

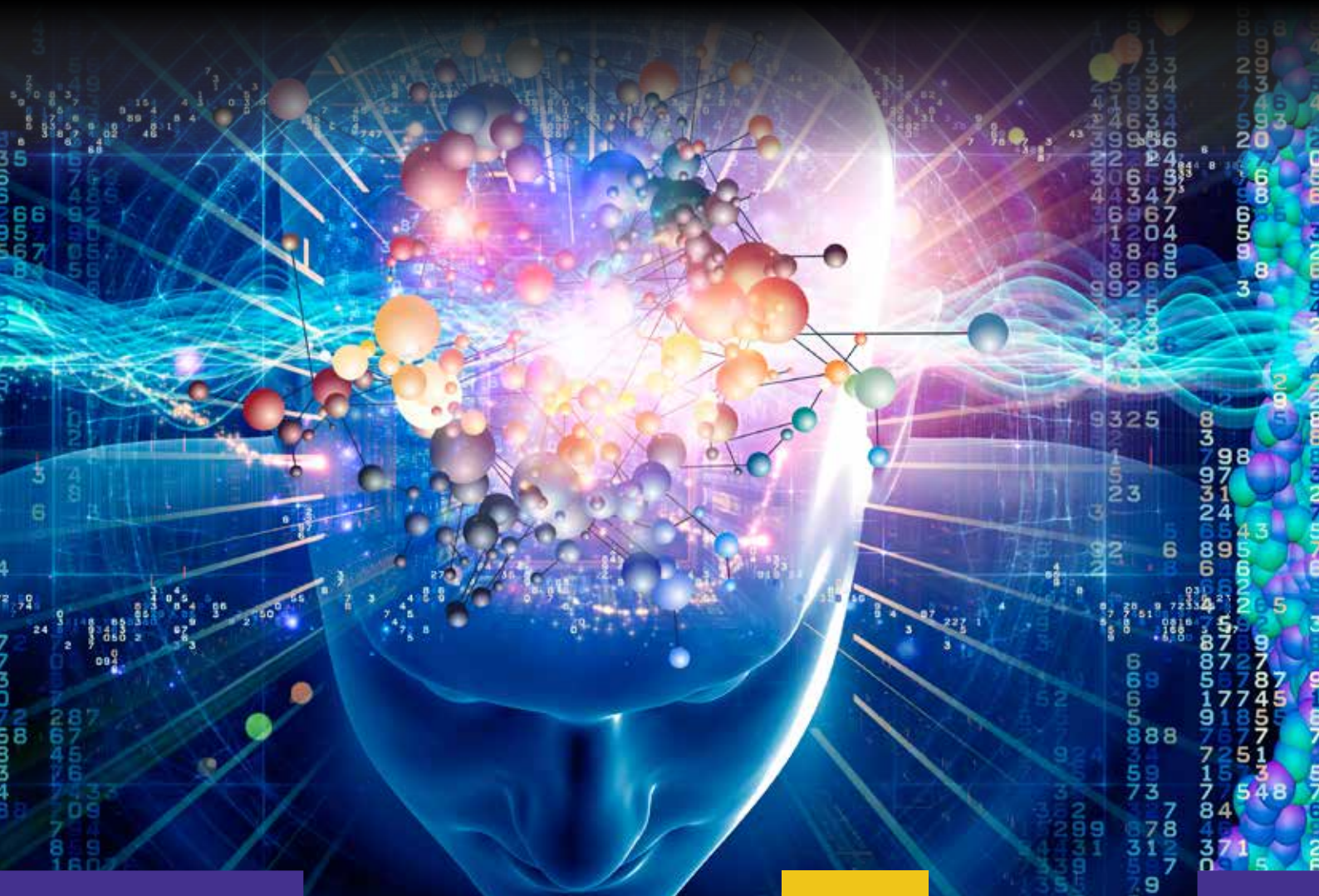


THE WEIZMANN

INTERNATIONAL MAGAZINE
OF SCIENCE & PEOPLE

No. 3

SPRING 2013



Floating with the
Phytoplankton

PAGE 12

For the Love of Science

PAGE 36

The Science of Fat

PAGE 48

Cover Story

The Human Brain Project

PAGE 40

Cover Story



The Human Brain Project
PAGE 40

מכון ויצמן למדע
THE DANIEL SIEFF
RESEARCH INSTITUTE

**Faculty of Chemistry
Alumni Reunion**

October 3, 2013
19:00

At the Weizmann
Institute of Science

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www.weizmann.ac.il/alumni/English/home

מכון ויצמן למדע
WEIZMANN INSTITUTE OF SCIENCE
מרכז המידע

From the President



There are almost as many different plans and approaches to setting up research institutes as there are institutes. Some of them may be dedicated to a single topic – for instance cancer or nuclear physics. All of the financial and intellectual capital of such an institute will be invested in producing tangible advances in the specific field. On the other hand, a research institute can take the broad approach to science and discovery, encompassing a wide variety of research

fields within its scope of activity. Of course, both ends of this spectrum – and anything in between – are valid plans for an institute. Each provides both its researchers and the individuals, foundations and governments that invest in it with a different set of advantages.

Even a quick flip through the pages of this magazine will give you some pretty strong clues as to where the Weizmann Institute is situated along this spectrum. If you take a little more time, you will find articles on fascinating, cutting-edge research in fields from theoretical physics to personalized medicine, from marine biology to brain research. And don't forget science education – from outstanding science teachers to a program for international high-school graduates. In other words, the Weizmann Institute's plan is to provide a very broad platform – one that will foster a wealth of new ideas in as wide a range of fields as possible. One of the biggest advantages we experience with this approach is that scientists have the opportunity to make connections between ideas – including, more often than not, ideas that arise from such disparate disciplines as biology and

physics or computer science. The great thing about this synergy is that no one can predict where it will lead. And this means that, once in a while, this type of research will lead somewhere completely new – to a place that was not only not predicted, but never even dreamed of.

But this magazine is about more than just the connections our wide-ranging approach generates. Of course we want to show you what we do, but our goal is also to strengthen a different type of connection – that between our supporters and our scientists. These connections are what have enabled us to create this amazing web of science here at the Weizmann Institute. I hope that our supporters feel themselves to be full partners in the generation of new ideas and in the scientific adventure we undertake here each and every day. I would like to take this opportunity to thank them, one and all, for their superb generosity.

