

IMPACT



FALL 2015



AMERICAN ASSOCIATES
Ben-Gurion University
of the Negev

SOLUTIONS TO THE GLOBAL WATER CRISIS

TELLING THE STORY OF
HOMO SAPIENS

REGENERATING BONE

AUTOMATING MEDICAL CARE

TRAINING SOCIAL
ENTREPRENEURS

PUTTING RESEARCH TO WORK

BY LLOYD GOLDMAN AABGU PRESIDENT



David Ben-Gurion envisioned a university that would serve as an engine for the development of the Negev. He believed that the Negev would be a laboratory for finding solutions to the challenges confronting Israel’s drylands. And so, quite naturally, the university that bears his name has emphasized the application of basic research from the very beginning.

Water research has become a core focus in an increasingly dry world. As recounted in this issue’s lead feature, the worldwide quest for adequate sources of clean water and Israel’s remarkable achievements in this arena, many unfolding at our Zuckerberg Institute for Water Research, have resulted in our technology attracting global interest. BGU’s water experts are advising researchers and policy makers from France to Zambia, China to California.

Biomedical research provides another great example of BGU’s success. Breakthrough treatments for bone injury and disease, which affect increasing millions of people each year as our population ages, are emerging at the Avram and Stella Goldstein-Goren Department of Biotechnology Engineering. Read about two scientists engaged in this work on page 15.

Find out, too, about the world of medical informatics. Here, cutting-edge technology is deployed to create automated care-systems that promise better and more affordable healthcare for the chronically ill and many others in need (page 22).

And, since “Israel has one of the biggest collections of archaeological sites in the world,” BGU researchers are filling in major gaps in the biggest story of all: the history of humankind (page 11).

You’ll also read about the Rothschild Cube, a brand new BGU resource, which will enable social entrepreneurs to explore strategies and methodologies to “do more good, more professionally” (page 24). Enjoy!

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ON THE COVER: A student (right) participating in BGU’s Rural Water Development field course this past summer helps a local team dig a well in Masindi district, Uganda. See story on page 17.

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2015 OASIS OF INNOVATION AT BGU

THE AMERICAN DELEGATION to the Oasis of Innovation at the 45th Board of Governors was welcomed to BGU's Marcus Family Campus this past May at a reception in the Living Legacy Garden.

Following the reception, BGU President Prof. Rivka Carmi hosted a welcome dinner for the University's guests from around the world in

the entryway of the new, modern building of the National Institute for Biotechnology in the Negev (NIBN).

The NIBN is an independent research entity on the BGU campus that functions as a unique partnership between academia, industry, government, and private donors. Its researchers are working on treatments and potential cures for various forms of cancer, genetic diseases, autoimmune diseases, infectious diseases, and more.

The NIBN is just one example of the innovation and collaboration that is simply part of BGU's DNA. Another

is the close relationship between BGU and the city of Beer-Sheva.

"We coordinate on a day to day basis with the University," said Beer-Sheva Mayor Ruvik Danilovich, speaking enthusiastically in Hebrew (with simultaneous English translation) at the opening plenary.

The city of Beer-Sheva is working with BGU on the planning and development of the North Campus, which will double the University's total landmass. Among the first North Campus buildings to be built is a student housing complex. "With the building of new housing for research students, post docs and young faculty, BGU will soon be well placed to successfully compete for the world's most talented and committed young

Continued on next page

Artists painting "Mapping the Future" mural at the Student Evening. BGU's guests were invited to take home a tile, each inscribed on the back with a student's dream.





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scholars,” said Prof. Rivka Carmi.

The opening plenary also included the election of new governors, including AABGU community members David Breslauer, Joanne Harrington, Lorry I. Lokey, and Ernie Simon.

LISTEN AND LEARN

The Board of Governors is a chance to attend lectures by world-class professors and guest speakers.

- Zvi Yehezkeili, Arab affairs reporter for Israel’s Channel 10 news, shared an insider’s perspective on how young Muslims are being drawn into ISIS through the Internet, how Israel is the address for Arab inner conflict, and his view that ISIS is not an existential threat to Israel.
- Prof. Adele Diamond, a neuroscience researcher from the University of British Columbia and one of the honorary doctorate recipients, spoke about how play is critical to a child’s development of core executive functions including inhibitory control, working memory and creativity.

AMERICAN IMPACT

Inaugurating of the Amos Oz Initiative for Literature and Culture
 Named in honor of BGU Professor Emeritus Amos Oz, renowned author and longtime Arad resident, this multi-year initiative will enhance the city of Arad’s engagement with Hebrew literature and culture. Members of the Arad community will also come to BGU for workshops at *Heksherim*: The Research Institute for Jewish and Israeli Literature and Culture.

This initiative was funded by Toni Young, AABGU’s first vice president, and her late husband, Stuart B. Young. “The arts have the power to change people and transform societies,” said Toni at the dedication, which was attended by her daughter, Ann, and son-in-law, Hanoach, who live in Israel.

The dedication featured lectures, in memory of Stuart, by members of BGU’s Department of Hebrew Literature moderated by Department

1. Alex Goren, chairman of the BGU Board of Governors, receives his honorary doctorate from BGU President Prof. Rivka Carmi and Rector Prof. Zvi HaCohen.
2. Jim and Liz Breslauer, accompanied by Prof. Rivka Carmi, walk across the new bridge they sponsored that connects the Marcus Family Campus to the health sciences campus.
3. Harry and Carol D. Saal in the courtyard they donated at the American Associates Village at Sede Boqer
4. Toni Young (right) and daughter, Ann Young Saban, with renowned Israeli writer and BGU creative writing instructor, Etgar Keret, at the inauguration of the Amos Oz Initiative for Literature and Culture
5. AABGU National Board Member Marjorie Kaiz Offer chats with BGU students at the Student Evening.
6. Zvi Yehezkeili, Arab affairs reporter for Israel’s Channel 10 news, lectured on “Israel in the Age of ISIS: Somewhere Between Gaza and London,” under the auspices of the Robert St. John Chair in Objective Middle East Reporting.
7. An evening view of the National Institute for Biotechnology in the Negev building

Chair Dr. Haviva Ishay. The speakers included Prof. Nissim Calderon, Etgar Keret and Prof. Yigal Schwartz. Amos Oz spoke about his passion for the Hebrew language, and his gratitude to Toni Young for creating this program.

Dedicating the Jim and Liz Breslauer Bridge

This new pedestrian bridge spans a high-traffic street that bisects BGU’s main campus and the health sciences facilities. Before the bridge was built, students, faculty and members of BGU’s administration had to cross the busy Ben-Gurion Boulevard on foot.

After the ribbon cutting the group walked across the bridge. Students in the Faculty of Health Sciences could be seen looking out the window and cheering from the other side.

Students like these inspired Jim and Liz to build this bridge. “I love the students—talking with them and hearing from them and understanding what makes them tick,” said Jim.

MEET THE STUDENTS

The Student Evening, sponsored this year by Alex Goren and Brooke Kroeger; Maribeth and Steven Lerner; and Aileen Whitman, is a chance to connect with BGU students. The evening featured Negev Brewery beer,



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mural painting and an auction to secure funds for student programs. Another highlight was an interactive BGU trivia game played by teams of students and BGU supporters.

WHERE THE DESERT BLOOMS

Attendees chose their own “Negev adventure tours” with researchers from the Jacob Blaustein Institutes for Desert Research and the Ben-Gurion Research Institute for the Study of Israel and Zionism.

Participants had the opportunity to learn about the Negev ibex; desert insects; water technologies; making wine in the desert; desert architecture; the challenges faced by the Negev’s Bedouin community; and why students from around the world choose the field of Israel studies.

On a stop at BGU’s Sede Boqer Campus, the American delegation



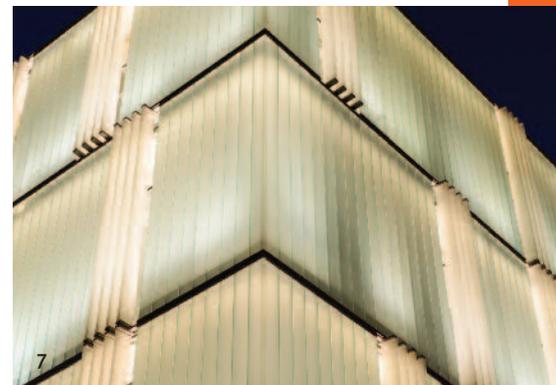
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celebrated the dedication of phase III of the American Associates Village, where graduate students and their young families are happily living.

HONORARY DOCTORATES

Two of this year’s recipients are members of the AABGU community.

- Alex Goren was recognized as a passionate Zionist and for upholding his family’s tradition of contributing to BGU’s growth and achievement. “Ben-Gurion University has totally changed Beer-Sheva and the south, and the perception that people have of the south,” said Goren, who is currently serving as chair of BGU’s Board of Governors.
- Lorry I. Lokey was recognized as a philanthropist and businessman (see page 32) who gives to important



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causes worldwide, with higher education being a priority. “Ben-Gurion University of the Negev is a thriving institution. And when I see that, I say to myself: ‘What do they need?’” said Lokey.

CONNECTING WITH COMMUNITY

The final night’s gala was held on the plaza outside the new Carasso Science Park, where cutting-edge science meets the traditional Turkish architecture of Beer-Sheva’s Old City.

A band played American and Israeli songs as the worldwide BGU family danced and sang into the night. ■

Prof. Isaac (Sakis) Meir (front left), of BGU’s Bona Terra Department of Man in the Desert, leads a tour on desert architecture.



BOOK REVIEW

LET THERE BE WATER

BY LLOYD GOLDMAN AABGU PRESIDENT

DESPITE ITS UNFORGIVING terrain, rapid population growth and low annual rainfall, Israel is not only fending off a water crisis; it boasts a water surplus. It is also the only country in the world in which the desert is receding. Want to know how and why? Then you must read Seth M. Siegel's *Let There Be Water: Israel's Solution for a Water-Starved World*, surely one of the most interesting books available on the story of Israel.

Seth M. Siegel is a writer, entrepreneur and activist. He has written for *The New York Times*, *The Wall Street Journal* and the *Los Angeles Times*, and has appeared on NBC's Today Show, CNN, MSNBC, Fox News, and CNBC. He is a member of the Council on Foreign Relations.

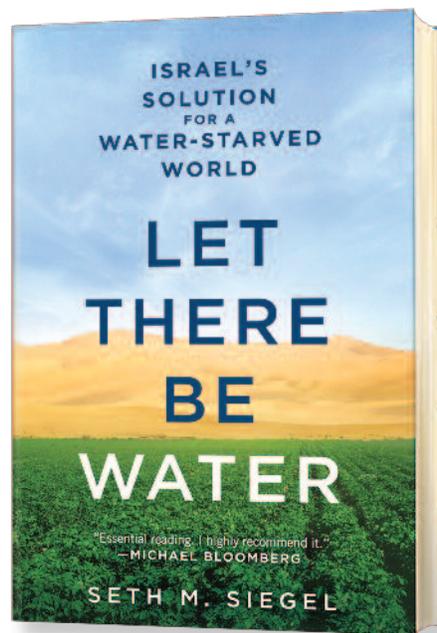
His new book tells the story of Israel in a way that it has never been told before. We all know Israel through its wars, political struggles and international isolation. What we don't know is the way in which Israel was shaped by its quest for water independence and the effect that had on Israel's role in the world.

In *Let There Be Water*, Siegel reveals the secret to Israel's bold approach to water security, and how the rest of the world can adopt these measures to get ahead of the looming global water crisis. His book examines in well-written prose how Israel, a tiny nation with almost no natural resources, has turned human ingenuity and creativity into an abundant natural resource.

Knowing Ben-Gurion University's Zuckerberg Institute for Water Research, this book is a testament to the good work of several of BGU's past, present and no doubt future scientists, who have created solutions to problems previously thought to have been unsolvable (see page 17).

Built on hundreds of interviews and rigorous research, *Let There Be Water* is an inspiring, novel-like read that tells the story of how Israel's water mastery came to be.

"As a young nation, we had to create new industries, and as an isolated nation, we had no choice but to think creatively or we would not have survived," explains Ilan Cohen, a government official who was instrumental in Israel's water efforts and is one of those interviewed.



The book describes this creativity and innovation in riveting detail that begins with the socialist foundation on which Israel was created. This came as a surprise: Israel, a modern Western-style society that has embraced capitalism, regards water as a state-owned resource, removed from the world of political manipulation by lobbies and private interests. But the smart and innovative leaders of what

became the Israel Water Authority also embraced Israeli entrepreneurship and ingenuity to build a water industry and foster relevant privatization.

Siegel tells the story of how, from the beginning, water was a national—not private—resource. Understanding the necessity to de-politicize water and water policy, an autonomous Water Authority was established that would be beholden to no politician or political office. A national water policy and education campaign was created, and each citizen was charged the actual cost of water production and management. Every drop of water, from what falls from the sky to what is found underground, is owned by no one and managed for everyone.

