AFHU Friends Haverim

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The Power of Prague

For five days last February, the city of Prague became the campus for a pioneering Hebrew University course — "The Golem, Frankenstein, Faust, and Kafka: German Social Theory in Historic Prague," when **Professor Gad Yair**, head of HU's Department of Sociology and Anthropology, took 16 master's degree students to Prague to study 16th century science, magic and religion.

"Research on education shows the importance of unique, once-in-a-lifetime experiences," says Professor Yair. "In creating a powerful experience in the very place where history happened, I wanted the students to gain insights. Prague was the ideal venue for my course."

The students conducted research in the Czech national library that was once a Dominican monastery, read the kabbalistic Book of Creation in the Alt-Neu Synagogue where the mythical golem is said to have slept, and toured the castle where alchemists, astrologers and the fathers of modern science gathered around King Rudolf II.

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Photo: Hagay Eltzur

HU Professor Gad Yair (left) with students in Prague to study 16th century culture.

Hebrew University students work in teams on interdisciplinary research projects.

Fostering Hebrew University Excellence: Four Areas of Strength

To ensure The Hebrew University remains a leading institution worldwide, research and teaching are being integrated in four areas of strength: agriculture, medicine, brain science and the humanities. Interdisciplinary collaboration is being encouraged by the construction of new facilities and expanded programs, creating a new paradigm for integrated teaching and research.

Agriculture

At the Robert H. Smith Faculty of Agriculture, Food, and Environment, construction is underway for a Complex of Animals Sciences and Veterinary Medicine and for the Institute of Environmental Sciences and Natural Resources in Agriculture. These new facilities will house the talents and resources of scientists devoted to addressing problems such as controlling animal disease, and safeguarding water and soil purity. Throughout the entire Smith Faculty, scientists share their knowledge with colleagues around the world through conferences and fieldwork, and have trained hundreds of students from developing countries in nutrition and plant science.

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IN THIS ISSUE

From AFHU's National Executive Director

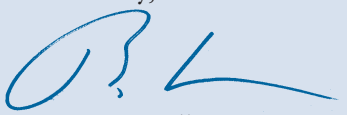
I am pleased to share this issue of *Haverim*, which highlights some of the many new developments, success stories and academic initiatives at The Hebrew University of Jerusalem.

The Hebrew University continues to stand in the vanguard of higher education for Israel and internationally. "Fostering Hebrew University Excellence" describes initiatives in the high-priority fields of medicine, brain research, the humanities and agriculture. Our University, by building new facilities, upgrading existing laboratories and expanding interdisciplinary academic programs, demonstrates why this great institution is top-ranked worldwide. Progress is evident in the physical growth on our campuses and in the innovative degree programs that unite students and faculty from different disciplines, creating a stimulating intellectual climate that leads to breakthroughs.

Great universities must look to the future, which is why HU recruits outstanding new faculty. "Brain Gain" describes some of the young scientists conducting state-of-the-art research in high-tech science and medicine. You'll also read about groundbreaking summer programs at the Rothberg International School, where young American students join their counterparts from around the world to enjoy a rich array of studies while experiencing the wonders of Israel firsthand.

Enjoy *Haverim*, and please visit our web site at **www.afhu.org** to learn about the programs, educational events and missions to Israel that AFHU has organized for 2009. Join us and meet some of the faculty and students responsible for The Hebrew University's excellence.