Daniel Zajfman

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CONTENTS

SCIENCE BRIEFS

- 2 Reprogramming Protein Revealed
A Computer Learns to See
- 3 A Better Basis for Biotech
Seeing Spin

LESTER CROWN'S STORY

NEW SCIENTISTS

- 8 Prof. Ulf Leonhardt: A Trick
of the Light
- 10 Prof. Yarden Samuels: Working
Toward Personalized Cancer
Treatment

PLANT SCIENCE

- 12 Floating with the Phytoplankton

INTERNATIONAL BOARD MEETING

- 14 The Weizmann Institute's
64th Annual General Meeting of
the International Board
- 17 A lifelong partnership and a
dream fulfilled
- 20 Achievement extraordinaire:
awarding of Ph.D.s *bonoris causa*

ENVIRONMENTAL SCIENCE

- 24 Cycles

AROUND THE WORLD

- 26 Dr. Manfred Gentz to lead
German Friends

- 27 New Spanish Association
of Friends launched
At the Falling Walls Conference,
Prof. Zajfman says science
literacy is critical
- 28 A History of Scientific Relations

PHYSICS

- 30 New Horizons in Physics

BIOLOGICAL REGULATION

- 32 The Cholesterol Conversation

EDUCATION

- 34 Schooling Teachers in Science
For the Love of Science
- 38 Q&A with Dr. Bessie Lawrence
- 39 Top that

COVER STORY:

- The Human Brain Project**
- 40 Prof. Henry Markram: Mind
and Brain
- 42 The Human Brain Project
- 43 Prof. Yadin Dudai on the
Human Brain Project

ON CAMPUS

- 44 Remembering Dr. Chaim Weizmann
- 47 Opening a Window to Science
Lecture Series for Scientists

OBESITY

- 48 The Science of Fat
- 50 The Personalized Nutrition Project

PRIZES

- 52 Prize Possession

LAB STORY

- 54 Extreme Chemistry

STUDENTS

- 56 Students Who Teach
- Students Who Organize

THANK YOU

- 60 **10 THINGS WE DIDN'T KNOW**
About Dr. Chaim Weizmann

Reprogramming Protein Revealed

Weizmann Institute scientists revealed a piece of the stem cell puzzle: an enzyme that plays a key role in the process of turning an adult cell back into an embryonic-like stem cell. Scientists have learned to reprogram cells, creating so-called induced pluripotent stem cells (iPS cells) by inserting a small number of genes, but the process, itself, has been a “black box.”

Dr. Jacob (Yaqub) Hanna and his team found that an enzyme called Utx is activated in reprogramming. Utx changes the packaging of the genes, so that hundreds of genes that are normally silenced in the adult cell can be turned on. When the team looked for the original function of this enzyme, they found that it is crucial for the production of sperm or eggs in a developing embryo. So their findings may have relevance for fertility research, as well as research on iPS cells.

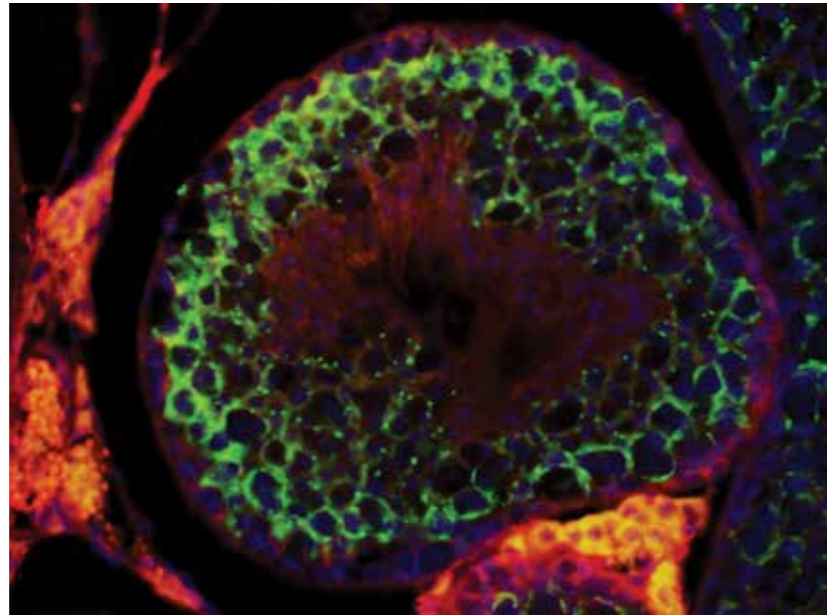
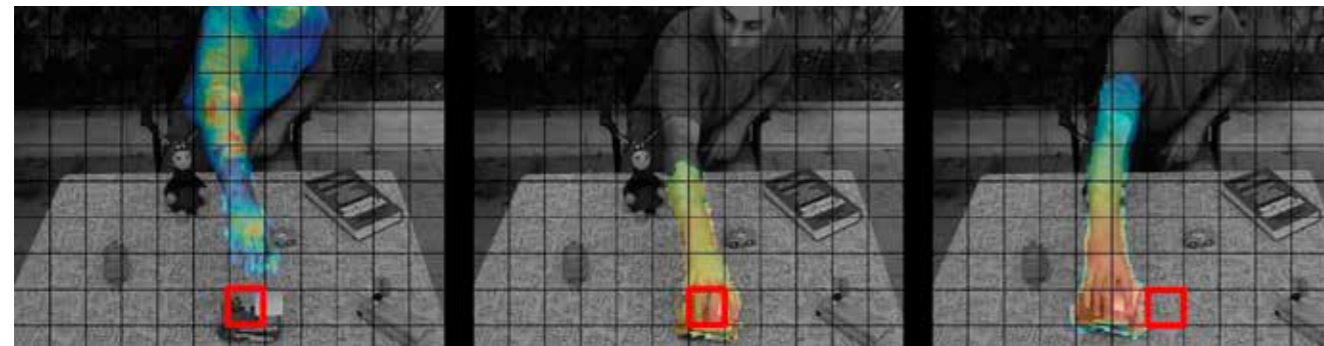


Image of adult male mouse testis reveals enzyme function in sperm production

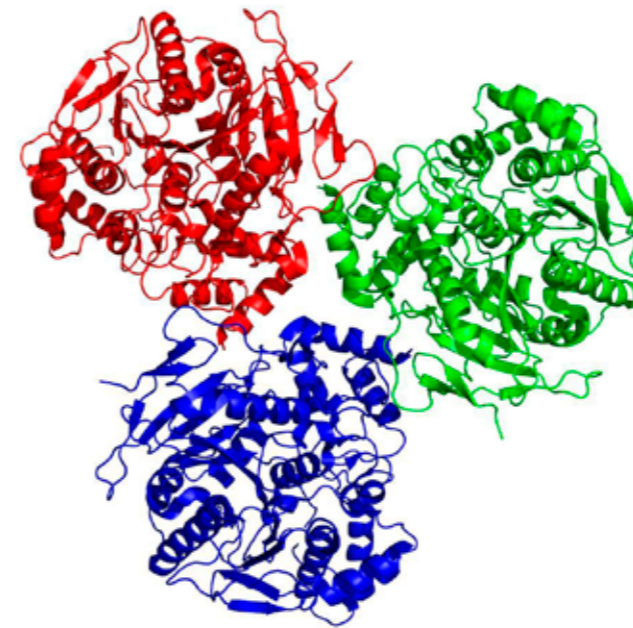
the Ruth and Samy Cohn Professor of Computer Sciences, and his research team believe that computers can help, as well as learning from babies how to become intelligent agents. They designed computer models based on the way that babies observe their environment. Newborns, for example, can track movement. The question was whether some kinds of movement are more helpful than others in learning to identify such objects as hands – one of the first things infants learn to distinguish, despite the fact that hands can take on quite a range of appearances.

Ullman and his team created an algorithm in which the computer would figure out, through watching a series of video clips, what visual objects can be identified as hands.

Their findings suggest that “mover events” – observations of hands moving objects – are best for learning. Adding in faces and bodies as reference points further improved the computer’s learning abilities. The research, part of the Digital Baby Project, can be tested in studies with infants, and it may yield useful insights for computer vision and learning, and robotics.