Yet, Israel incentivized inventors, scientists and scholars with grants to develop technologies and with assurances that the technology would be theirs to own and market. Today, Israel has had a part in nearly every important technology touching the world of water, including drip irrigation, desalination, dual flush toilets (invented by a professor from Ben-Gurion University), and more.

And, while I knew that Israel was extremely efficient with water resource management, some of the statistics woven into *Let There Be Water* left me agape: The dual flush toilet alone saves about 13.5 billion gallons of water per year. Monitoring for and immediately fixing water-pipe leaks saves 40 to 70 percent of water; 500 million gallons of water are desalinated every day; and more than 85 percent of Israel's wastewater is recycled and reused for agriculture.

But don't think that *Let There Be Water* is an almanac of statistics or an engineering guidebook. All of these facts are embedded in a fascinating story that helps to move the fast-paced narrative.

No one worries about the level of water in the Kinneret (Sea of Galilee) anymore. Drip irrigation; pumping the brackish water from the aquifers that lie beneath the desert sands that can be desalinated for drinking and

TRANSITIONS

BY DORON KRAKOW
EXECUTIVE VICE PRESIDENT

THE JEWISH NEW YEAR is a time of transition. We take stock of the year gone by, reminded of both our achievements and the losses we have endured. We look forward to the year ahead, understanding implicitly that this is a time of change—of transitions. We are filled with a sense of wonder and the limitless possibilities that lie before us.

As 5776 gets under way, a new academic year beckons: an academic year that finds BGU with its highest ranking yet according to the annual QS World University Rankings, having moved up 33 places since last year to 259. Notwithstanding our relatively short history (BGU was founded in 1969), we are increasingly acknowledged to be among the finest universities in the world, and while 259 is our best ranking yet, our sights are set far higher.

Stories about cyber security can be found in the headlines almost every day. The latest cyber attacks on major corporations and national institutions and their aftermath are but harbingers of what is yet to come. While most of us are left wondering how we can respond to these assaults, the scientists at the National Center for Cyber Security Research at BGU are hard at work finding solutions that will inhibit or prevent attacks we haven't even imagined.

September saw the announcement of the acquisition of Israeli startup Valtech Cardio (a replacement heart valve-maker) by HeartWare International for an estimated \$929 million. This most recent example of the continuing prowess of the “start-up nation” in the field of medical technology comes close on the heels of BGU's launch of the Center for Digital Innovation (CDI).

This nonprofit research center will promote and develop digital medical technologies in Israel in partnership with a group of Israeli entrepreneurs. It is headed by Ziv Ofek, founder of dbMotion (recently sold to U.S.-based Allscripts Healthcare Solutions), and its board is chaired by our own Rivka Carmi, BGU's president and both a physician and renowned geneticist in her own right. The CDI will bring the talents and research of BGU together with the most promising rising stars in the field of eHealth to create an engine of innovation, enhancing Israel's success at bringing new companies into the international marketplace.

The New Year finds our experts at the Zuckerberg Institute for Water Research continuing their engagement with leading officials in California as the state seeks to address its historic drought and find answers for an increasingly thirsty population. Our



brain research team is breaking new ground in the diagnosis of post-traumatic brain injuries, working in close collaboration with scientists at Boston University on what could be a breakthrough in treatment to forestall long-term

damage. The new Amos Oz Initiative for Literature and Culture is bringing international attention to the Negev city of Arad, Oz's desert home throughout his tenure as a member of the BGU faculty. And I could go on and on.

The New Year is a time for optimism and hope. It is a time to renew our commitment to the vision of David Ben-Gurion through the continued growth and development of the University that bears his name. May it be a year of great achievements, a year of breakthroughs, a year of unprecedented progress in the Negev, and may the wind be at our backs.

Finally, and on behalf of the entire AABGU family, I extend my deep appreciation to Harry Greenwald, AABGU's long-time chief financial and administrative officer, as he begins his most well-deserved retirement. Harry has been the backbone of this organization during a period in which we have reached new heights in our support for BGU. He has been more than an outstanding CFO; he has been a great partner, a valued colleague and is a genuine *mensch*. Thank you, Harry. ■

agriculture, or used as is to raise fish and certain crops in the desert; and developing seeds that are water-efficient and/or thrive on salty water have resulted in desert agricultural techniques and water technologies that transformed a nation.

Israel has found the answers to help

the rest of the planet with its growing water crises. This tiny country is working with China, India and across Africa, fixing and developing water systems. Israel exports water to the West Bank and Gaza, and to Jordan. Our very own experts from the Zuckerberg Institute are working with

officials in drought-stricken California. The global water challenges may pave the way to bringing Israel the respect it has long deserved among its neighbors and around the world.

Let There Be Water will change the way you think about Israel. Don't miss it. ■

ROCHELLE ETINGIN is a fifth generation *sabra* (native Israeli)—a title none too many in her generation can claim. She was recruited into the Israeli army for the War of Independence.

“I was about to graduate from high school in June 1948,” she recounts. “David Ben-Gurion moved graduation up that year so we took finals and graduated April 1st. And I was immediately taken into the army.”

After the war Rochelle studied fashion design in Jerusalem, then decided to continue at New York’s Parsons School of Design. She soon met Maks, who had a very different war experience.

Maks Etingin was incarcerated in the Vilna Ghetto in Lithuania from its creation in 1941 until its liquidation. His family—father, mother and younger brother—managed to survive through what he calls “thousands of miracles.” When the ghetto was about to be liquidated in 1943, the family was determined to escape.

“My father had helped a man financially in the past, who sent him a message: ‘If you need help, you can count on me.’ So at 4 a.m. we managed to escape. We walked to his house and showed up at his door the next day, unexpected,” Maks recalls.

“This Christian man—an uneducated taxi driver—knew his family could be killed. But they hid us for 10 ½ months and gave us food every day.”

The four Etingins spent each and every day in a hole their benefactor dug in his backyard. “When we were liberated we couldn’t walk. We were crawling. But that’s how I survived the war and we were lucky that our whole nuclear family survived.”

Many members of his extended family perished, however, and it is believed that out of 40,000 Jews crammed into the Vilna ghetto, only 250 survived.

After liberation the family immigrated to Sweden, where Maks’ father, Albert, had contacts. Maks left to study engineering at Virginia Tech. His father came to the United States later and started a real estate business in New York. Maks decided to join him.

Rochelle was then renting a room from a family in Queens, and one of the family members gave Maks her number. “We met by telephone; we went on a date—that was it,” she says. They married and had two daughters: Orli and Doreen.



ROCHELLE AND MAKES ETINGIN
NEW YORK, NEW YORK

HONORING HISTORY TO BUILD A FUTURE

Always interested in Israeli causes, the Etingins discovered AABGU through an acquaintance almost 25 years ago. “We slowly became involved,” Rochelle says. “We attended a few meetings and heard people talk about the University; we met Avishay Braverman, BGU’s former president.”

The Etingins became longtime University benefactors. They initially funded scholarships in memory of Rochelle’s brother, Shlomo Goldzweig, who was killed serving in the Israeli army in 1950.

“He had a pioneering spirit and would have really connected with BGU,” Rochelle believes. “And we’re interested in developing the desert—Ben-Gurion’s dream.”

In 2004, they endowed the Maks and Rochelle Etingin Chair in Desert Research at the Jacob Blaustein Institutes for Desert Research. Their most recent gift is a building, in their name, in the new American Associates Village at Sede Boqer. The Etingins have also supported emergency needs

during recent wars that affected Beer-Sheva and the University, as well as brain research.

“We see that every dollar we give is put to productive use,” Rochelle says. “Every time we go to BGU we’re impressed with how it’s growing in huge steps. The people are so vibrant. It always feels like something is being built. In such a short amount of time BGU competes with the best universities, and we’re proud.”

Rochelle currently serves on both AABGU’s national board and Greater New York regional board. This commitment is now a family tradition. Son-in-law Neil Davidowitz, who heads Orsid—the family real estate business—has just been elected to the national board.

For many years, Maks and Rochelle visited Israel regularly. A highlight was their trip in 2007 with their extended family—now numbering 17, including great-grandchildren.

Another important occasion for Maks and Rochelle was unveiling a memorial at Yad Vashem, the World Center for Holocaust Research in Jerusalem, in memory of the Righteous Among the Nations. This honors Boleslaw and Jozefa Boratynski, who saved Maks’ family during the war. “He didn’t want recognition when he was alive,” Maks says.

These days, Maks is Orsid’s chairman emeritus and goes to the office a few times a week. He and Rochelle live in New York and weekend in Connecticut. ■

ELIZABETH GRZEBINSKI was drawn into the AABGU world by the Kosher Extravaganza, the Greater Texas Region's legendary fundraising event. Each year, renowned chefs, many of whom own their own restaurants, are invited to participate in preparing a memorable kosher dinner.

"That led to my learning more about the University, and I agreed to help out on the regional level." This evolved into a position on the region's board, and then her nomination and acceptance into AABGU's leadership program.

Elizabeth has hosted speakers and events and became part of the Extravaganza planning committee. She assumed the mantle of chair of the region this past year and is co-chairing the 2016 Extravaganza. In October, she was elected to the national board.

Elizabeth feels a strong commitment to Jewish causes. "As a Jew living in the Diaspora, and as a wife and mother, I'm concerned about our future as Jews and our connection to the land of Israel. We must do what we can to make Israel a strong and vibrant country."

A graduate of the Wexner Foundation Fellowship Program to develop Jewish leaders in the United States and in Israel, Elizabeth also participated in AABGU's Zin Fellows Leadership Program. Its goal is to create a community of leaders under age 50 to carry on Ben-Gurion's dream for the Negev. This experience, extended over two years, brought Elizabeth to BGU and southern Israel for the first time.

"I was blown away," she says, "by the commitment I saw in the professors and staff at BGU and what they're doing to ensure the success of their students—it's an inspiring level of care and devotion, the sign of a true world-class university.

"And the Negev is wild and beautiful, its potential untapped. BGU is in the unique position to both benefit from and contribute to its success. It's easy to see a strong devotion in both the students and faculty. They seemed to reflect a bit of the ideals of Israel's original founders. The pioneering spirit you feel at BGU is captivating!"

Elizabeth's husband, David, is chief executive officer of Kirby Corporation, a marine transportation provider that operates fleets of inland and offshore tank barges.



ELIZABETH GRZEBINSKI
BELLAIRE, TEXAS

PASSIONATE ABOUT CONNECTING TO ISRAEL

The couple is raising three teenagers; the eldest has just begun college.

Elizabeth enjoyed a 10-year career in finance before her children arrived, and has since been able to volunteer for causes in which she strongly believes. Among them is Medical Bridges, a charity that ships surplus medical supplies to needy people around the world. She also serves on the board of the Forever After Project, a nonprofit whose mission is to eliminate prejudice and discrimination by keeping the memory of the Holocaust alive. Additionally, she has been a board member of the Jewish Federation of Greater Houston, which honored her in 2008 with its Young Leadership Award.

"I'm fortunate to be in a position to give," Elizabeth says. She and

David are also giving their children a strong Jewish identity through Jewish summer camp, day school and regular visits to Israel.

They hope to take a family trip to BGU next year so their teenagers can see firsthand the University they hear so much about.

"We spend a lot of time role-modeling to show our kids, through the organizations we support, how important it is to give back to the community as much as you can."

As a new member of the national board, Elizabeth looks forward to spreading the word about BGU among her peers. "I hope to see more bridges between BGU and local communities in the U.S. Israel needs supportive American Jews. The more bonds we can create between American Jews and the BGU staff and faculty, the more opportunity we will have to learn from each other."

Elizabeth observes that as American Jews become more assimilated the risk grows that they will feel less committed to Jewish causes. "People tend to give to local hospitals or symphonies, and that's wonderful—but we also need to care for our brothers and sisters in Israel.

"Education benefits a community on both macro and micro levels. BGU's expertise in desert research and many other areas attracts talented students from all over the world. It's a little like watching the desert bloom, and I want to be part of that!" ■

RONI ITZHAKI

A BORN LEADER

AT 27, BGU biotechnology engineering student Roni Itzhaki has already led a challenging life that fuels her motivation.

In 1991, when she was three, a rocket fell near her home in Tel Aviv during the Gulf War. Frightened literally to death, her mother suffered a fatal heart attack at 36. Her father, a former army intelligence specialist and later a deli owner, raised Roni and her three older siblings basically on his own.

“I learned to be independent—went to school, made my own lunch, was responsible for myself,” Roni recalls. “At the time I liked the freedom, but sometimes felt no one was giving me full attention or checking on me when I stayed out late. But now I’m thankful. I know how to handle things.”

Interested in biology and chemistry from her early schooldays, Roni studied the subjects in high school. For 10 years she also participated in a program sponsored by *Kav Hazinuk*, an organization that fosters young people’s leadership and social entrepreneurship skills.

