipper Postdoctoral Research Fellowship from the EGL Charitable Foundation (2023), Women's Postdoctoral Career Development Award in Science, administered by the Weizmann Institute (2024)

NEW SCIENTISTS FUNDS AND GIFTS

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