Sincerely,



Peter T. Willner

Summer in the Holy City

Modern Hebrew. Biblical Hebrew. Middle East politics. Israeli history. The treatment of psychological trauma. Literary and conversational Arabic. These are just a few of the subjects that attracted students from around the world to the 2008 Summer Institute for Middle East Studies, a renowned program of HU's Rothberg International School (RIS). Some 1,150 students from 50 countries participated in the rich array of programs, including:

- **Ming Guan Pei,** 27, from China, who pursued his lifelong interest in Middle East politics.
- **Marcus Lampert**, 23, a Princeton alumnus and current Fulbright scholar, who immersed himself in modern Hebrew and learned to converse with his Israeli roommates.
- **Max Reibman**, 21, a senior majoring in history at the University of Pennsylvania, who conducted research on the British Mandate period at the National Library of Israel on the University's Edmond J. Safra Campus.
- **Line Emma Madsen, a 23-year-old** theology major at the University of Copenhagen, who studied Biblical Hebrew intensively, and relished her stay in Jerusalem, a living remnant of biblical times.

Summer programs have been a focus of RIS since its early days. Originally aimed at providing Hebrew-language courses, today they include the Institute for Israel Studies, which focuses on the emergence of the modern State of Israel, and the Institute for Middle East Studies, held in conjunction with the Department of Islamic and Middle Eastern Studies at the Faculty of Humanities.

Groups from overseas universities attend the summer programs, as well. In 2008, these included students from the Università Cattolica del Sacro Cuore in Milan, Michigan State University, Denmark, Finland, Norway and Sweden (who attended through the generosity of Thanks to Scandinavia, a scholarship fund that honors World War II rescuers of Jews). Students from New York's Brooklyn College, who spent two months studying contemporary Israeli society also participated in an archaeological dig.

An intensive two-week course, "Trauma and Resilience: Theory and Practice from the Israeli Experience," debuted in 2008, and drew 23 psychologists, psychoanalysts, counselors, researchers and students from

Photo: Sasson Tiram

The 2008 RIS Summer Institute far exceeded students' high expectations.

eight countries. A cooperative effort of RIS and the Israel Center for the Treatment of Psychotrauma, the course was initiated by RIS **Provost Professor Yonata Levy**. "I was looking around for topics and areas of study in which The Hebrew University has unique knowledge — and for which Israel in general, and Jerusalem specifically, offers the most suitable arena," says Professor Levy. "Israel, with its long experience of war and terrorism and the resultant stress, is in effect a living laboratory for the study of trauma."

Half of the students followed the course with a week at the Israel Center for the Treatment of Psychotrauma, where they learned trauma intervention skills. "The course far exceeded my mile-high expectations," says Dr. Paul M. Beckingham, a Canadian Army chaplain at Carey Theological College in Vancouver.

Brain Gain

Hebrew University is committed to recruiting outstanding new faculty with important research specialties. Three recently recruited scientists have created world-class laboratories at The Hebrew University, where they're laying the groundwork for scientific breakthroughs.

At the Racah Institute of Physics, **Dr. Hagai Eisenberg** is studying the behavior of tiny packets of light energy called photons. In his lab, a forest of four-inch cylinders supports small crystals, prisms, lenses and mirrors on a steel surface the size of two ping-pong tables. Visitors wear goggles to protect their eyes from accidental contact with the barely visible red streak of light generated by a titanium sapphire laser.

Eisenberg explains: "This laser produces 80 million pulses of light a second, with each pulse being ultra-short — less than a million-millionth of a second."

By processing these very brief pulses, it's possible to produce a couple of red "daughter" photons from a single blue photon. According to quantum theory, if you move these "entangled" daughter photons very far apart, even to opposite ends of the universe, and measure a property of one of them, it influences the result you get when you measure the same property of the other one.

Puzzled? You're in good company! Einstein felt that this prediction of quantum mechanics contradicted everything he knew about physical reality. But the nature of entangled particles has now been proven — and they offer the possibility of developing quantum computers with unimaginable efficiency.

A quantum computer with a memory of a mere 156 bytes (everyday laptops have more than a billion times as much) will be able to break every security code in the world! But don't worry: Quantum entanglement also will help develop security codes that no computer will be able to crack — not even quantum computers.

Photo: Yoran Aschheim

Dr. Hagai Eisenberg's quantum mechanics research could lead to quantum computers.