Now she volunteers for the *Kav Hazinuk* program in Sede Boqer and has coached teenagers in leadership skills. “I know what the program has meant to me,” she says, “and I want them to share the same feeling.” She meets regularly with the group to review their work on social projects. “I teach them to build and manage their projects, organize their tasks and how to write letters to important people.”

When it was time for military service, Roni committed to training as an officer, which requires a three-year commitment. Women in the Israel Defense Forces normally serve for



A BGU family: Roni Itzhaki, new husband Edan Elovic, and Guinness

two years. “That was the best decision ever,” she says.

In 2009, she participated in Operation Cast Lead in the Gaza Strip. “I took an active part in protecting the border. It was meaningful for me to be in a position where I could actually help defend my country.” Roni’s role was to use computer systems to solve problems with mortars. “It was a big responsibility. It was nice to know they trusted me.”

Her service earned Roni a citation of excellence from the chief of paratroopers, presented in a formal ceremony.

Post-army, Roni knew she wanted to continue with biology and chemistry. “I wanted to combine them—and I also wanted to have the choice of working in industry. That brings in engineering. So I decided to combine all three.”

She looked at various universities, but chose to study at BGU’s Avram and Stella Goldstein-Goren department of Biotechnology Engineering. “BGU has definitely been a good experi-

ence,” she says. “I love Beer-Sheva.”

However, “It’s a hard program. Really intense—a lot of material to remember, a lot of pressure. But I want to do research and I’m definitely motivated.” This past year, she appreciated support from the dean of students when times were rough for her, as well as a scholarship, made possible by a generous AABGU donor.

“I hope to develop new medications one day. If it wasn’t for my scholarship, I’d be struggling to achieve that dream.”

Roni also reaps the advantage of a good study-mate. She met her boyfriend, Edan, in the army and married him on October 8th. “The first day I met him he told me what he wanted to study, and I said ‘so do I!’”

Edan is currently working on his Ph.D. in biotechnology in a special BGU five-year program. Roni is in her fourth year of study for her bachelor’s, and plans to continue on for a master’s degree.

Roni also has three years teaching experience to her credit. After her first year at BGU, she received an award from the Weizmann Institute of Science to teach chemistry to Beer-Sheva 9th graders. She also taught fourth graders in a school for gifted children.

“I found out I love teaching! I was an instructor in the military, too. Israel needs teachers and I know that it’s in my future. I want to give the experience I had to other young people, and I’m sure I will teach as part of my life. But there’ll be time later.”

What does she do in her free time? Does she have free time? “No...only late at night. Then I have time for myself.” ■

TELLING THE STORY OF *HOMO SAPIENS*

IN ISRAEL, a rich variety of archaeological opportunities beckon. And BGU's faculty and students have been unearthing quite a lot.

There's the 55,000 year-old skull discovered in a Galilee cave, recently dated to connect modern man and Neanderthal.

Then there's the excavation at Tel Erani, a 5,500-year-old brick-walled town that illuminates the urban revolution and life under Egyptian overlords.

And certainly worth mention: new scientific evidence that suggests the Masada legend needs reconsideration.

In addition to working with such discoveries, the Department of Bible, Archaeology and Ancient Near East is opening a set of labs this year—thanks to the generosity of the Soref-Breslauer Texas Foundation—where modern technology offers new ways to examine the distant past more closely.

"Israel has one of the biggest collections of archaeological sites in the world," notes Prof. Steve Rosen, who formerly headed the department and is now the University's vice president for external affairs. "The region is particularly important to understanding the spread of modern man."

WHAT THE SKULL SAYS

Most historians agree that human evolution began in Africa and dispersed in waves of different species, starting 1.8 million years ago. The final wave, modern *Homo sapiens*, came about 60,000 years ago and displaced all others.

"Israel has one of the biggest collections of archaeological sites in the world. The region is particularly important to understanding the spread of modern man."

— PROF. STEVE ROSEN

This basic storyline is grounded on genetic evidence, because few human remains more than 30,000 years old have been found. Thus, recent discoveries at Manot Cave are especially momentous.

The cave was accidentally revealed in 2008 when a bulldozer damaged it in the course of construction work, recounts Dr. Ofer Marder, a member



of the core team. A partial skull was found sitting on a ledge.

"All the archaeological material was highly preserved, like a prehistoric time capsule," Marder says. "Most of the layers we found were 30,000 to 45,000 years old, the Upper Paleolithic period, so we expected the skull to be from that period and fully modern. But we couldn't date it visually, so it was tested."

The work was meticulously done over several years by an international team of researchers. "When we learned it was more than 50,000 years old, big surprise! This was the time *Homo sapiens* left Africa to journey over the Levant Corridor and the population spread through Eurasia.

"It's the first real evidence of a movement predicted by genetic research." Moreover, while basically modern, the cranium possesses some

Top: Manot Cave, where the skull fragment was found, photo by Mae Goder-Goldberg
Inset: The 55,000 year-old skull raises major questions about human history. Photo courtesy of Clara Amit, Israel Antiquities Authority



Dr. Ofer Marder (second from the left) with students at Manot Cave

Neanderthal features, which possibly testifies to inter-species breeding.

The findings were published early this year in *Nature* as one of the most important discoveries in the study of human evolution.

Marder leads a new Manot excavation this fall, students included, and expects to continue exploration until at least 2020. The Upper Paleolithic period materials discovered include flint artifacts, animal remains, bone tools, and shells. Evidence shows that the shells were used as ornaments, after the fish were eaten. Not much more has yet been found in the cave from this period that spans from 250,000 to 50,000 B.C.E.

Intriguing questions remain about the transition skull, identified as Manot 1: How did it come to be on the shelf where found, out of context? Why is it relatively smaller than modern man's, suggesting smaller brain capacity? As a single specimen, the cranium's age, sex and "normalcy" cannot be judged.

Manot Cave is a "dream excavation," Marder affirms. "We look at ornaments, bone tools, artifacts, and human remains to understand how people lived, their social interaction, how they were buried—all to tell the story of *Homo sapiens*."

TRANSITION TO URBAN MAN

Dr. Yuval Yekutieli focuses on the Early Bronze Age, about 5,500 years ago, particularly the connections between the areas later known as Egypt, Canaan and Trans-Jordan. He seeks to uncover when urbanization started in the region and whether or not it was caused by an external power.



Unearthing an Early Bronze Age structure at Tel Erani in the northern Negev, a 5,500 year-old site

"Archaeologists have struggled for many years with the transition from rural to urban societies in the Near East," he says. "By 'urban' we mean sites that are relatively large, have a social hierarchy, a ruling class, a priest caste, artisans, and other workers. Since everyone need not grow his

own food, work becomes specialized. Management systems must be introduced. And as a product of this process people do monumental things: build temples, fortifications, palaces, structures. They create art."

Little is known about the region's road to urbanization because in contrast to Egypt, and for uncertain reasons, the people left no written records. One theory claims that Egypt stimulated urbanization when, establishing the first dynasty in about 3100 B.C.E., it expanded into the Southern Levant (Mediterranean Basin).

But Yekutieli, following an earlier 1980s BGU expedition led by Prof. Itzhak Gilead and Prof. Aharon Kempinski, found contradictory evidence when he began excavating Tel Erani in the northern Negev.

"We find that urbanization started before Egypt arrived. The Egyptians found at least one urban settlement when they came—perhaps it even drew them to this region!"

Located on the outskirts of the modern city of Kiryat Gat, the site appeared as a low mound and had long been known. Excavations in the early 1950s unearthed materials from at least 12 different layers, and includ-



Many artifacts were found at Tel Erani and are being restored in BGU's lab.

ed Egyptian jars and vessels. Their presence indicates that Egyptians captured the town in 5100 B.C.E.

Over time, Yekutieli says, it became clear that Tel Erani holds keys to questions about Egypt's role in the region and the transition between the Chalcolithic and Bronze Ages,

as well as urbanization.

A team from Jagiellonian University in Krakow contacted BGU a few years ago, hoping to excavate in the Levant. A joint program was created and preliminary work began in 2013 and 2014, with a major excavation envisioned for 2016.



Dr. Yuval Yekutieli

The team found a fortified city whose size and sophistication surprised Yekutieli. An eight-meter wide wall made of unfired mud bricks surrounded a city estimated at 5,000 people. Radiocarbon dating is under way, but he is already sure that the city predates the Egyptians' arrival and continued on when they left 50 to 100 years later.

The Egyptians settled all over the northern Negev and southern Shephelah at the same time. Precisely why they came and why they left, also simultaneously, is another ancient mystery. Like many colonizers, they installed an administrative system much like their own. They made pottery in their own style, and imported luxury items from home via a 20- to 30-day walk.

The integration of cultures is especially interesting, Yekutieli notes. "You can see in a ceramic pot a hybrid culture starting to emerge that melds both Egyptian and local ideas—Canaanite fabric, Egyptian design."

While it isn't known what language the local people spoke, words and grammatical ideas imported from Egypt remain even in today's Hebrew. "We try to understand the relations between the groups," Yekutieli says. "Was there resistance? Hostility? Probably not harmony—we see that some of the Egyptian strongholds' fortifications were enlarged at least twice, so they didn't feel too safe.

"There's so much to learn! Tel Erani is the largest and most important Early Bronze Age site in

Israel. That period saw the beginning of all kinds of things—kingship, religion as an institution, the state, probably the roles of men and women in the family. Urbanization deeply affected the human mind-set and that's when the change happened."

DETECTIVE WORK

Dr. Haim Goldfus, now department head, sees archaeological work as puzzle-solving: "You rebuild history."

In recent years, Goldfus and his BGU colleagues, Dr. Peter Fabian and Dr. Karni Golan, have co-directed excavations at the archaeological site of Tsalit, 16 kilometers northeast of Beer-Sheva. Material collected in the 1980s—pottery shards, coins, glass fragments, and broken stone vessels uniquely used by the Jews—affirmed that Tsalit was a large Jewish village on the southern fringe of Judea. It was inhabited from the first century C.E. until 132-235 C.E., after the Bar-Kokhba revolt.

"We want to understand the minute details of everyday life in a remote Jewish settlement far from the center: Jerusalem," Goldfus says. "We also try to identify the various stages of its occupation, which is an extremely short time span."

One surprise was a pottery shard inscribed in Hebrew with a name that suggests "Chaalit," a small town mentioned by Josephus Flavius, the famous Jewish historian of the first century C.E. Tsalit may be this same settlement and thus a rare confirmation that sheds some light on the town's role in travel routes of the period and as

a refuge for the rebels of the First Jewish Revolt after their failed attack on the pagan city of Ashkelon.

Archaeological surprises can be unsettling. "To get to the truth, as close as possible, archaeologists must undermine assumptions," Goldfus



This coin found in Tsalit depicts the bust of Roman Emperor Trajan, who reigned from 98 C.E. until his death in 117 C.E.

observes. This can be unwelcome. Case in point: Masada, the heroic saga, based solely on Josephus's account of Jewish defenders choosing to "die free" when the Romans were about to breach their stronghold.

"We found no evidence of a fight, or that the Romans managed to build an assault ramp," Goldfus says. "It's a famous story that never happened as told! Archaeology amends the myth."

Since 1995 he has explained this conclusion in collaboration with colleagues from The Hebrew University. Their few articles and television interviews encountered deep resistance. Masada is Israel's top tourist attraction as well as its most inspiring tale. Goldfus and three colleagues have just submitted a new article, "The Unfinished Opera of the Roman Ramp

Dr. Haim Goldfus





A student at the Tsalit excavation

at Masada,” to be published in a leading scientific journal. “When you tackle historical issues with scientific methods, maybe people will see the light,” he says.

Goldfus welcomes the growing role of technology for archaeologists. While he doesn’t envision it ever replacing excavation work, he notes that remote sensing may make it possible to reduce the damage done by excavation. New technology also speeds analysis and advances the examination and preservation of objects. This semester, the department amplified its technical and scientific resources with two new labs and a new faculty member, Prof. Yuval Goren.

DEEPENING THE SCIENCE

Prof. Yuval Goren describes himself as a micro-archaeologist, and a specialist in “combining analytic geological methods and archaeological questions.”

He explains: “We look at archaeological sites and artifacts technically, as natural materials manipulated by humans. We examine pottery, for example, as if it’s a rock, but a human-made rock. We study the technology, the provenance of the artifact—where it was made and how. Knowing that, we can come to conclusions about the society and the interaction between different cultures.”

Since a single month of fieldwork typically produces at least one year

of study, the labs are important to student learning as well as to practicing archaeologists.

Goren values the varied collaborative opportunities he sees at BGU. “We have a strong faculty of engineering with a very experienced department of materials science. Geology. The arts. So BGU is very unique.” Also, the new labs are near the University’s nanotechnology facilities, with which he expects to work closely. He also relishes collaborating with the Department’s bible scholars.

For the past 10 years, Goren has mainly focused on cuneiform tablets, records written on clay. “Ancient Near East archives are filled with hundreds of thousands of them, including letters between kingdoms. We can reconstruct where the letter was written,

included epics, tales and religious documents as textbooks. “We’ll try to see how the schools functioned, the dictionaries they used, the movement of language and cuneiform writing.”