Computer detection of a mover event as it flows through the red cell



Structure of a human protein produced in caterpillars

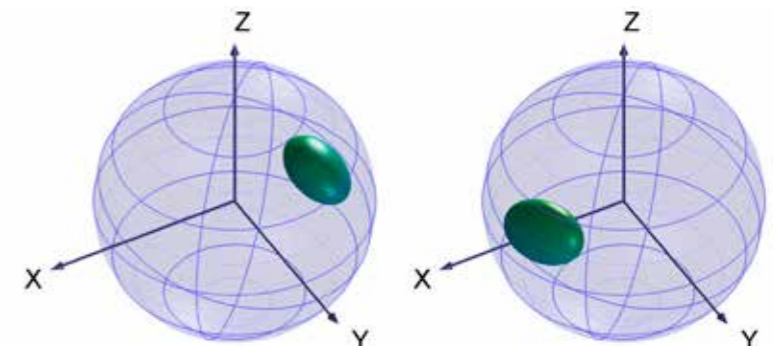
A Better Basis for Biotech

In today’s biotech industry, human proteins for drugs and research are produced by inserting human DNA into bacteria, yeast or animal cell lines and tricking them into manufacturing the new molecules. Scientists searching for newer, simpler, more cost effective methods have hit upon the idea of using whole insect larvae, as these might effectively yield large quantities of the required proteins. But it was not clear whether the proteins created in this way would be as close to the human ones as those produced by today’s methods.

To find out, the Weizmann Institute’s Dr. Harry Greenblatt and Prof. Joel Sussman, the Morton and Gladys Pickman Professor in Structural Biology, joined forces with researchers in the US army and the biomedical industry. They investigated a human enzyme produced

synthetically in cabbage looper moth larvae.

Their findings revealed that the new proteins were identical to those manufactured in cultured insect cells. The scientists reported that the moth larvae were easy to grow and manipulate, and they produced large quantities of the enzyme. These results are a “proof of principle” that can hopefully be applied to the manufacture of many more biomedical proteins.



All spin directions (spheres) collapse on one or the opposite direction depending on the measured polarization of the photon

Seeing Spin

Physicists who want to measure quantum systems have a problem: Observing or measuring a quantum system in any way changes the system. Unobserved quantum systems can be in superposition – in more than one state at a time. One quantum property that lends itself to superposition is a particle’s spin – an intrinsic magnet. Spins can be oriented in multiple directions simultaneously, but observation will collapse that to a single direction of spin.

Dr. Roee Ozeri and his research team investigated what happens to a single atom’s spin when it is observed, in this case with light. They lit the atom up with a laser, causing the atom to collide with a photon. The results, which appeared in *Science*, showed that the direction the photon takes as it leaves the atom is the direction that the spin adopts when superposition collapses.

Measuring the polarization of the photon showed whether the spin was parallel or anti-parallel to the direction of emission. Further research revealed that the photon and atom were entangled: Even after they were separated, measurements in one caused an instantaneous change in the other.

In his first job, he made 30 cents an hour.

Lester Crown's Story

is a true American tale whose path led to the Weizmann Institute three decades ago – and the friendship only continues to grow

Lester Crown likes to say that his approach to philanthropy and his approach to business management are identical: Invest in the best management. Trust them to make the right decisions. Then, instead of telling them what you want, find out what they need.

This philosophy has not only guided Crown as head of his diverse family business and as principal shareholder of defense giant General Dynamics, but it has also inspired a steady stream of major gifts from the Crown family to the Weizmann Institute over the years, starting with their earliest gift, for the Crown Immunology Fund, in 1984 and including the Crown Human Genome Center, opened in 1998.

The scientific advances resulting from the Crowns' generosity have been numerous. The Crown Photonics Center, established in 2008 with a generous gift from the family, for instance, funds research into light and its interaction with matter. The center "has positioned the Weizmann Institute at the forefront of a hot, growing field that is important both for basic physics and for applications ranging from information science to medicine," says Prof. Yaron Silberberg, the Harry Weinrebe Professor of Laser Physics, who heads the Center. "It is very admirable that a donor appreciates the importance of basic research and realizes that sometimes this is the best 'gamble' if your wish is to have a long-term impact on humanity in the broadest possible way."

In step with the latest priorities of the Institute, the family's most recent gift was the first major commitment to the new Israel National Center for

Personalized Medicine (INCPM).

As Vice Chair of the International Board, Crown works closely with the Weizmann Institute's management, and sits on the Institute's Executive, Assets and Management committees. He was awarded a Ph.D. *honoris causa* from the Institute in 1990. The Institute benefits greatly from the business savvy that has served him and his family well.

"Lester's philanthropy is unique: He gives, and then he gives you the feeling that he owes you," says Prof. Daniel Zajfman, President of the Weizmann Institute.

The Crown family gives generously to many causes: education, the arts, civic, environmental and social causes, Jewish organizations and Israeli entities. He has had friendships with generations of Israeli leaders, and he has also come to know some of the leadership in the Gulf countries, where he has spent a good deal of time. As an active leader in Chicago civic life, Lester became an important and early supporter of President Barack Obama. In voluntary roles, he helps make Chicago go: he led the committee to expand Chicago's O'Hare Airport and led its business community in the county's establishment of a major new hospital. The list goes on. He is a major donor to his alma mater, Northwestern University, where he established the Crown Family Center for Jewish and Israel Studies and, last fall, a new chair in Israel Studies, in addition to many other gifts.

The Crowns' relationship with Weizmann Institute goes back decades; the Institute has been part of his life for so long that he can't quite pin down

the exact date. His friend and fellow Chicagoan Robert Asher (a former President of ACWIS) introduced him to then-president of the Institute Prof. Haim Harari in the early 1980s. "I was impressed with Prof. Harari and the high standard of research at the Institute. So it was natural to add the Weizmann Institute to the list of things we were doing in Israel," he says. He continues: "The Weizmann Institute is a spectacular organization. It is a major part of the tremendous contributions that Israel gives to the world. Israel's intellectual gifts are illuminating the whole world."

"I have known Lester Crown for 25 years," says Harari, now Chairman of the Davidson Institute of Science Education at the Weizmann Institute. "I have yet to see one case in which he will not respond with passion, sensitivity, generosity and smile to a request or a need of the Weizmann Institute or of the State of Israel. He is one of those pillars of strength and wisdom that an Institute like ours must rely on."

"Lester is a dear friend and a true visionary," says Prof. Doron Lancet, the Ralph D. and Lois R. Silver Professor of Human Genomics, head of the Crown Human Genome Center. "Fifteen years ago he grasped the significance of genome research. We all are indebted to his continuous generosity, which has helped advanced genomics at Weizmann and in Israel."

The family's involvement in Israel began in the 1930s, when his mother became active in Hadassah; both his parents, in addition to Lester, his brothers and most of his children, were good friends of the late mayor of Jerusalem, Teddy Kollek.

"It is very admirable that a donor appreciates the importance of basic research and realizes that sometimes this is the best 'gamble' if your wish is to have a long-term impact on humanity in the broadest possible way"

Prof. Yaron Silberberg



"Everyone realized that the establishment of the Jewish state was a miracle," says Crown, explaining his family's original impetus for giving to Israel. "But the fact that it has thrived and has given so much back to the world in the face of everything that has happened to it is an even bigger miracle."

An American story

The Crown family history is a true rags-to-riches tale. Lester's grandparents, Arie and Ida Crown, left their village in Russia around 1890, arriving in Chicago by horse and cart. They came "with absolutely nothing," says Lester.

His father, Henry, and uncles Irving and Sol, founded Material Service Corporation in 1919. Starting with relationships with a few contractors, Material Service grew to become the largest supplier to the booming Chicago construction industry. By 1928 the company's supply yards dotted the Chicago metropolitan area, and its barges, tugboats and trucks hauled supplies throughout the Chicago area. The company survived the Depression and, as America's road and housing infrastructure boomed in the post-World War II era, the company thrived. In 1959, it merged with General Dynamics.