In this lab at The Hebrew University, Professor Eisenberg and his colleagues are working at the forefront of the research that will make technology's quantum future possible.

Combatting Alzheimer's

"There is a strong tendency in scientific research to direct projects towards applications," says **Dr. Uri Raviv** of HU's Institute of Chemistry. "I believe we must understand the fundamentals first — we then have a better chance of designing successful applications."

In his laboratory, Raviv — the University's first recipient of a Rudin Fellowship — pursues fundamental knowledge that he hopes will enable scientists to design more effective drugs.

Using X-ray techniques originally developed by physicists to analyze the structure of liquid crystals, Dr. Raviv is investigating some of the most basic interactions that take place in living matter.

Our bodies are composed of soft structures filled with a chemical soup of biomolecules. Yet we understand very little about how these substances interact with each other, the forces between them and the structures they form. Close encounters between proteins, for example, produce complex structures. Sometimes the result can be devastating damage, as in the case of Alzheimer's disease, where groups of protein fragments (peptides) stick together, forming the amyloid plaques that prevent normal brain function. In a joint project with **Professor Tim Deming** of UCLA, Dr. Raviv is investigating the dynamic nature of protein aggregates, and how synthetic peptides can envelop the protein fragments before they clump together — suggesting a way to combat the process that results in Alzheimer's.

Raviv's team also will prepare to study the forces between microtubules, the protein-based, filament-like structures that speed essential proteins from one part of a cell to another.

Basic science first, applications later: Professor Uri Raviv and his team are building a solid foundation for future medical advances.

The Secret Life of Bacteria

A physicist who turned to biophysics while conducting postdoctorate work at Harvard, **Dr. Ady Vaknin** is investigating a harmless strain of E. coli bacteria, in particular, the way they sense the world around them.

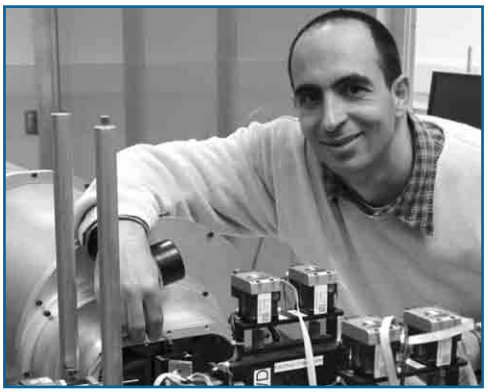


Photo: Sasson Tiram

Dr. Uri Raviv's research could help combat Alzheimer's.

It may surprise you to learn that the behavior and movement of bacteria are not random. E. coli, like other bacteria, has 32 different sensory systems that provide essential information to help it thrive. Bacteria can even detect the chemicals we produce when our immune system is weakened — and can use that information to invade our cells and make us sick.

The particular sensing mechanism that Dr. Vaknin and his team are studying enables E. coli to home in on a source of food. "It is always looking for a better life," explains Dr. Vaknin, "and constantly samples the chemicals in its environment, computes where it wants to go and moves

Photo: Sasson Tiram

Dr. Ady Vaknin's research could lead to new antibacterial medicines.

off in that direction." His team is investigating, at the molecular level, how bacteria detect tasty chemicals and issue instructions to the filament-like structures behind them that push the bacteria toward the food.

"The more we know about the system, the easier it is to interfere with it," says Dr. Vaknin. The insights gained at his lab may be the first steps toward designing new antibacterial drugs.

Honoring Bill Gates

On December 2, 2008, The Hebrew University of Jerusalem and the American Friends of The Hebrew University honored **Bill Gates**, founder and chairman of Microsoft Corporation and co-chair of the Bill & Melinda Gates Foundation, with its inaugural Einstein Award at a gala dinner held at the New York Hilton. The dinner raised more than $1.5 million for cutting-edge plant and animal science research at HU's Robert H. Smith Faculty of Agriculture, Food and Environment.