Goren also studies the cargos of shipwrecks of the Bronze and Iron ages. He is writing now about a 13th century B.C.E. cargo ship, among the oldest excavated, found in Turkey. Among the 10,000 items found on the sunken ship were gold, copper and tin ingots, jewelry, hippo teeth, an elephant tusk, ceramics, and as many as 24 stone anchors.

“In antiquity a ship without an anchor is lost, and in times of danger—like a storm or piracy—they’d cut the ropes and sail away. So they’d need a new anchor as backup. But why 24 of them?” Goren wonders.



Prof. Yuval Goren examines thin sections of amphorae, examples of which are seen in the background, from a fourth century B.C.E. shipwreck at Kyrenia, Cyprus. Photo taken in Kyrenia’s Ship Museum.

and explore problems and debates about the transfer of language and literature. Analyzing the clay can help us understand why a letter was written and clear up controversies about the location of places, how the kingdoms related to each other and the nature of their trade.”

One ongoing project involves studying materials used to train scribes. In their schools, they used student training exercises that

The anchors themselves do suggest a story, however. They are composed of cemented beachrock, Goren explains, and were often made along the way, so examining their composition suggests the ship’s probable route.

“There’s always something new to tell,” Goren says. “Field work is an adventure—but lab work is an adventure too, an intellectual one. So we have our feet in two good worlds.” ■

REGENERATING BONE AND CARTILAGE

TISSUE ENGINEERING... smart biomaterials...biochips...biosensors...glycomics: These are some of the areas explored in labs at the Avram and Stella Goldstein-Goren Department of Biotechnology Engineering. They may evoke science fiction, but all the department's research aims for practical ways to benefit people by applying innovations in chemistry and biology.

Several labs focus on an especially intractable problem: repairing bone and cartilage damage. As aging populations soar, especially in highly developed countries, more and more people suffer from osteoporosis and osteoarthritis. Sports injuries among younger people are also on the rise.

The bone and cartilage repair challenge is far from being ignored. Thanks to new technologies and creative researchers around the world, an enormous amount of data is being generated, observes Dr. Emil Ruvinov. "But when you look at what's happening to patients, it's been the same for

Top: Peptides, designed in Prof. Hanna Rapaport's lab, coat and conceal a titanium implant and encourage bone-forming cells to grow bone tissue. This image, acquired by fluorescence microscopy, shows the new bone tissue cells (red) on the peptide-coated titanium. The nuclei are blue and adhesion focal points are green.

20 years! There's a huge discrepancy between research and available clinical technologies."

Two of the department's labs are pursuing new avenues that may help close the gap in the near future. Dr. Ruvinov works in one, and Prof. Hanna Rapaport leads the second. Both are also part of BGU's Center for Regenerative Medicine, Cellular Therapy and Stem Cell Research.

HANNA RAPAPORT: HELPING BONE HEAL

"Our bones are in a constant state of remodeling," Prof. Hanna Rapaport explains. They contain cells called osteoblasts, which form new bone and osteoclasts, cells that break bone down. "When osteoblasts don't function well, the resulting bone breakdown creates osteoporosis. Bone loss due to trauma, disease or other causes can also leave people with insufficient bone."

Prof. Rapaport's journey to address bone damage began with fundamental research. She studied small pro-

teins called peptides, which are composed of amino acids, nature's basic building blocks.

As a post-grad student, she created peptides for very thin films and noticed that they interacted well with calcium. "Then I started to think. As I tell my students, engineering is a profession in which you are supposed to help humanity in the short term, not just do research for its own sake. You know there is a problem and you try to solve it.

"So what could I do with these peptides to help? Bones are rich in calcium. There are proteins in the bones; so it was a good guess that

such peptides might be beneficial to problems with bone tissue."

Rapaport came back to BGU, where she'd earned her first degree as one of the first biotech engineering students, with a mission: to develop systems that promote bone formation. She invested 10 years in achieving the goal she set for herself.

"We discovered something really unique," Rapaport says. "We can use the peptides to create hydrogels.



Prof. Hanna Rapaport

Just like when you mix powder with water to make jello, you get a solid-seeming appearance, very rich in water. This is very good for tissue regeneration applications.”

Hydrogel can be injected into the bone tissue to create a favorable environment for the osteoblasts (the bone-forming cells) to culture. The hydrogel acts as a sponge to calcium ions, thus maintaining the high calcium concentration the osteoblasts need to form bone, which consist of 70 percent calcium phosphate minerals.

“And the particular hydrogel we use accelerates the formation of bone mineral. So the hydrogel acts in multidimensions, in a way that is very unique to bone tissue.”

Her lab is investigating more uses. “The peptides lead us,” she says. “I’m learning with my students what peptides can do and how they can be used.” Among projected applications: treating osteoporosis patients locally to promote bone regeneration; accelerating spinal fusion; delivering a drug for local treatment of bones invaded by cancer; and developing a coating for titanium orthopedic bone implants to promote integration of the bone with the metal surface.

Rapaport also hopes to create peptide nanoparticles to treat cancer and other diseases related to mitochondria dysfunction, such as autism, Parkinson’s, ALS, and muscular dystrophy.

Rapaport is working with BGN Technologies, the University’s industry transfer company, toward commercializing her hydrogel discovery. Optimistically, she thinks clinical trials for her bone regeneration system could materialize in a few years.

She credits her students for helping her move forward and notes that they have chosen a challenging field. They are trained in physics, chemistry, math, chemical engineering, and more, and are prepared to take a concept through every lab and pre-clinical stage.

“Great ideas—that’s what it takes

to attract the good students we need to do the experiments.”

EMIL RUVINOV: EQUIPPING CARTILAGE TO REGENERATE

Dr. Ruvinov is a member of Prof. Smadar Cohen’s lab and his investigations extend her work with heart tissue. Cohen’s major discovery (covered in past issues of *Impact* and viewable online) is an injectable,

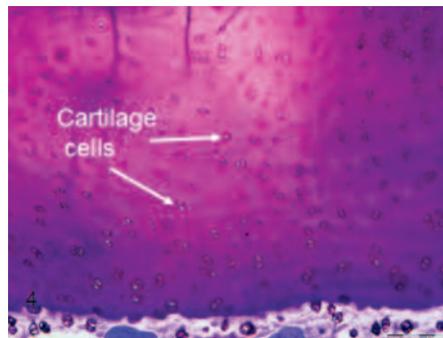


Dr. Emil Ruvinov

algae-based gel that delivers therapeutic proteins and creates scaffolding for the heart immediately after an attack. The system prevents further damage and preserves heart function. This treatment is currently in advanced clinical trials in the U.S.

and is widely seen as a landmark achievement.

“We have this core technology, a biomaterial developed in the lab,”



On the left, healthy “native” cartilage cells. On the right, damaged cartilage regenerated by treatment with growth factor-loaded bilayer hydrogel shows high similarity to the healthy cells.

Ruvinov explains, “and wanted to explore additional directions. We realized there’s a critical need to direct medication to areas where the tissues’ intrinsic ability to regenerate is very limited.”

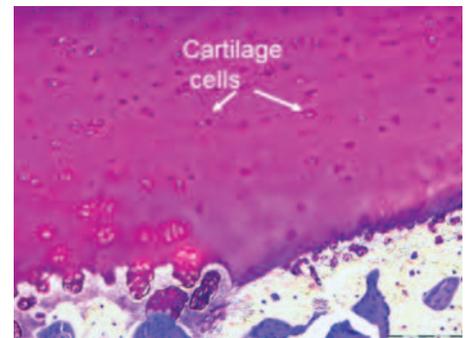
While healthy bones have a remarkable ability to rebuild themselves if fractured, cartilage—the outer layer of bone—does not. Unlike the bone

it protects, cartilage lacks a supply of blood vessels and access to the stem cells in the marrow. Damaged cartilage cannot repair itself and current remedies are short-term at best. Beyond the long-term physical limitations and pain such injuries can create, initial damage may progress past the cartilage to the bone.

“We decided to try the same core technology but adapt it,” Ruvinov says. “We implemented nature-inspired mechanisms of protein binding to upgrade the alginate biomaterial. This enables it to act as a platform for sustained delivery of therapeutic proteins.”

Aiming to treat bone and cartilage simultaneously, the team developed a two-layer approach for delivering medication. The upgraded algae-based gel carries two well-known therapeutic proteins—one called *bmp4*, which drives the stem cells toward the bone cells, and TGF Beta 1, which directs the differentiation of the stem cells to cartilage.

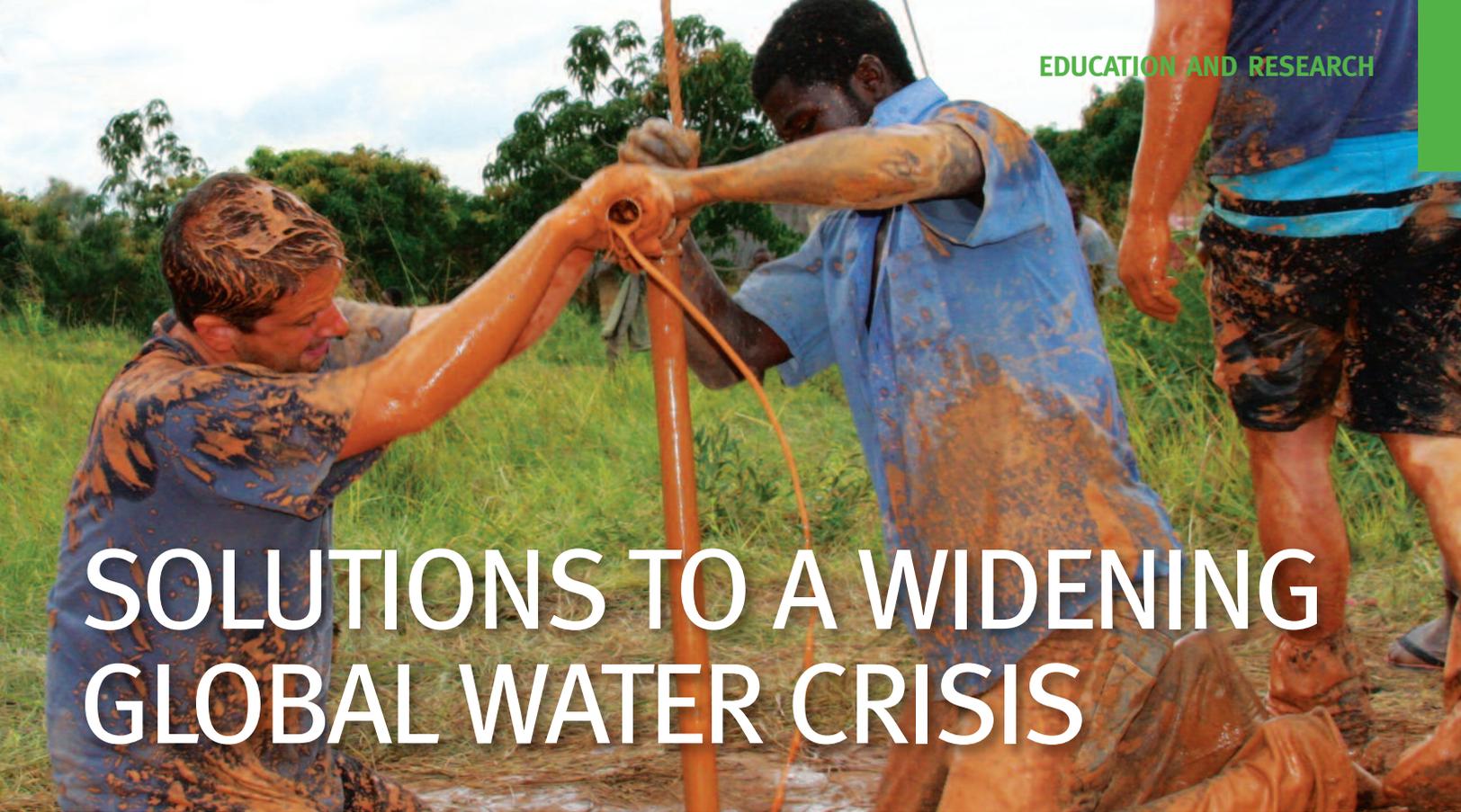
Experiments were carried out on mini-pigs, which are similar to humans in relevant ways. Small injuries were introduced. Six months later the team was excited to find that



the bone had reformed well.

“We also saw cartilage that looked almost identical to the native cartilage!” Ruvinov says. Microscopic analysis confirmed this observation. “To our joy, we found characteristics of the native cartilage.” This result provides proof of concept, which enables the researchers to move on to

Continued on page 35



SOLUTIONS TO A WIDENING GLOBAL WATER CRISIS

TODAY, WATER IS A PREMIER concern for many nations around the world. But Israel's focus on supplying sufficient, high-quality water predates this global awareness by many years.