The Crown family work ethic was legendary, as was their reputation for business honesty and loyalty to associates. *New York Times* columnist David Brooks has called Lester Crown an "exemplar of humility." Lester says his father was the source of these qualities. He calls his father "probably the finest human being I've ever known," and says that he had "ingenuity and a moral compass, and he was willing to work very hard." His relationships with people were paramount to him, Lester says. He was humble, often giving others credit for his own ideas, which enabled him to accomplish a great deal. All the Crown children in Lester's generation worked from the earliest age possible, most of them in the family business.

Lester was born in 1925, the middle of three boys. His first job with the family business came at age 12, as an office boy. "I made 30 cents an hour, which was 5 cents under the minimum wage for children then," he recalls. So, I got a raise

to 35 cents." He continued working for Material Service throughout high school and in college summers, primarily in demanding physical tasks in the sand and gravel pits and quarries. "The toughest job I had was periodically driving an old chain-drive Mack truck and unloading sacks of cement," he recalls. He earned a B.Sc. in chemical engineering from Northwestern in 1945 and an MBA from Harvard University in 1949.

His father volunteered in World War II and attained the rank of Colonel. Lester's mother, Bea, died young, in 1943, of cancer.

Material Service's success spawned other family investments, including, in 1951, Henry Crown's purchase of the Empire State Building which he later sold. Henry Crown's successes reinforced his belief that in America anything was possible if you were willing to work for it, and he transmitted this markedly

The Crown family work ethic was legendary, as was their reputation for business honesty and loyalty to associates

Midwestern work ethic to his children. Lester gradually took over the leadership of the family businesses in the 1980s. Henry died in 1990.

The marriage with General Dynamics, which built the F-16 fighter jet, nuclear submarines and advanced missiles, actually proved to be a mixed blessing, but it launched the investment firm Henry Crown & Company, and Lester Crown with it, into an international, diverse business world that extended around the globe. Lester became President of Henry Crown & Company in 1969. He now presides over the family business empire together with a number of other family members. The company's holdings include stakes in the Chicago Bulls, the New York Yankees, the Aspen

Skiing Company, JP Morgan Chase and Rockefeller Center in New York, in addition to General Dynamics. He served as a director and chair of General Dynamics Executive Committee and has been on the boards of a number of other major corporations.

Family traditions

All seven of Lester and Renee's children – Steven, James, Patricia, Susan, Daniel, Sara and Janet – absorbed the family traditions of work and philanthropy from their parents and grandparents. Two of his sons, Steve and Jim, are the senior officers of Henry Crown & Company, which also includes two sons-in-law in major positions. All are involved in philanthropy. "We are intensely proud of all of them," he says.

Lester's commitment to Weizmann has touched the Institute in myriad ways. In the 1990s he helped organize two "Air ACWIS" missions to jet major Weizmann supporters to Israel, with stopovers and meetings with King Abdullah II of Jordan. He was also one of a handful of International Board members on the search team that recruited Prof. Daniel Zajfman to be president of the Institute in 2006. "I saw a capable administrator with vision and humility, and yet a backbone of steel," recalls Lester.

When asked to assess the next generation of American Jewish donors to Israel, Crown says he's impressed with what he sees, particularly from his perch in Chicago. However, their relationship with Israel is a very different one than that of his and his parents' generations.

"We lived through the Holocaust and the struggles to found the State of Israel. We have a deeply emotional attachment to Israel," he says. "For this new generation, the connection is more intellectual. They have many interests and passions. They need to connect with Israel in a new way." He thinks the scientific research of the kind pursued at Weizmann and the "other tremendous gifts that Israel is giving back to humanity" are the inspiration. The challenge for all institutions in Israel, he adds, is to find a way to reach this generation.



(l-r) Institute President Prof. Daniel Zajfman, Lester Crown and President of the American Committee for the Weizmann Institute of Science Laurence Blumberg

A history of giving to the Weizmann Institute by the Crown family

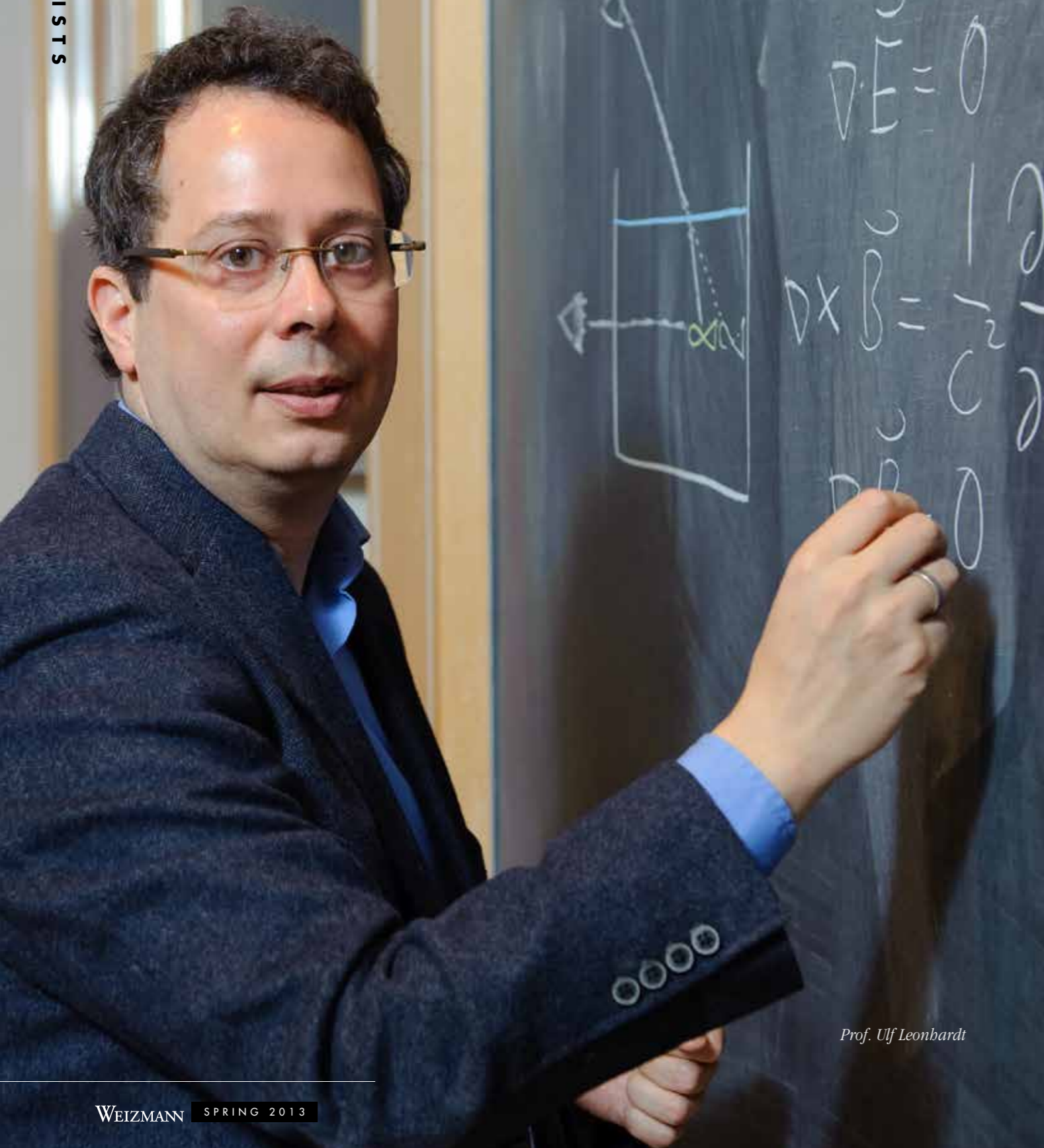
- The **Crown Endowment Fund for Immunology Research**, established in 1984, provides research grants for immunology-related studies.
- The **Crown Endowment Fund for Brain Research**, established in 1989.
- The **Crown Human Genome Center** opened in 1998, five years before the worldwide human genome sequencing effort completed