Robert H. Smith served as honorary chair of the Einstein Award event, and Einstein biographer Walter Isaacson delivered the keynote address. Ambassador Sallai Meridor spoke on behalf of the State of Israel.

In accepting the award, Mr. Gates noted that remarkable progress has been made in recent decades in improving health around the world, in no small part because of HU breakthroughs such as drip irrigation. "Agricultural innovation is one of the most important ways to make people's lives better," he said. "History has shown us that almost no country has managed a rapid rise from poverty without increasing its agricultural productivity. HU is uniquely suited to contribute to the world though agricultural research and development."

> ***"He is a pioneer who has transformed the world..."***

The Einstein Award was inspired by the legacy of Albert Einstein, whose actions were rooted in the belief that true progress requires the alleviation of human suffering. "Bill Gates truly embodies the values and ideals of The Hebrew University and indeed the Einstein Award," said **George Schieren**, AFHU president. "He is a pioneer who has transformed the world, first through revolutionary technological innovation, and now through his selfless pursuit to eradicate disease and hunger. His dedication to meeting the nutritional needs of millions around the globe mirrors the continued efforts by Hebrew University researchers to feed the world through sustainable agriculture."

From left: HU President Professor Menachem Magidor, honoree Bill Gates, AFHU President George Schieren, gala dinner Honorary Chair Robert H. Smith, gala dinner Honorary Co-Chair and University Board of Governors' Chairman Charles H. Goodman.

Fostering Hebrew University Excellence: Four Areas of Strength *(continued from page 1)*

Humanities

The former home to such great minds as the philosopher Martin Buber, the scholar of Jewish mysticism, Gershom Scholem, and archaeologist Yigael Yadin, the Faculty of Humanities brings together scholars from varied disciplines. Just one example is the Faculty's Scholion Interdisciplinary Research Center in Jewish Studies at the Mandel Institute of Jewish Studies, where experts in Jewish Studies, the humanities and social sciences examine specific areas of Jewish Studies within broad cultural contexts. Recently ranked 41st in arts and humanities among universities worldwide, HU's Faculty of Humanities is a wellspring of Israel's intellectual life.

Brain Science

The Hebrew University's neuroscience community has won worldwide acclaim as a source of ground-breaking research. HU expertise in these areas is exemplified by the award-winning Interdisciplinary Center for Neural Computation (ICNC), where diverse experimental and theoretical areas interact, creating new directions of medical inquiry and producing world-leading neuroscience. Hebrew University brain research has led to new and effective treatments for Alzheimer's and Parkinson's disease, as well as advances in artificial limb control.

Medicine

The Faculty of Medicine's new Institute for Medical Research encourages interdisciplinary approaches to medical research and provides state-of-the-art equipment and facilities to its talented researchers. Medical research at Hebrew University enjoys many distinct advantages, including an internationally recognized team of experts in a wide array of disciplines, access to a unique human population and climate, and access to one of the largest academic hospitals between London and Tokyo. The Faculty produces 30% of Israeli biomedical research published in prestigious journals. Its areas of strength range from cancer and autoimmune disease research, to genetic and stem cell research and projects dedicated to eradicating infectious diseases.

To learn more about these areas of excellence and how American Friends, visit our website at **www.afhu.org**.

The Power of Prague

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"To a certain degree, it was a course in methodology since it showed us how to analyze a specific culture," says **Ruti Baidach**, a second-year master's student in cultural studies. "It also brought me closer to my late grandmother, who lived in Prague for a brief period and actually taught Hebrew to Kafka."

For **Hagay Elitzur**, now working as an organizational consultant, the course "undoubtedly changed my worldview as a sociologist. It was the last course I took before completing my master's degree — and a great finale."

Professor Yair's colleagues in the Department of Sociology and Anthropology are now exploring the possibility of offering similar courses in other parts of the world.

Visit our website: www.afhu.org for additional news and information about HU as well as upcoming AFHU events and programs.

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