"Here, water has long been treated as a scarce resource," observes Prof. Noam Weisbrod, director of the Zuckerberg Institute for Water Research (ZIWR) since August. "So the Israeli brain invested in maximizing its efficient use and developing technology to protect and re-use groundwater. Now we're ahead of even well-developed countries that didn't see water as a major issue, and didn't invest in it."

This past year, BGU's experts have been called to consult on water urgencies in places such as Mongolia, Kenya, Uganda, Chile, and Central Asia—and also in California and Colorado. "In the past, we thought water issues weren't relevant to developed countries," Weisbrod observes, "because money and technology aren't problems there. Now it's a different story."

Water research has been under way at BGU for decades, but resources were expanded and centralized in 2002 when ZIWR was founded as part

of the Jacob Blaustein Institutes for Desert Research. It unites under one roof all aspects of science and technology relating to water resources—desalination, hydrogeology, hydrobiology, hydrochemistry, and water resource management.

"In the past, we thought water issues weren't relevant to developed countries ... Now it's a different story."

— PROF. NOAM WEISBROD

Water research at BGU has served Israel well. Along with other Israeli institutions, BGU has helped perfect the use of drip irrigation, which delivers water to plants in highly precise amounts. It has contributed prominently to the national system that reclaims sewage water and treats it for re-use in agriculture.

BGU water specialists have helped develop the country's four—soon to

be five—enormous desalination plants, which can supply more than 30 percent of Israel's water needs. Today, 19 ZIWR researchers, together with their technical staff and graduate students, conduct basic and applied research to improve all these technologies and find new ways to safeguard our common water future.

"We are the largest water research group in Israel and doing quite well, with all modesty," says Prof. Eilon Adar, deputy dean of the Blaustein Institutes and former ZIWR director. "We are known around the world and we are happy to share our know-how." In response to California's extreme drought and water troubles during the past few years, Adar has himself consulted on site several times.

But he and his colleagues find that California's challenge goes far beyond technology to the realms of politics and public policy, and is worsened by misconceptions about the nature of water problems.

Top: Students help a village in Zambia access clean water. Many Rural Water Development projects are deliberately low-tech so local villages can easily replicate and maintain them.

A SYNONYM FOR FOOD

In California, as in most places, the central problem is not water scarcity, Prof. Adar explains. “We have sufficient water—the problem is that year by year, we have more contamination due to our activities. So water becomes a scarce resource because our modern interference with nature pollutes it.”

Adar calls water a synonym for food because most of it is used for food production, not drinking. The world population is expected to double in less than two generations. “Since most existing arable land available for cultivation is already taken,” he notes, “where will the food come from?”



Prof. Eilon Adar

Israel’s solution—combining drip irrigation with reclaimed sewage water—works for the country on several levels.

As cities grow they consume more water and produce more sewage. Today, a startling 86 percent of Israel’s municipal sewage is treated and recycled to irrigate crops. This releases about two-thirds of the “fresh good water” that agriculture would otherwise need, so it can be redirected to drinking and other domestic use.

A few countries reclaim wastewater to a far lesser degree, but in the United States and Western Europe, most wastewater is treated and released into waterways. “The Israeli system is win-win,” Adar says. “The more we reclaim, the less we damage the environment.”

One reason this system is not practical for California, Adar found, is because various authorities, including the Environmental Protection Agency, currently restrict utilization of treated sewage water. In addition, California lacks the basic infrastructure to transmit and distribute reclaimed municipal sewage to farms distant from residential areas.

WHERE POLLUTION COMES FROM

“Industry is an obvious source of pollution, but agriculture is the biggest polluter on earth,” says Dr. Ofer Dahan. “California is suffering tremendously from drought. It doesn’t have enough surface water, which has been traditionally used all over the state. The main additional water resource is groundwater, but it’s becoming more and more polluted by how farmers implement irrigation, pesticides, herbicides, and fertilizers.”



Dr. Ofer Dahan

Understanding how agriculture affects groundwater quality is difficult. One reason is a lack of efficient monitoring tools to deliver real time information on what happens below the surface. The unsaturated zone, also termed the vadose zone, is the area between the land surface—where human activity such as agriculture and industry take place—and the groundwater below.

Dr. Dahan invented the Vadose-Zone Monitoring System (VMS). It can be installed under an agricultural

“Industry is an obvious source of pollution, but agriculture is the biggest polluter on earth.”

— DR. OFER DAHAN

field, gas station or industrial site to measure the subsurface water’s hydrological and chemical properties and provide real-time warning of potential contamination.

It can take years to decades to know that a hazardous waste is

leaking to the aquifer, or that an individual farmer is contaminating underground water that affects land and water resources.

“The VMS tells us what’s happening now so we can give the growers, legislators and water resource managers information about the fate of this water in the future, should they continue to do what they’re doing. So they know what actions today will prevent catastrophe in 10 or 20 or 40 years,” Dahan explains.

When contamination does occur, the system’s early warning function enables much more effective remediation.

To date, more than 70 VMS systems have been installed around the world and one is slated for Berkeley, California. However, convincing more people to use the system and its data is in itself a challenge, Dahan finds. “The scientific data we collected in the past 10 years often contradicts basic assumptions about what should happen according to textbooks.”

One idea took several years to find publication, Dahan says. “We have shown that organic farming, perceived by the general public as environmentally friendly, is a catastrophe!”

Intensive organic agriculture, he explains, depends on the use of animal manure or compost to fertilize. Large quantities are embedded in the soil during the early stages of the growing season before planting. However, the root systems of young plants are too small to uptake the water and nutrients. “So large quantities of fertilizer go down with the water, unconsumed. In conventional [using drip irrigation] farming the exact quantity a plant needs is added with the water as the plant grows, so there’s less to flush down.

“Now we have the tools that show the farmer he’s losing money on water and fertilizer he shouldn’t use. We need not wait years for the pollution to be seen.”

IMPROVING NEW TECHNOLOGIES

Already on staff in BGU's water treatment group in 1997, Prof. Jack Gilron was among the first senior researchers recruited to the Zuckerberg Institute when it was formed. He is a chemical engineer and in the 1980s became interested in the problem of mineral scaling of the membranes used in desalination.

This narrow-sounding focus turned out to be critical to the main method of desalination used today. Essentially, salt is removed from municipal wastewater, brackish water or sea-water by forcing the water at high temperature through thin, strong plastic membranes at high pressure. The salt is left behind. The more water that is pushed through the membrane the higher the salt concentration.

Scaling, Gilron explains, is what we see on a teakettle when minerals precipitate out on the surface. Scaling greatly impedes the efficiency of membrane systems, which are also relied upon to remove waste produced by chemical and agricultural industries from water.

To solve this problem, Gilron and his colleague, Prof. Eli Korin, developed a process called flow reversal, currently being commercialized by ROTEC, a BGU spinoff company co-founded by the team.

"Often the brine solution rejected in desalination supersaturates the membrane," Gilron explains. "It contains more of a dissolved mineral than it can indefinitely keep in solution, and eventually the mineral precipitates out on the membrane surface. However, this does not happen immediately—it has an incubation time.

"So we can remove that brine solution and replace it with a feed solution that's unsaturated, reset the incubation clock to zero, and the membrane surface won't scale."

Periodically switching the feed and brine connections to the membrane module back and forth prevents



Top: Drs. Roni Kasher, Moshe Herzberg and Osnat Gillor from the Zuckerberg Institute for Water Research at a sewage water treatment plant near Kibbutz Sede Boqer **Left:** Prof. Jack Gilron (center) at the Antofagasta desalination plant in Chile **Right:** The ROTEC flow reversal system to prevent scaling developed by Profs. Jack Gilron and Eli Korin

scaling. This greatly increases the product water volume that can be extracted from a given feed, reduces chemical use and reduces the amount of brine requiring disposal.

The process works without the usual level of antiscalant chemicals needed to protect membranes. Flow reversal is employed in the Netherlands, where brackish water is desalinated for return to an underground aquifer. Additional pilots in China and Israel are operating, and talks are under way for another plant in Chile.

In another development, Gilron, with colleagues Prof. Zeev Ronen and Prof. Emeritus Yoram Oren, recently adapted a bio-electro membrane process to remove chemicals left over from production of explosives and rocket fuels from highly contaminated groundwater.

Gilron would prefer to see more prevention and less need for remediation. "How much damage and future health problems were caused by recent large-scale contamination in a West Virginia spill last year, for example? Cost-benefit analysis tells us that it's much cheaper to enforce appropriate environmental safeguards rather than trying to clean up water once it's been contaminated."

Zuckerberg Institute researchers are engaged in dozens of projects. One new area faculty members are exploring, Noam Weisbrod notes, is how climate change affects the water cycle and in particular, soil evaporation. Recently a customized climate-controlled lab (CCL) was established at ZIWR. It can mimic changes in atmospheric conditions, such as different temperatures,

enabling researchers to quantify their impact on soil evaporation.

“Moreover,” Weisbrod says, “while soil evaporation has traditionally been treated without giving much attention

But the biggest problem, BGU researchers agree, is that in the U.S., water rights often belong to whoever owns the land above the groundwater, or through which surface water

not adequately implemented, a reckless landowner can contaminate water “below the radar” as it flows downstream, perhaps creating an eventual catastrophe for the downstream users.

Water inevitably crosses national borders as well as property lines. This motivates BGU, and Israel, to collaborate with neighboring countries to protect common water resources. Political limitations hamper this ideal, but Adar hopes that educating non-Israeli students alongside the Israelis—which ZIWR does in BGU’s Albert Katz International School for Desert Studies—will produce a next generation of water professionals who speak the same language.

Adar is also optimistic that California will resolve its challenges. “I believe the U.S. political system can come up with attractive incentives for the farms and local water utilities to coordinate use, build treatment facilities and eventually re-use treated water for agriculture.



Water distribution facility under the auspices of the Israel Water Authority

to its link to salination, we are now exploring and quantifying the link between soil evaporation, soil salinization and climactic conditions.”

THE CALIFORNIA CHALLENGE

With so much well-tested technology developed to address Israel’s own severe water challenges, why do solutions for California appear so difficult?

“Our consensus is that the problems have more to do with policy issues than technology,” Prof. Jack Gilron comments. “Who will implement new technology? Bear the costs? Local politics affect water use. Is it being used to grow water-thirsty crops, as opposed to those that take little? Can someone be told to use less water? Water policy needs to balance the needs of different sectors.”

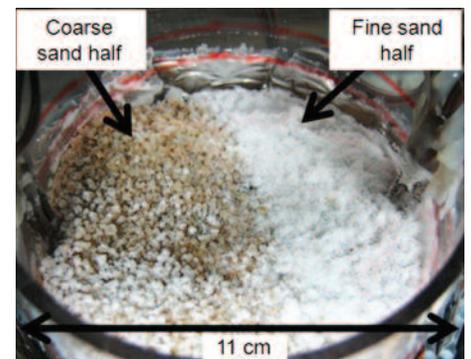
Given that Greater Los Angeles alone is sectioned into more than 200 different water districts, cooperative effort is hard to envision.

flows. California further allocates “senior” and “junior” water rights based on history—people who own land that was settled early hold streamwater rights from the nearby rivers and may use as much as they wish, though neighbors go wanting.

In Israel, water is nationally owned and treated as a national resource. “Once you give a resource value,” Prof. Adar observes, “it is relatively easy to assess measures and alternatives when a shortage is reached.

“In Israel we reached the stage where we didn’t have enough water but we knew how to price it per unit. Then we could assess impact on the economy if we didn’t close the gap between supply and demand. Unless we could produce more water at a certain cost, our economy would slow down. That triggered us to look at increasing efficiency of use and come up with alternative sources.”

Dr. Ofer Dahan points out that private ownership of water also affects pollution control. If regulations are



In an experiment, two columns of sand were saturated with saline water and left to evaporate under controlled conditions. The fine-textured sand is fully covered with salt, while the coarse sand is less so. Understanding the combined process of evaporation and salinization in arid and semi-arid regions will lead to remedies for better soil management.

“Our labs develop novel methodologies and technologies I now gladly share with the U.S., knowing they might help there. I’m proud that Roy Zuckerberg and the American Jewish community can see that their contributions are also relevant and quite precious to the U.S.” ■



WATER IS LIFE

BGU students help local villages in Uganda and Zambia secure safe, clean water and train local people to build, test and maintain water systems.

IN THE LAST FEW YEARS, the Rural Water Development course offered to select students at the Albert Katz International School for Desert Studies has brought groups to villages in rural areas of Ethiopia, Zambia and Uganda. Preparation for nine intensive days in the field takes three months.

In each locale, directed by Prof. Noam Weisbrod, students work with local people to identify their water sources and test their quality, teach children about hygiene issues and educate people about the aquifer.

Projects range from drilling wells with local materials to building storage tanks to collect rainwater and installing bio-sand filters to reduce contamination. These practical projects are deliberately low-tech so nearby villages can recreate them, multiplying their impact.



Prof. Noam Weisbrod

“Like other universities, we try to understand water dynamics and how contaminants migrate. We explore the cutting edge of hydrology. We teach that.