the first-ever sequencing of human DNA. The Center has enabled Weizmann researchers to become world leaders in elucidating the mysteries of the human genome; in particular they have been innovators in organizing genetic information in an easy-to-use yet powerful database known as GeneCards. In collaboration with physicians in key hospitals in Israel, their research has led to the identification of the genetic cause of six monogenic hereditary diseases of Israeli populations (Ashkenazi Jews, Bedouins and Persian Jews, for example). This information is now available for genetic counseling.

- The **Crown Photonics Center**, established in 2008, funds research into light and its interaction with

matter. With its help, Weizmann researchers have been able to generate pulses of light shorter than one femtosecond. Photonics Center researchers are engaged in studies that range from faster lasers to new ways of capturing light energy in photovoltaic cells.

- The **Crown Institute for Genomics**, established by the founding gift of the Israel National Center for Personalized Medicine and a natural extension of the Crown Human Genome Center, will enable the advent of high-throughput sequencing analysis of whole genomes or large sections of DNA, to pinpoint the underlying causes of disease.



Prof. Ulf Leonhardt

A Trick of the Light

Prof. Ulf Leonhardt describes how bending light can hide or reveal an object, or probe the physics of a black hole

Prof. Ulf Leonhardt says that his research involves an old, familiar subject: the connections between optics and curved space. We instinctively feel those connections, for instance, when we note that a fish in a tank of water appears displaced from its actual position, especially when we view it from different angles. The physics of light bending in glass or water had already been worked out by the early 17th century.

Yet Leonhardt rocked the world of science in 2006 when he and another group published papers describing how the principles of light curvature in space could be applied to making objects invisible. Combining lessons from more recent physics with ideas from the design of new optical materials, he described how light could be guided in a circle, leaving an unseen “hole” in the middle. “You can create a situation in which a single object appears to shrink down to a point – making it effectively invisible,” he says.

Since then, a number of experimental groups world-wide have taken up the challenge of creating “cloaking devices.” While true invisibility – to multiple wavelengths of radiation in three dimensions – is still a way off, several have already succeeded in creating partial invisibility, for instance to the electromagnetic waves used in mobile phones.

At the Institute, Leonhardt plans to continue researching phenomena ranging from some that occur on nanoscales to

others taking place in black holes. For example, attaining perfect imaging – the opposite of invisibility – could also be based on light curvature. A few years back, Leonhardt showed that light could be spread out and sharply refocused, thus eliminating what has been considered a fundamental limit of light microscopy – the inability to see anything smaller than a wavelength of light. So far, he has demonstrated this finding with long microwaves; his goal is to show it can work with visible light. Possible applications might include

“You can create a situation in which a single object appears to shrink down to a point – making it effectively invisible”

techniques for achieving highly-detailed etching on electronic chips.

The processes taking place in black holes are another subject that fascinates Leonhardt. Because black holes are, by their nature, invisible to our telescopes and impossible to study up close, he has been working on methods of creating simulated black holes in the lab – with light. He has found that very short, highly intense pulses of laser light in an optic fiber can mimic what happens in a black hole. Among other things, Leonhardt

intends to use such systems to help answer questions about the radiation that black holes are thought to emit.

Yet another area he plans to investigate concerns a quantum phenomenon that was discovered in the late 1940s: Two metallic plates placed a few micrometers apart in a vacuum will pull closer together, even though there is no apparent force acting on them. This occurrence can be observed in daily life, says Leonhardt: It’s the reason a paper parking ticket stays on a windshield, for instance. But the physics underlying the phenomenon is still barely understood. Leonhardt plans to investigate not only how this attraction works, but whether it can be altered or even reversed. Findings in this direction could be crucial for the design of nanomachines: At such small scales this effect becomes predominant, creating significant drag on moving parts.

Prof. Leonhardt comes to the Weizmann Institute from the University of St. Andrews in Scotland. He was born in the former East Germany, receiving his Ph.D. in theoretical physics from Humboldt University, Berlin, in 1993. His research positions have taken him to Oregon, Sweden, Germany, Singapore, Austria and China. He was attracted to the Weizmann Institute, he says, because of the open, supportive atmosphere he had experienced on an earlier visit. “I feel very welcome here, and I am looking forward to getting together a research group and to working with the strong optics group that is already in place at the Institute,” he says.

Working Toward Personalized Cancer Treatment

Prof. Yardena Samuels wants to understand which mutations drive cancer and which are along for the ride

“We don’t just want to find the genes involved in cancer,” says Prof. Yardena Samuels, who recently joined the Institute’s Molecular Cell Biology Department, “we want to understand what those genes do. We want to reveal the complete picture of a cancer genome.” That is something of a tall order, considering that cells from melanoma, the cancer Samuels is researching, can contain anywhere from tens to thousands of mutations. On average, melanoma – the deadliest form of skin cancer – has more mutations in the DNA of its cells than any other solid tumor. This range of mutations explains, among other things, why a recent treatment designed to target melanoma, though it represents a large step forward, will only help around 50% of those with the disease.

Samuels first came to the Weizmann Institute at age 17, when she attended the Bessie F. Lawrence International Summer Science Institute. That encounter left her aspiring to one day run her own lab. The Israeli-born Samuels grew up in Israel, France, Mexico and the United Kingdom: Her

mother is a diplomat, and her father is Director for International Relations of the Simon Wiesenthal Centre. After completing her B.Sc. in Cambridge University, Samuels returned to Israel to serve in the IDF Medical Corps labs. She went on to receive an M.Sc. from Hebrew University/Hadassah Medical School and a Ph.D. from Imperial College

Cells from melanoma, the cancer Samuels is researching, can contain anywhere from tens to thousands of mutations

London. Samuels continued on to the lab of one of the preeminent cancer genetics researchers in the world – Prof. Bert Vogelstein, at Johns Hopkins University. There, she identified a gene called PIK3CA, which is one of the most highly mutated oncogenes in human malignancies. These studies put PIK3CA

in the spotlight of both clinical and basic cancer research.

Her postdoctoral experience inspired her to focus on personalized medicine for cancer: Investigating cancer biology using genomic tools and managing malignancies by tailoring treatment to personal genomic profiles. In 2006, Samuels established an independent research program as a tenure-track investigator at the National Institutes of Health (NIH) where, together with colleagues, she established a unique tumor bank of 120 matched normal and tumor tissue samples. This allowed her group to comprehensively analyze mutations in melanoma, identify possible new drug targets and lay the groundwork for future personalized therapies.