“But these questions are totally irrelevant to people if they have no running water or have to walk miles to a well or handout, which may be highly contaminated. A million people die every year from water-related disease, but most of us in developed countries aren’t aware of that.

“It’s a shame for people to finish a Ph.D. or M.S. without understanding these problems. So we established this course. It’s not mandatory but many more students want to take it than the 10 we choose each semester due to financial limitations.”

— PROF. NOAM WEISBROD, DIRECTOR OF THE ZUCKERBERG INSTITUTE FOR WATER RESEARCH

For a firsthand glimpse of what BGU students are experiencing and accomplishing, view the films and slide shows on Prof. Weisbrod’s website: <http://noamweisbrod.weebly.com/courses-and-others.html>

THE NEXT GENERATION AUTOMATING MEDICAL CARE

PROFESSOR Yuval Shahar, M.D. and computer scientist, has always been interested in “how the human mind works, and how we can emulate it in computers.”

Combining his twin avocations, he created new computer software systems that may revolutionize medical care.

The double-barrel problem plaguing doctors, Prof. Shahar explains, is the need to know far too much, and to process so much data for use. “There’s a serious quality of care problem that stems from a human’s limit on processing data. A doctor can look at you, listen to your complaints, even send you for a lab test, but can’t see the trends in your liver functions evolving over the past six years.” Moreover, keeping up with new discoveries and treatment options is daunting.

Converting from paper records to an electronic medical record (EMR) system, as many doctors and health-care institutions are doing, is indeed a revolution, Shahar says. But that revolution can only work for patients if doctors have intelligent assistants with infinite knowledge and memory to interpret all that data.

So, Shahar used artificial intelligence concepts to build an automated medical-decision support system that remembers everything and integrates many information channels. It links the patient’s

data to a digital library of the best current knowledge about his medical condition. The system interprets the data, identifies meaningful patterns in it, visualizes the patterns and their interrelationships, and asks questions if more information is needed.

FROM SPOCK TO PICARD

By the time he came to BGU 15 years ago, Prof. Shahar had begun developing a digital guideline library and an automated patient-management system based on best practices for therapy and medication. “We called it Mr. Spock because he was a character who knew everything but was quite annoying. Our tool would say things such as, ‘Are you sure you want to administer 80 milligrams of this medication? The standard is usually...’”

Just this past year, Shahar’s lab moved on to create a next-generation version of Spock, based on more sophisticated algorithms. It is called, of course, Picard.

“This system can operate completely automatically, with machine-comprehensible code representing the best-practice guidelines, and can even run multiple different guidelines to support both the patients and their doctors. It tells you where to start, what to do now.” If Picard needs more information, it asks questions, for example, “Did the patient have a glucose tolerance test?”

To test the system, Shahar worked with obstetricians at Soroka University Medical Center, who regularly treat pregnant women with high blood pressure (toxemia). Each doctor monitored half his patients with the usual methods, which included the use of EMRs, but no intelligent decision support, and used the computer system for the rest.

“The results were amazing,” Shahar reports. “Without the computer, the clinicians performed 47 percent of the American College of Obstetrics and Gynecology toxemia guidelines. With the computer, they adhered to 94 percent of the recommended actions, a hugely significant increase.”

Moreover, when the doctors used the EMRs without computer support, it turned out that 68 percent of the procedures they employed were redundant, such as requesting a test that had already been performed recently. Picard reduced the redundancy to three percent.

Doctors appreciate the support, Shahar says. Computer assistance does not ask them to suspend judgment. Ultimately, the

computer is just another tool, he explains, not a replacement for doctors. Doctors see the patient, know much more about her and medicine in general, understand human norms, and can apply common-sense knowledge.

“We see a huge potential for ensur-



Prof. Yuval Shahar, M.D., Ph.D., FA.C.M.I., holds the Josef Erteschik Chair in Information Systems Engineering and heads the Medical Informatics Research Center in the Department of Information Systems Engineering. He is also a magician and during Operation Protective Edge in the summer of 2014, performed for children in a campus bomb shelter.

ing that ‘evidence-based medicine’ is actually applied, and that expensive unnecessary tests are avoided.”

Doctors can turn the table and ask Picard questions, too. Pushing a button labeled “explain” brings up text that details why the recommendation was made, and leads back to the original guideline-based reasoning.

“We aren’t replacing physicians, but patients won’t need to depend on their doctors’ memories.”

— PROF. YUVAL SHAHAR

THE PATIENT’S VIEWPOINT

Computerization is the patient’s best friend, Shahar is sure. He notes the alarming statistic that each year in the U.S. alone, 100,000 people die from preventable medical errors.

“We aren’t replacing physicians, but patients won’t need to depend on their doctors’ memories.” When a patient has multiple problems, if the guidelines conflict, or when quality of life issues that involve human preferences should be taken into account, the case requires human judgment.

“Realistically, we will be able to treat a lot of the bread and butter cases better—avoid errors, make sure physicians comply with the tested and proven protocols, and interpret the data correctly.” Counterintuitively, studies show that computer support leads doctors to spend more time with patients rather than less.

Picard also provides a way to disseminate new medical knowledge faster. New developments can be constantly fed into the library’s medical knowledge base and thus become immediately available to practitioners, long before an article in a journal is read or presented at a conference.

STAY-AT-HOME TREATMENT

Over the past four years, Picard has been playing the key role in MobiGuide, a 13-partner, five-country European project. The objective is to create automated, remote, at-home care for the chronically ill. It includes a smartphone-based monitoring system linked to sensors on or around the patient to measure heart rate, blood pressure, blood glucose, and more, according to patient need. When the local decision-support system via the smart phone is out of its depth, it consults the central decision-support server, which includes Picard.

MobiGuide is now in its clinical pilot phase. One group of subjects consists of cardiac arrhythmia patients in Pavia, Italy suspected of having atrial fibrillation. The system is installed as an application on each patient’s smartphone, which is attached to various sensors by wireless technology.

A patient with palpitations or dizziness puts an EKG belt around his chest, transmitting the signals to the smartphone; the phone interprets the signals, diagnosing atrial fibrillation when it occurs. It then alerts the patient, who can respond by following given protocols. If an alarming pattern is detected and the smartphone is out of its depth, it consults the central server. The doctor might be alerted to prescribe a specific medication or reminded that the latest guidelines call for a procedure.

“Other than a network of computers spread across Europe and Israel, no human is involved in the whole process,” Shahar notes, “although, of course, a doctor can do as she or he sees fit.”

MobiGuide is proving itself in unexpected ways. A few weeks into the pilot, it was discovered that one patient had been misdiagnosed for 10 years. The interpretation module

analyzed a set of electrocardiograms obtained via the smartphone and found no evidence of the atrial fibrillation for which he was being treated, and instead identified a different arrhythmia.

“We can only guess,” notes Shahar, “how many patients currently move through the medical system mislabeled.”

Journal articles about MobiGuide have begun to appear, and at the year’s end, Shahar says, the promising results will be shared with the larger scientific world.

A BIGGER PICTURE

Picard or its successors will enable patients to stay at home more than 90 percent of the time rather than shuttling constantly to doctors, Shahar believes, while getting better treatment and feeling empowered to manage their own care. Unnecessary tests and procedures will be minimized.

Considering that 80 percent of U.S. healthcare dollars go to treating the chronically ill—and that the numbers increase along with longevity—potential savings are enormous.



<http://www.mobiguide-project.eu/>



“Exciting things are happening,” Shahar says. “It’s a new world and BGU is the right place for a medical informatician. We have a lot of excellent students. The collaboration between the engineering and medical faculties is good. And there’s the general pioneering spirit in the air here—it feels like anything is possible.” ■



THE ROTHSCHILD CUBE TRAINING SOCIAL ENTREPRENEURS

“Research proves that people who have dreams—a passion for helping the community—are not as successful as they could be,” says Edna Batan, who directs the new Rothschild Cube Center for Social Innovation housed in BGU’s Department of Community Action. “They don’t have the skills. We want to help them be more effective so they can do good even better.”

THIS IS THE THINKING behind “The Cube,” an innovative training facility to help “social” entrepreneurs and nonprofit leaders accomplish their goals in the best professional ways. Rather than offering standard management training, The Cube (named for the shape of its facility) centers its learning experience on simulation. Participants interact with professional actors and sophisticated computer programs to learn by role-playing and experiencing realistic scenarios.

The idea took more than two years to develop. During that time, Vered Sarussi, who heads the Department of Community Action, found an enthusi-

astic collaborator, the Rothschild Caesaria Foundation. “They were interested in building something that connects academia and social engagement and promotes social change,” explains Dr. Hagai Katz, who researches nonprofit management and lectures on it in the Guilford Glazer Faculty of Business and Management.

He has served as the project’s academic advisor since inception, and is a member of the steering committee that also includes BGU faculty members who specialize in entrepreneurship, social work, sociology, health sciences, and public policy.

The Cube was officially inaugurated

in May. It ran pilot programs this past year, and began full operation this fall.

TEACHING NONPROFIT LEADERS

“We identified gaps in knowledge among nonprofit leaders that we believe should be filled,” Batan says. The team targeted areas such as working with the community, values clarification, cross-sector partnerships, database management, and economic sustainability. A more general “social responsibility” track was also created to foster community involvement

among students and other groups.

Each area was meticulously researched and planned. “It was a journey,” Batan says. “We talked to professionals all over Israel about what we wanted to do and how.”

Dr. Katz adds, “We didn’t want to start another accelerator for social enterprises, but to do something unusual. We wanted it to have the advantage of being at the University and informed by research. Not a place to sit and talk about models and theories, but where people could come to increase their capacities through experience with the actual work in a safe environment and not be afraid to take risks.”

For models, Batan looked at all kinds of centers, from driver training



Dr. Hagai Katz at the inauguration of The Cube

to the worlds of medicine and management. They also looked at computerized simulators for pilots, combat situations and more. “We found the technology exists—but had never been adapted to our field and issues,” Katz says.

An extended process of consulting with experts followed, both from BGU and outside, to create the modules. Each one introduces participants to foundation concepts and then actively involves them—individually or in groups—in a role-playing simulation. Some are computerized and others are “live” with trained actors from a Beer-Sheva theater school. A Cube specialist directs each activity.

For practice in decision-making, a main screen projects the assignment

and tactics.

Participants are assigned specific roles and work with tablets, programmed to respond answer by answer based on their own input. A real-time framework makes the experience authentic.

In one scenario designed to help nonprofit managers fundraise more successfully, an actor assumes the role of potential donor. The manager is grounded in basic principles: how to write, speak, stand, and tell his organization’s story—what makes it unique and how it solves an important problem. Then he pitches the “donor.”

“The lesson is how to be a professional,” Batan says. “The manager learns to not talk about what’s important to him, but about the value of giving for the donor. He learns how to do it right with minimal speaking—no blah blah blah.”

Other group members rank the presentation and everyone, including the actor and facilitator, makes suggestions.

“There’s no such thing elsewhere in Israel or anywhere else in the world,” Katz observes. “The experience is fun, which I think is very important in learning. For me it’s also an opportunity to do research and understand how leaders make decisions. Seeing people’s values in action, how they respond to different triggers—it’s exciting!”

Katz and Batan are eager to see the full-blown program evolve this year and anticipate a wide range of clients: social organizations, businesses, the public sector, students. “As they write to us, we plan the simulation,” Batan says. “We hire professionals to write it and collect the material so it’s



Students participate in a pilot program at the Rothschild Cube.

HELPING THE LOCAL COMMUNITY

completely up to date and relevant.”

The Cube will serve groups and individuals all over Israel and will be a self-sustaining organization. Fees are charged according to the activity, and contracts are coming in, Batan says. Some scholarships will be available.

Groups of high school and university students have already participated in Cube programs to promote their general social awareness, as well as to develop their leadership and decision-making skills. The army, interested in enhancing its members’ social awareness, sends soldiers regularly. Other universities as well as nonprofit organizations are exploring programs.

The Cube will remain anchored by its innovative simulation approach, but expand with additional support services to help local organizations function better. Workshops, advice on networking and help with infrastructure are part of the bigger picture.

“From my viewpoint as someone who wants to generate

positive social change, The Cube is very effective,” Katz says. “We train one social entrepreneur and eventually she’ll produce a lot of social enterprises in her career. So these people multiply the experience into organizations that benefit many people.” ■



Edna Batan

GREAT LAKES

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CINCINNATI VISITS BEN-GURION UNIVERSITY

Two delegations from Cincinnati recently visited BGU's Marcus Family Campus in Beer-Sheva. The first was a group from Cincinnati Children's Hospital Medical Center (CCHMC). For more than two years, CCHMC and BGU have partnered on the development of medical devices for pediatric and neonatal applications. The group that visited BGU included CCHMC surgeons, administrators and leading supporters of the partnership. The second delegation from Cincinnati was a group of Wexner Heritage Fellowship alumni.

MEETING IN ST. LOUIS

BGU President Prof. Rivka Carmi, M.D., visited National Institute for Biotechnology in the Negev science advisory board member Dr. Phillip Needleman and his wife, Sima, at their beautiful home in St. Louis.