One of these analyses revealed that a protein called ERBB4 is highly mutated in melanoma and that treatment with an FDA-approved drug currently being used for breast cancer patients, lapatinib, suppresses the proliferation of ERBB4-mutant melanoma cells. This study paved the way to a clinical trial in melanoma patients harboring ERBB4 mutations, recruited from NCI and Memorial Sloan

Prof. Yardena Samuels

Kettering Cancer Center. The results are currently being analyzed.

The future of cancer genomics lies in the integration of genetic, functional and clinical data. Thus Samuels plans to collaborate with Institute computational biology, biology and biochemistry groups to further decipher the genetic and functional landscape of the melanoma genome. One avenue her group will

be pursuing is to sort the thousands of genes that are mutated in melanoma into “drivers” and “passengers” – that is, those that help the cancer develop and the incidental mutations that are just along for the ride. Another will be to explore different experimental approaches and functional models to see which are best for revealing the functions of the various identified genes in their physiological

context. Samuels is also planning to make use of the new Israel National Center for Personalized Medicine; the goals of the Center mesh perfectly with her own approach of conducting basic research, but ultimately aiming for the clinic.

Prof. Yardena Samuels is married to Dr. Ori Lev, a bioethicist, and is mother to two children, ages 7½ and almost 5.



Floating with the Phytoplankton

Taking a month-long Atlantic cruise was all part of the job description for Dr. Assaf Vardi, incumbent of the Edith and Nathan Goldenberg Career Development Chair. He and his Weizmann team were among 30 researchers on a voyage to understand the role that single-celled microorganisms called phytoplankton play in major global cycles - from those of the food we eat to our weather to the oxygen we breathe and the fuel we use for transportation.

Trillions of these plant-like microorganisms float in the oceans; they are so numerous they can be tracked by satellite. Together, they absorb as much carbon dioxide as the world's rain forests; they produce around half of the planet's oxygen; and they form the basis of the entire marine food chain. Yet we know very little about these organisms.

For instance, what makes their populations expand rapidly - and then collapse just as suddenly? These so-called algal blooms can sometimes choke waterways and produce toxic substances that kill fish and work their way up the food chain, so that even humans are affected. Thus among other things, Vardi and his team are investigating the molecular and biochemical basis of those blooms, and the mechanisms that lead to their collapse.

For that month, the cruise ship - part ocean liner, part floating lab - was home to five different research teams from Rutgers University, Woods Hole Oceanographic Institute, the College of Charleston and the Weizmann Institute, all of them investigating the life cycles of phytoplankton. After setting out from Ponta Delgada in the Azores, the

The collapse of an algal bloom is a basically a mass-suicide attempt to keep a viral invasion in check

ship headed north and continued up the middle of the Atlantic to Reykjavik, Iceland. Every day, the teams brought up water samples from different depths; but for the first two weeks, there was no sign of an algal bloom. When they did find one, says Vardi: "That was an unforgettable moment of relief, on the one hand, and a shot of new energy, on the other, to go back out and keep working 20-hour days to continue our research efforts."

Vardi has found that the cycles of bloom and collapse are tied to the eternal battle between living organisms and the

viruses that infect them. This has led to an evolutionary arms race, in which the phytoplankton have developed an entire arsenal of biochemicals, not only for fighting the viruses on an individual level, but for coordinating the battle plan of an entire population. Thus, some of the biochemicals produced by these microorganisms, which Vardi has dubbed "infochemicals," are used to communicate with fellow members of the bloom; others may be weapons in another evolutionary race - against competing species. Vardi has also found that phytoplankton have a suicide mechanism to be used when all else fails. So the collapse of an algal bloom is a basically a mass-suicide attempt to keep a viral invasion in check. This massive collapse has a tremendous impact on the flow and fate of carbon that is released from these cells down to the deep ocean.

A microbiologist, Vardi is also working with Weizmann environmental scientists to understand how algal blooms may supply "seeds" for cloud formation, thus affecting global weather cycles.

"This effort," says Vardi, "was the first of its kind to focus on all levels simultaneously, from molecular processes within the cell through the behavior of whole populations spread over thousands of kilometers and up to the influence of these processes on the atmosphere and climate. Working right alongside the ocean's surface, accompanied by whales - this was a once-in-a-lifetime experience. Every day, there was a brand-new sunset, until we neared the Arctic Circle and experienced the midnight sun there. Those are things that none of us will ever forget."



Dr. Assaf Vardi on board



On the open sea, looking for algal blooms

The Weizmann Institute's 64th Annual General Meeting of the International Board



The opening event: Israel Symphony Orchestra Rishon LeZion

In a week that celebrated the best of science as well as the friendship and support of the Weizmann global community, the Weizmann Institute's International and Executive Boards convened for their 64th Annual General Meeting.

The year 2012 marked 60 years since the passing of the Institute's founder and the first president of the State of Israel, Dr. Chaim Weizmann, and the events of the four-day gathering

(November 11-14) were infused with a celebration of his life and vision. That vision - for a vibrant Jewish state with world-class institutions of higher learning - still drives Israel's ingenuity, economic health and physical security, while benefitting all of humanity.

The opening night's festivities included a film narrated by Israeli actor Alex Ansky of the Habima National Theatre of Israel and a concert by the Israel Symphony Orchestra Rishon LeZion conducted by

Daniel Cohen with a special appearance by pianist Roman Rabinovich.

Launch of the Israel National Center for Personalized Medicine

More than 300 distinguished guests came together on the third eve of the International Board to celebrate the launch of the Israel National Center for Personalized Medicine (INCPM). Weizmann Institute President Prof.



The INCPM launch: Miel de Botton performs a song in honor of her late father

Daniel Zajfman said: "We believe this project will transform the quality, magnitude and impact of biomedical research in Israel - not only in academia but also in the medical sector and the pharmaceutical, biotech and biomedical industries."

The event also marked the inauguration of the INCPM's Crown Institute for Genomics, established by Vice Chair of the International Board Lester Crown and his family; and the de Botton Institute for Protein Profiling, established thanks to a

gift by Miel de Botton of London.

Prof. Aaron Ciechanover, of the Technion, Chair of the INCPM and 2004 Nobel laureate in Chemistry, said, "We are building something that will be national in the deepest sense of the word. The knowledge from all the hospitals and the institutions in Israel will be concentrated in one place."

The event also honored Lester and Renee Crown and Miel de Botton. At the dinner, Mr. Crown expressed his family's pride in being part of a project

that strengthens the State of Israel, which gives hope to the whole Jewish world that there will be a continuation of the Jewish people, while at the same time advancing science and medicine.

Miel de Botton conveyed her sentiments in song to her late father, Gilbert de Botton, who was a close friend of the Institute and in whose honor she established the de Botton Institute for Protein Profiling.



(l-r) Profs. Yehiam Prior, Ada Yonath and Serge Haroche

Nobel laureate joins the Board

In November, Prof. Serge Haroche, 2012 Nobel laureate in Physics from the Collège de France, was elected to the Weizmann International Board and of the Scientific and Academic Advisory Committee (SAAC).

A month earlier, the Weizmann Institute had hosted Prof. Haroche for the SAAC review of atomic, molecular and optical science, and he was a speaker at the Atomic, Molecular and Optical Science Symposium organized by Prof. Yehiam Prior. During his visit, Haroche was also honored at a reception hosted by the French Ambassador to Israel, Christophe Bigot.



(l-r) Ido Pinkas, Roberto Franchini, Prof. Michal Neeman, Milvia Perinot and Corrado Valsangiacomo

Picture of health: new frontiers in imaging and genomics

The Henry Chanoch Kreter Institute for Biomedical Imaging and Genomics was inaugurated in the presence of Milvia Perinot and other distinguished members of the Henry Kreter Foundation. At the inauguration ceremony, Prof. Daniel Zajfman spoke of Henry Kreter, who throughout his life was deeply committed to Israel.

At the dedication, Prof. Michal Neeman, Dean of the Weizmann Institute's Faculty

of Biology and first head of the Kreter Institute, explained the Institute's role thus: "What will sampling a football field tell us about the game of football? Maybe we'd get a blade of grass, a ball, a fan in the stands. But none of these individual components can explain football. You need the entire image - like a wide-screen TV. In the same way, bioimaging is advancing the understanding of cancer beyond biopsies, because it enables us to view cancer as it is unfolding."

Powering the future

In a new collaboration funded by the Leona M. and Harry B. Helmsley Charitable Trust, scientific teams from the Weizmann Institute and the Technion - Israel Institute of Technology are working together to advance alternative energy research. The joint effort was formally launched in a special session honoring the Helmsley Trust on November 14. The research aims to "change the paradigm" of energy options, said Prof. Daniel Zajfman.

The complementary focus of the two

A lifelong partnership and a dream fulfilled

In establishing the Henry Chanoch Kreter Institute for Biomedical Imaging and Genomics at the Weizmann Institute, Milvia Perinot says she found "the best possible way" to fulfill her beloved life partner's dream. At the same time, she says, she hopes to contribute to improving the understanding and treatment of cancer. Henry Kreter died in 2008 after a battle with lung cancer.

Henry Chanoch Kreter was born in 1931 in Dresden, Germany. In 1933, sensing the bad times ahead, Henry's father sent him and his mother to Yugoslavia, later joining them. In 1941, on the eve of the Nazi invasion into Yugoslavia, the small family escaped yet again, boarding a train bound for Palestine. Henry grew up in Tel Aviv, and in 1948, lying about his age to join the army, he fought in the War of Independence. He later became a salesman in a Judaica factory in Tel Aviv, but five years later, he joined his mother and father in Trieste, where they had moved in 1951.

When Italian-born Milvia met Henry in 1961, he was working for a local refrigeration company whose customer base he had expanded throughout the continent. She joined him in his travels, navigating and helping him prepare for meetings. Together, they traveled across Europe. Eventually, they settled in the lakeside city of Lugano, Switzerland.

"We had a wonderful life together, but

Henry always yearned to come back to Israel," recalls Milvia. "His great love was Israel. His heart was in Israel. He frequently said, 'I want to do something for Israel. We must go back someday, but first I must grow something so I can bring something real there.'" He related to her an encounter he had during his years in Israel: A beggar told him he would leave the country, make a fortune, and return to Israel and be happy.

Henry died in Lugano on May 28, 2008. Milvia brought him to be buried in Israel. "Unfortunately he did not have time to fulfill his dream, and this task was passed to me," says Milvia. "This is why I found the Weizmann Institute and decided to

establish the Institute for Biomedical Imaging and Genomics, because it will help scientists better understand cancer. I hope that one day they find something to help all the people suffering from this terrible disease."

Milvia spends more time in Israel now and rents a flat in Tel Aviv. She has picked up some Hebrew and says she feels "at home" in Israel. "At the Weizmann Institute I have been welcomed by the scientists - by everyone. It is a warm and special place, and the Institute has become a family to me. If Henry could see what has been done in his memory, I hope that he would be happy."



Milvia Perinot and Henry Kreter

institutions - with Weizmann scientists focused on basic research insights and the Technion on applications - was central to the Helmsley Foundation's decision to support the partnership, said James O'Sullivan, a representative of the Helmsley Trust.

Technion President Prof. Peretz Lavie said that "the Helmsley Trust has brought



(l-r) Prof. Daniel Zajfman and Helmsley Trust representative James O'Sullivan



(l-r) Pascal and Ilana Mantoux and Dr. Jacob Hanna

together the best minds in two great institutes.”

The Helmsley collaboration builds on a strong base of energy research that has been generously funded by Weizmann friends over three decades. Major resources include the Alternative and Sustainable Energy Research Initiative (AERI), which was initiated by Israeli businessman Yossie Hollander; the Mary and Tom Beck-Canadian Center for Alternative Energy Research; and the Brazil-Israel Fund for Alternative Energy. The partnership also builds on the Israeli Center of Research Excellence (ICORE) in alternative energy, in which Weizmann participates with the Technion and Ben-Gurion University.

Repair and renewal: the promise of stem cells

“This is a very exciting day for me,” said Dr. Jacob Hanna at the November 13 dedication of the Ilana and Pascal Mantoux Wing for Stem Cell Research. “It feels like I showed up to my wedding.” Hanna, who is also a medical doctor, joined the Institute in 2011 following a postdoctoral fellowship at the Whitehead Institute at MIT.

Pascal Mantoux spoke movingly about the couple’s decision to support stem cell science – with its promise to renew and regenerate damaged tissue and offer solutions for disease and injury. “It is with a lot of emotion at this particular time that Ilana and I have the privilege of

dedicating this stem cell research wing in memory of our parents, Beatrice and Efraim Ronat and Arlette and Olivier Mantoux.”

Hanna noted that thanks to the Mantoux’s generous contribution, his team now has a fully equipped laboratory suited for research at the highest level. This support has also put him in a strong position to recruit top-notch research colleagues and additional resources from such international granting agencies as the European Union, the Britain-Israel Research and Academic Exchange Partnership, and the Leona M. and Harry B. Helmsley Charitable Trust.

Saying that he and his family value the personal bond that has formed with the



(l-r) Prof. Daniel Zajfman and David and Dr. Judy Dangoor

Mantoux family, Hanna added: “Often, when we have a big result in the lab, my first thought is to tell Ilana and Pascal – not to impress you, but because we really cherish your support, the fact that you believe that we will be able, one day, to do something important.”

Archaeology of the future

The Weizmann Institute’s scientific archaeology program is receiving a major boon this year – the Dangoor Research Accelerator Mass Spectrometry laboratory, or D-REAMS, dedicated to dating archaeological samples. Israel’s entire archaeology community and its international collaborators will benefit from this upgrade in research

capabilities, which was realized thanks to the generosity of the Exilarch’s Foundation and of Dr. Naim Dangoor, CBE, and his son and daughter-in-law, David and Dr. Judy Dangoor of London. The gift was dedicated on November 12 in the presence of David and Judy Dangoor, members of the archaeological milieu in Israel and distinguished guests. The acquisition of the accelerator mass spectrometer “is a dream come true,” said Dr. Elisabetta Boaretto, head of the D-REAMS laboratory. She added that it will help draw outstanding archaeology students and postdocs to the Institute, strengthening the research program.

David Dangoor outlined the family’s reasons for promoting “carbon dating

on steroids.” He said: “We are great believers in mixing disciplines – one of the important elements of the Weizmann Institute – and we are excited that we are mixing physics, archaeology, anthropology and biology.

“Weizmann is, in a sense, in my opinion, part of the peace process,” he continued. “What Weizmann does helps place Israel’s position in the eyes of the world and, hopefully, one day, in that of its neighbors, as a wonderful asset for the region. I did my primary education in Iraq. My dream is that one day samples from Iraq will come to this laboratory and help start a dialog on other levels that one day will lead to the peace that this country so richly deserves.”