INTRODUCING THE CENTER FOR DIGITAL INNOVATION

Ben-Gurion University recently launched the Center for Digital Innovation (CDI), a nonprofit organization in Beer-Sheva's Advanced Technologies Park devoted to mentoring would-be digital health start-up entrepreneurs. Led by Ziv Ofek, founder and chief innovation officer of dbMotion (acquired by AllScripts in 2013), CDI brings experience, expertise and connections to help accelerate the launch of early stage companies, and improve their likelihood of success.

Ofek and Prof. Rivka Carmi were recently in Chicago to introduce CDI to local investors and prospective

partners at MATTER, the Chicago healthcare business incubator, and at 1871 (named for the year of the Great Chicago Fire), the renowned entrepreneurial hub for digital startups.



REMEMBERING LIVING LEGACY MEMBER ALLEN GREENBERGER

The AABGU and the BGU community mourn the passing of Allen Greenberger ז"ל, professor emeritus of history at Pitzer College of Claremont, California. A native Chicagoan, Prof. Greenberger was a staunch believer in Israel as the Jewish homeland, and was captivated by the emphasis on social integration, advancement and environmental sensitivity lived daily at BGU.

A member of BGU's Living Legacy Society, Prof. Greenberger chose to leave his estate to endow scholarships in memory of his parents, brother and a dear friend.

Prof. Greenberger taught courses on the British Empire and Commonwealth; Asian traditions; the cultural history of Japan; Jewish history; and memory and history. A long-ago student, David Straus, said the professor taught "in a gentle embrace and with a captivating laugh."

May his memory be a blessing.

1. Cincinnati Children's Hospital Medical Center President Michael Fisher with Ben-Gurion University President Prof. Rivka Carmi
2. Prof. Allen Greenberger (of blessed memory) leading a class in 1983
3. Steven Franklin, regional director; Dan Blumenthal, deputy director, Government of Israel Economic Mission to the Midwest; Ziv Ofek, founder and chief executive officer of the Center for Digital Innovation; Tom Alexander, chief operating officer of 1871; Prof. Rivka Carmi, BGU president
4. Prof. Rivka Carmi with Phil and Sima Needleman in St. Louis

GREATER FLORIDA

GREATER FLORIDA ADVISORY COMMITTEE

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MIDDLE EAST UPDATE

Prof. Emeritus Fred Lazin presented three updates on Israel and the Middle East in Palm Beach. A lovely brunch was hosted in the home of Janyce and Marvin Jacobs for several supporters and new friends. Over 65 people attended a program at The Tradition of the Palm Beaches. Another 60 people attended a first-time AABGU event at Temple Beth Am in Jupiter, where Prof. Lazin spoke on “Who’s Afraid of a Nuclear Iran?”

CELEBRATING ISRAEL AT COMMUNITY EVENTS

The region participated in Israel Independence Day celebrations sponsored by the Jewish Federation of the Palm Beaches in Howard Park and the Jewish Federation of South Palm Beach County in Mizner Park.

BOARD OF GOVERNORS AND SPECIAL BGU VISITS

Special appreciation to those who experienced the pioneering energy of BGU on recent visits: Sylvia and Stanley Graber; Nancy and Joel Hart and Neil Efron; Marion and Bernard Herzberg; Marilyn and Ed Kaplan; Ellen and Ken Schaeffer; and Helene and David Weingarten. Thanks to AABGU National Board Members Jan Liff and Joel Reinstein for



attending the 45th Board of Governors, and Atlanta Mayor Kasim Reed, who led a 40-member delegation to explore BGU’s cyber-security capabilities with Conexx Atlanta.

UPCOMING EVENTS

The Greater Florida Region looks forward to 2016 when it will host AABGU’s Mid-Winter Meeting at the Marriott in Delray Beach on February 8 to 9, 2016.



1. Neil Efron; Joel and Nancy Hart; Prof. Yuval Golan, director of the Ilse Katz Institute for Nanoscale Science and Technology in the Ilse Katz building 2. David and Helene Weingarten at the scenic overlook of the Zin Valley 3. Event Chair Rhoda Temkin, Robert Fishman, Gail Fishman, Prof. Fred Lazin, and Regional Director Reva Feldman at Temple Beth Am 4. Dr. Adi Portugies, director of the Ben-Gurion Archives; Jan Liff, AABGU national board member 5. AABGU National Board Member Edward Kaplan and his wife, Marilyn, and Drs. Annie and Robert Spoot in BGU’s Living Legacy Garden

GREATER NEW YORK

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HOTEL AND TOURISM STUDENTS EMBRACE NEW YORK CITY

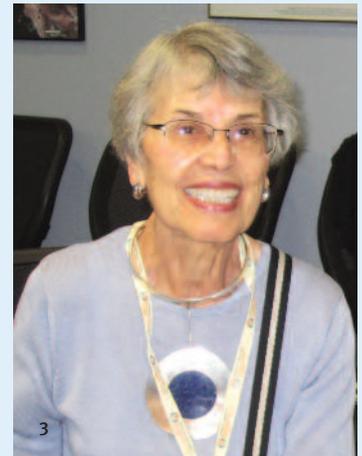
As a result of the second Intifada, which broke out in 2000, Israel’s hotel industry suffered tremendously. Due to lack of occupancies, hotels in Israel were unable to offer students from BGU’s Hotel Management and Tourism Department internships, an important aspect of their education.

When Sol Freedman, a longtime friend and supporter of BGU, learned about the situation, he contacted local hotel owners and quickly arranged for students to participate in meaningful internships at New York hotels.

Thanks to Freedman’s initiative, this summer internship program has reached its bar mitzvah year with 13 cohorts of students having received this life-changing opportunity to work in hotels in New York City; Asbury Park, New Jersey; and Charlotte, North Carolina.

BGU students learn the ins and outs of the hospitality industry and gain valuable hands-on experience during their three-month internships, while serving as ambassadors of Ben-Gurion University—and Israel as well.

“What better place to dive in head first and learn all there is to know about the hotel and hospitality field than New York?” says one student. “New York is the capital of the world and a tourism hub.”



1. BGU students participating in the Hotel Internship Program (top row: Assaf, Naomi, Linoy, Tal M., Shira, Adam, Noam, Tal H., Simona) led by Faculty Advisor Judith Keren-Klot (bottom row, right) with Jessica Sillins and Sol Freedman 2. AABGU is saddened by the loss of Jane Bressler z”l, longtime friend and supporter of BGU, pictured on the right with her brother, Dr. Mark Blechner, and BGU President Prof. Rivka Carmi, at the 2014 Board of Governors Meeting as they were honored as President’s Pillars. 3. In loving memory of Cecile Bittkower z”l, a dear friend and supporter of BGU for many years. May her memory be a blessing.

Freedman, along with Jessica Sillins, a vice president on AABGU’s national board, has partnered with hoteliers and Judith Keren-Klot, BGU’s internship program faculty advisor, to implement this unique annual experience. Some 150 Israeli students have completed the program to date.

“Each year I say ‘this was the best group of students yet’ and each year I’m blown away again and again,” says Sillins.

“The program is what you make of it. You get what you give and this can be the most worthwhile experience of your life,” says Ira Tesis, a BGU alumnus.

The sky is the limit for these gifted young Israelis. With the support of individuals like Freedman and Sillins, the internship program is sure to continue to generate great successes for the students and BGU alike.

GREATER TEXAS

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 Ellen Marcus, *Austin Chair*
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THE ARLINE AND BEN GUEFEN ZIN FELLOWS ENDOWMENT

AABGU's Greater Texas regional board kicked off its 2015 to 2016 year with a gathering celebrating the Zin Fellows Leadership Program. Local members of Zin Fellows Cohort II shared passionate and unique observations and personal defining moments on their recent seminar in Israel's Negev region.

After the Zin fellows spoke, Arline and Ben Guefen shared the news of their generous endowment and matching gift program in support of the Greater Texas Region's participation in the Zin Fellows Leadership Program in perpetuity. Zin fellows from the Greater Texas Region will be called Arline and Ben Guefen Zin Fellows.

"It's very important to us to help create leaders that will continue our passionate work for BGU and the State of Israel," said the Guefens.

Indeed, many Zin fellows have chosen to take on AABGU leadership roles. Elizabeth Grzebinski, of Zin Cohort II, was installed as the new regional chair and was just elected a member of the national board of directors. Zin fellows Jerrad Bloome, Dr. Riva Collins, Mara Baumgarten Force, Nir Grossman, Jaynie Schultz, and Robin Toubin Stein, were added as regional board members. What's more, both Jaynie Schultz and Robin Toubin Stein were also elected to AABGU's national board.

Longtime AABGU supporter Robyn Shkolnick was also welcomed to the regional board.

BBQ AND BGU IN AUSTIN

A "BBQ with BGU" event was held at the Austin home of Ellen Marcus and Harvey Malyn. Zin fellows Jerrad Bloome, of Houston, and Jaynie Schultz, of Dallas, shared their personal experiences of participating in the Zin Fellows Leadership Program, and how it changed their perceptions of the Negev and BGU.

LOOKING FORWARD TO THE 15TH GOURMET KOSHER EXTRAVAGANZA

The 15th Gourmet Kosher Extravaganza will be held on Monday, February 22, 2016 at the Westin Galleria Hotel.

Event Chairs Robin Toubin Stein and Elizabeth Grzebinski are leading this year's Extravaganza team.

As always, the event will feature an array of Houston's top chefs who will prepare a multi-course gourmet kosher meal. The keynote speaker will be Seth M. Siegel, author of *Let There Be Water: Israel's Solution for a Water-Starved World* (see page 6). This will be Siegel's first appearance in Houston, and each Extravaganza attendee will receive his new book as a gift from AABGU.



1



2



3

1. Robin Toubin Stein and Arline Guefen 2. Barbara Baliff, Regional Chair Elizabeth Grzebinski and Lewis Kalmans 3. At the "BBQ with BGU" gathering in Austin

MID-ATLANTIC

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POWERFUL VOICES FOR ISRAEL

The Mid-Atlantic Region's annual tribute brunch gala on Nov 8 honored three "Powerful Voices for Israel:" Wayne Woodman, Toni Young, both AABGU national board members; as well as Dr. Felix Zandman z"l. The event, held at the National Museum of American Jewish History, was chaired by Rose and Paul Astor; Bonnie and Bobby Hammel; and Reiko and Dr. Barry Kayne.

This year's event featured a special guest speaker, Seth M. Siegel, discussing his new book, *Let There Be Water: Israel's Solution for a Water-Starved World* (see page 6).

To generate excitement for tribute season, Aimee Katz and her daughter, Kathy Katz Hall, hosted

a kick-off reception with guest speaker Yaron Sideman, consul general of Israel to the Mid-Atlantic Region. Sherrie R. Savett, Esq., hosted the tribute brunch patron party, with special guest BGU President Prof. Rivka Carmi, M.D.

EVENTS AROUND THE REGION

• The Mid-Atlantic Region held two events in Delaware: AABGU Executive Vice President Doron Krakow spoke at the home of Yetta Chaiken; Dr. Simon Barak, of BGU's Jacob Blaustein Institutes for Desert Research, presented at the home of Arlene and Bob Davis.

- Dr. Barak also spoke at the Ardmore Rotary and AABGU's Philadelphia Chapter board meeting.
- Dr. Paula Kabalo spoke at Har Zion Temple in Penn Valley, and at a luncheon in the home of Holly Nelson, a graduate of Zin Fellows Cohort II.
- Prof. Emeritus Fred A. Lazin provided a Middle East update for Negev Forum members, hosted by co-chairs Roz and Chuck Epstein; Sam and Jodi Greenblatt; and Maribeth and Steve Lerner.



1. Bob and Arlene Davis; Dr. Simon Barak
2. Jackie Needleman, Holly Nelson, Lisa J. Scheller, Dr. Paula Kabalo, Sharon Freedman
3. Powerful Voices for Israel Honorees: Dr. Felix Zandman z"l, Toni Young and Wayne Woodman
4. Henri Levitt, Jodi Greenblatt, Prof. Fred Lazin

NEW ENGLAND

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BREAKFAST WITH ISRAEL'S FIRST FEMALE BEDOUIN PHYSICIAN

The New England Region was privileged to return to Temple Emanuel of Newton and collaborate with its Israel Action Committee on a fascinating, informative program.

On a warm Sunday morning in June, guests gathered in Temple Emanuel's social hall to meet Dr. Rania Okby, a striking, warm and articulate woman who serves as a shining example of Ben-Gurion University's efforts to build bridges between ancient Bedouin tradition and modern Israeli society.

Dr. Okby graduated from BGU's Joyce and Irving Goldman Medical School in 2004 with the help of an outreach program offered by BGU's Robert H. Arnow Center for Bedouin Studies and Development. She received her degree in obstetrics and gynecology, and is providing medical assistance to Bedouins and serving as a role model in her community.

Dr. Okby spent the last year in Toronto completing her fellowship in maternal fetal medicine, choosing to go into this field because she "fell in love with the beautiful cycle of pregnancy to birth" during her first year as a medical student.

She shared her personal story of how she was identified among her classmates as a gifted student and given the opportunity to enroll in BGU as an undergraduate and complete her medical degree. Her presentation highlighted the health

conditions and availability of health-care within the Negev's Bedouin communities, advances and challenges in working with the government, and the importance of educating the male Bedouin community leadership about supporting medical care for women and children.

Dr. Okby attributes her achievements to having a strong mother and supportive family, in addition to the extraordinary program at the Arnow Center. Recognizing that many Bedouin women confront complex cultural challenges, she is committed

to empowering women in the community so that young girls can have a similar opportunity of their own for advancement.

"We should take pride in Israel's extraordinary achievement in medicine, as well as the combined efforts of the Israeli government, BGU and the Bedouin community to improve public health," one guest commented.

"BGU's educational outreach program certainly seems like a beacon of light and hope for the Bedouin community," another remarked.



1. Dr. Rania Okby (third from left) with her two young daughters and the program's hosts from Temple Emanuel in Newton (left to right): Ram Cohen, Debbie DeBotton, Omri Cohen, and Louise Wolfe
 2. Kevin Leopold, Northeast executive director, with Dr. Hedy Wald of Brown University's Warren Alpert Medical School. Dr. Wald assessed BGU's Joyce and Irving Goldman Medical School curriculum, and helped design and implement an inter-professional healthcare professions educational forum for BGU's Faculty of Health Sciences. 3. BGU students Danielle Keidar and Noa Keren-Khadmy, 2014-2015 recipients of the Philip Krupp Memorial Scholarship Endowment, flanked by Bernice Krupp and Douglas Krupp

NORTHWEST

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LORRY I. LOKEY RECEIVES HONORARY DOCTORATE

Businessman and philanthropist Lorry I. Lokey, of Atherton, was awarded a prestigious honorary doctorate degree at BGU's 45th Board of Governors Meeting in Beer-Sheva. Lokey, a Stanford University alumnus, founded the international media wire service, Business Wire, in 1961 and sold it to Berkshire Hathaway in 2006.

Since then, he has donated more than \$700 million to charitable causes, with the majority of his largesse going to universities. A state-of-the-art Lorry I. Lokey Chemistry Building is currently under construction on the Marcus Family Campus.

OVERCOMING WATER SCARCITY: WHAT CALIFORNIA CAN LEARN FROM ISRAEL

In light of California's worst drought in a century, Prof. Eilon Adar, deputy dean of the Jacob Blaustein Institutes for Desert Research and former director of its Zuckerberg Institute for Water Research, visited the San Francisco Bay Area and Sacramento several times this year to share his water technology and management expertise with government officials, water experts and lay people.

He made a variety of public presentations, including a one-day water symposium at Sacramento City Hall, organized by the Jewish Federation of Sacramento. He also met with the state's top water experts and policymakers, and consulted with landowners grappling with new groundwater legislation.

Prof. Adar explained that unlike the United States, Israel treats water



1. Lorry I. Lokey receives his honorary doctorate at Ben-Gurion University from President Prof. Rivka Carmi and Rector Prof. Zvi HaCohen. 2. Prof. Eilon Adar met with Karen Ross, secretary of the California Department of Food and Agriculture, and Louis Stewart, deputy director of the Governor's Office of Business and Development. 3. AABGU National Board Member Marjorie Kaiz Offer (center) with Alan and Roz Bornstein, whose daughter is a proud BGU alumna 4. Rob Spitzer; NIBN Director Prof. Varda Shoshan-Barmatz; AABGU National Board Member Kathleen Spitzer; and Chuck Broches, event host

as a national commodity. Israelis pay for each unit of water for their homes, which includes both the transmission of water to their property, as well as the treatment of the water released after use (see page 17).

BIOTECH FROM BEER-SHEVA TO SEATTLE

A team of seven scientists from BGU's National Institute for Biotechnology in the Negev (NIBN) visited the Northwest Region to establish a new collaboration with Seattle's Fred Hutchinson Cancer Research Center, known as the "Fred Hutch."

The weeklong visit included a joint symposium, and the announcement of new research grants that will bring together brilliant minds from the two institutions to accelerate the development of new treatments for cancer, Alzheimer's, auto-immune diseases, and more.

The visit was capped off by a reception hosted by longtime AABGU supporters Kathleen and Rob Spitzer, featuring talks by the NIBN team; Seattle Mayor Edward Murray, who had just returned from his first trip to Israel and BGU; and Dr. Larry Corey, president and director emeritus of the Fred Hutch.

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RECOGNIZING THE FROMSONS

Longtime members of the AABGU community Murray and Dodi Fromson of Brentwood were recently the subject of a prominent feature story in the *Jewish Journal of Los Angeles*. The article focused on their generous support to help inform journalists about the groundbreaking work taking place at Ben-Gurion University. Now in its 11th year, the Murray Fromson Media Mission brings American journalists to Israel's Negev region and Ben-Gurion University to learn firsthand about its innovative research. Nine journalists participated in the most recent trip last March, which focused on the advancement of medical technologies at BGU.

DEDICATING THE JIM AND LIZ BRESLAUER BRIDGE

The Jim and Liz Breslauer Bridge was dedicated during BGU's 45th Board of Governors in Beer-Sheva in a festive ribbon-cutting ceremony followed by a walk across the bridge.

This new pedestrian bridge seamlessly connects BGU's Marcus Family Campus with its Health Sciences Complex. The Breslauer-Soref Foundation generously supported the construction of the bridge that spans the busy Ben-Gurion Boulevard.

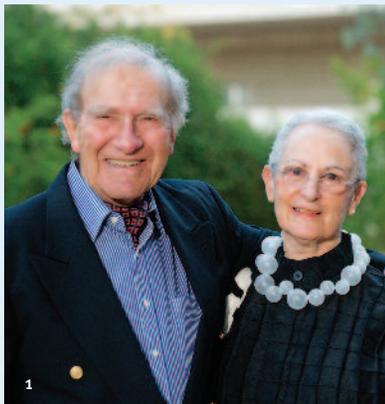
The ceremony was attended by Jim and Liz Breslauer of Long Beach, Stephen Breslauer of Houston, David Breslauer of Houston, members of BGU's administration and faculty, students, University supporters, dignitaries, and friends.

Jim Breslauer received an honorary doctorate in May 2014 from BGU for personally spearheading the

development of and funding for Beer-Sheva's Advanced Technologies Park (ATP). The ATP is becoming the cyber security center of Israel and a major high-tech hub. The Breslauers funded the bridge with the return on their early investment in the ATP.

CELEBRATING A VERY SPECIAL BIRTHDAY

Lottie Marcus, a dear member of the AABGU-BGU family, celebrated her 99th birthday at a dinner party in Rancho Bernardo with BGU President Prof. Rivka Carmi, daughter Ellen Marcus and her husband Harvey Malyn, granddaughter Jennifer Kaplan and her husband Ryan Hill, and Southwest Regional Director Philip Gomperts.



EMERGENCY RESPONSE

Dr. Oren Wacht, international expert on emergency medicine and paramedic instructor at BGU, gave a compelling presentation on "Emergency Response During War and Natural Disasters" in Century City to new and longtime members of the AABGU community.

Dr. Wacht heroically provided emergency medical care under fire during Operation Protective Edge near the Gaza border, where he served as a paramedic for 52 days. Thanks to Ardyth and Samuel Freshman for hosting this event.



1. Murray and Dodi Fromson at Ben-Gurion University. Dodi Fromson served as an AABGU national board member for many years. 2. Jim and Liz Breslauer (left) and BGU President Prof. Rivka Carmi (center) cut the ribbon of the new pedestrian bridge in the presence of former BGU President and MK Prof. Avishay Braverman and his wife, Yael. 3. Happy Birthday Lottie! BGU President Prof. Rivka Carmi with Lottie Marcus 4. At the Valley of the Sun Jewish Community Center in Scottsdale, Arizona: Andrew Hoffer, associate regional director; Dr. Micki Arbel; Dr. Oren Wacht, Ben-Gurion University; Dr. Randi Rubenzik Brodsky; Bob Ramsey

WASHINGTON/ BALTIMORE

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SPOTLIGHT ON DESERT RESEARCH

Dr. Simon Barak of the French Associates Institute for Agriculture and Biotechnology of Drylands at BGU's Jacob Blaustein Institutes for Desert Research gave a briefing to Washington area lay leadership. He provided examples of exciting research being conducted at the Institutes, including his own, which involves identifying genes that allow plants to tolerate the harsh environmental stresses of arid regions.



2

MAKING AN IMPACT: BGU ALUMNI STORIES

Drs. Firas Mawase and Olga Charnaya, two outstanding Ben-Gurion University alumni, were featured at a brunch reception at the home of Gene Sofer and Judge Judy Bartnoff. National Board Member and DC Chapter Co-Chair Art Hessel moderated the conversation.

Dr. Firas Mawase received his bachelor's, master's and doctoral degrees from BGU's Department of Biomedical Engineering and is now a post-doc fellow at Johns Hopkins University. He is specializing in the neurophysiology associated with motor behavior in healthy people and in patients with neurological disease and/or brain injury.

Dr. Olga Charnaya attended BGU's Medical School for International Health and is now a pediatric nephrology fel-

low at Children's National Health System in Washington, DC.

Attendees were particularly interested in the diverse backgrounds of both alumni. Olga, originally from Belarus, moved to Maryland as a child and decided to pursue international health after spending time in Israel as a teenager. Firas grew up in an Arab village outside of Haifa. He is the second of 15 members of his village who have attended BGU.



1



3

INTRODUCING THE ROSMAN SCHOLARS

Marty and Grace Rosman of Edgewater, Maryland established a scholarship fund at Ben-Gurion University for students who have completed army service and are studying the hard sciences. The Rosman Scholars will receive tuition and living assistance for the duration of their studies at BGU.



4

A TASTE OF ISRAEL

Dr. Nir Avieli, senior lecturer in BGU's Department of Sociology and Anthropology, spoke about the uniqueness of Israeli cuisine to AABGU supporters and students at the Baltimore Hebrew Institute at Towson University.

Dr. Avieli is a cultural anthropologist interested primarily in food and in tourism. He is currently writing about Vietnamese gender roles, food and tourism. He is also compiling a culinary ethnography of Israel, focused mainly on issues of food and power.

1. Dr. Simon Barak (third from left) with AABGU supporters Marge and Shelly London, Maury Epner, Deborah Fox, Rhoda Baruch

2. Dr. Firas Mawase (center) with hosts Gene Sofer and Judy Bartnoff

3. DC Chapter Co-Chair Art Hessel (center) moderates a discussion with alumni, Dr. Olga Charnaya and Dr. Firas Mawase.

4. Prof. Eilon Adar shows Misty Gibson and Rafi Rone, of Baltimore's Meyerhoff Family Charitable Funds, one of four Meyerhoff Courtyards at the American Associates Village in Sede Boqer.

REGENERATING BONE AND CARTILAGE

Continued from page 16

the next stage. Negotiations to commercialize the cartilage application are under way. All going well, clinical trials could begin in a few years.

The clinical benefits are tantalizing. Preparing the therapeutic protein-loaded alginate gel is extremely simple, Ruvinov says. Patients may need only a single injection to enjoy long-term, functional success without repeat doctor visits.

Ruvinov sees an even bigger picture for pushing the technology forward. Like bone, neurons lack the intrinsic ability to repair damage, so injuries to the spinal cord, for instance, are permanent. Preliminary experiments show signs of cellular regeneration, he reports. Stroke injuries similarly resist repair, and he hopes his bioactive gel will supply an answer.

“Our belief is based on the data and stems from the system’s simplicity,” he says.

“Academia is full of great ideas, but that’s not enough to pull them through the long winding road of translation to the clinic. We try to build a simple system based on the organism’s biological principles. That’s our driving force. Always.” ■



A student researcher in Prof. Rapaport's lab

THANK YOU FOR YOUR SUPPORT

AABGU salutes our philanthropic partners who joined BGU's most prestigious giving societies this past year.* Their names were inscribed on recognition walls or pillars on the Marcus Family Campus and unveiled at special ceremonies during the 45th Board of Governors Meeting in May.

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*Contributions from spring 2014 through spring 2015



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NO "NEGEV EXPERIENCE" IS REQUIRED.

This event is open to all of BGU's friends (new and long-time) from around the world.

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There is no charge for events or meals. You only need to pay for airfare, hotels and ground transportation to Beer-Sheva. Highlights will include exciting desert study tours and stimulating lectures and presentations; informal one-on-one encounters with researchers and students; and the closing gala at the magnificent Beresheet Hotel overlooking the awe-inspiring Ramon Crater in Mitzpe Ramon.

FOR MORE INFORMATION

Contact your local AABGU regional office, call **646-452-3711** or e-mail programs@aabgu.org

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