(l-r) Prof. Georg Klein, Shimshon Harel, René Braginsky and D. Ronald Daniel

Achievement extraordinaire: awarding of Ph.D.s *honoris causa*

The Weizmann Institute of Science awarded five honorary Ph.D.s. Keynote speaker Ph.D. Justice Dorit Beinisch hailed her fellow honorary Ph.D. recipients as individuals who have not only achieved great heights in their own careers but are deeply committed to public service.

Beinisch, Israel's first female chief justice - who was injured in New York several days before the ceremony and delivered her speech via video - invoked Dr. Chaim Weizmann, saying his vision, determination, patience and devotion to science and the Jewish people are qualities to be emulated for generations to come. She emphasized the importance of the democratic and Jewish nature of Israel.

"For me, the conferment of honorary Ph.D.s is always a highlight of our Board events. It is truly uplifting and inspirational to publicly celebrate the achievements of people who have made such remarkable contributions to society and the world," said Prof. Daniel Zajfman.

Other recipients of a Ph.D. *honoris causa* were:

- René Braginsky of Switzerland, a distinguished businessman and philanthropic leader who has dedicated himself to a wide array of meaningful causes in Switzerland and in Israel. At the Institute, he recently established the Braginsky Center for the Interface between Science and the Humanities, which is doing unique research at the interface between these two broad fields.
- D. Ronald Daniel of the US, honored for his pivotal role in developing the field of management consulting, transforming the profession into a major force in global business; and for his generous gift of time, expertise and effort to the world of academia in multiple roles, including as a member

of the investment committee of the Weizmann Institute's endowment.

- Shimshon Harel, a highly regarded figure in Israel's business community who has led key commercial enterprises and serves as Chairman of the Board of the Institute's Israeli friends. Haifa mayor Yona Yahav has called him "the best citizen of Haifa. He is an outstanding person with a great heart," who can be called upon to help execute some of the city's biggest management projects in a voluntary role.
- World-renowned cancer researcher Prof. Georg Klein of Sweden, a leader in his field, a great humanist and critically acclaimed author. The Institute's Prof. Moshe Oren called him "a chimera between a beacon and an oracle, recognizing the importance of findings and understanding where a field is going." Klein, accepting the honorary degree, spoke of his long connection to the Institute, and recapitulated his first visit, for the inauguration of the Ullmann Building in 1963.

"The fellows will benefit from the prestige of being awarded a special status of excellence among their peers"

Prof. Daniel Zajfman

The David Lopatie Hall: a new home for the Feinberg Graduate School

The Weizmann Institute of Science marked the inauguration of the David Lopatie Hall of Graduate Studies, which houses the Feinberg Graduate School. The Hall, created through a visionary gift by David Lopatie of Johannesburg, South Africa, was dedicated on November 13 in the presence of David Lopatie.

Lopatie's gift comes just a year after his gift enabling the establishment of

the David Lopatie Conference Centre. "Last year, I was filled with humility and pride after the dedication of the Conference Centre," said Lopatie at the ribbon-cutting ceremony. "This year I am simply filled with delight. Israel's geographical location, with its lack of natural resources, demands the very best of its inhabitants. This Hall will be home to the students who will help Israel in the challenges ahead."

The gift will also fund scholarships for outstanding students, helping the

Weizmann Institute to strengthen its academic program. At the dedication ceremony, President Prof. Daniel Zajfman said: "The David Lopatie Fellowship Program will help us attract the best and brightest students, and the fellows will benefit from the prestige of being awarded a special status of excellence among their peers." Each year the Feinberg Graduate School will award up to 10 David Lopatie fellowships to the best M.Sc. candidates at the Weizmann Institute.



David Lopatie at the Lopatie Hall of Graduate Studies dedication



Prof. Daniel Zajfman and David Azrieli at the Donor Wall

Thinking ahead: an investment in brain research

In a joint venture for the next decade, funded by the Adelis Foundation of Paris, scientists at the Weizmann Institute and the Technion – Israel Institute of Technology will study the human brain from a variety of perspectives. Presidents Prof. Daniel Zajfman of the Weizmann Institute and Prof. Peretz Lavie of the Technion formally launched the collaboration on November 14. The gift funds cooperative investigations to advance the understanding and treatment of such neurodegenerative diseases as Alzheimer's and Parkinson's, autism, clinical depression, schizophrenia and more.

"We are honored to be part of research that is a catalyst for a better world," said Sidney Boukhris, husband

of Adelis Foundation Executive Director Rebecca Boukhris.

The Adelis Foundation also funds a major Weizmann Institute research program in metabolic syndrome and obesity, and has supported neuroscience research and provided start-up funds for the lab of Dr. Oren Schuldiner.

At the dedication of the Adelis program, Dr. Ofer Yizhar, who joined the Weizmann Institute in 2011, discussed his research in the emerging field of optogenetics. Yizhar leads one of the 40 teams of scientists from the Weizmann Institute and Technion that will be involved in the joint research projects.

Written in stone

Some 170 friends of the Weizmann Institute from 10 countries had their names inscribed at the Donor Wall at

International Plaza this year, and close to 30 friends whose names were inscribed in recent years were honored at an inscription-unveiling ceremony during the meeting of the International Board.

The dedication paid tribute to the generosity of donors who contributed in a significant way in the past year to the research on campus. Lawrence Blumberg, chairman of the American Committee for the Weizmann Institute of Science, welcomed guests and announced the honorees, who were each called up to the podium to receive a gift from President Prof. Daniel Zajfman.

This year marks the first time that as many as 10 new inscriptions in the Patron section were inscribed on the wall. Prof. Zajfman described the walls of the International Plaza as "walls of leverage" because each philanthropic



Helen and Martin Kimmel Award for Innovative Investigation recipient Prof. Avishay Gal-Yam

gift provides the leverage on which the science practiced at the Institute moves forward.

Kimmel Award for Innovative Investigation to astrophysicist

Prof. Avishay Gal-Yam was named the sixth recipient of the annual Helen and Martin Kimmel Award for Innovative Investigation. The Award was established with the generosity of Helen and Martin Kimmel of New York. It enables scientists with proven track records in advancing their field to explore ambitious, even risky, ideas for future research avenues.

With the aid of research satellites and giant telescopes, Gal-Yam attempts to identify the stars responsible for spectacular stellar explosions called supernovae. He has quickly become a

leader in the emerging field of astrophysics in Israel.

In receiving the prestigious Kimmel Award, Gal-Yam joins previous recipients Profs. Naama Barkai, Yinon Rudich, Lucio Frydman, Rafi Malach and Omer Reingold.

Alon Pinkas speaks at Clore Luncheon

As keynote speaker at the annual Clore Luncheon, former Consul General of Israel to the United States in New York Alon Pinkas diffused some of the hand-wringing about US President Barack Obama's stance on Israel, saying that Israel's focus today should be about "how we can help America help us." Pinkas, who grew up near the Institute, is now a much-called-upon news analyst on US-Israel relations.



Dr. Avraham Aizenbud accepts the Sir Charles Clore Prize from Dame Vivien Duffield

The annual luncheon celebrating the awarding of the Sir Charles Clore Prize for Research and the Clore postdoctoral fellowships, held on November 12, marked the 20th year of these prestigious awards. The Clore Prize went to Dr. Avraham Aizenbud, a new recruit of the Mathematics Department who is a leading expert in representation theory, a branch of math used to study abstract algebraic structures.

Since the initiation of the fellowships in 1992, the Clore Foundation has funded more than 200 postdoctoral fellows at the Weizmann Institute. Dame Vivien Duffield, Chair of the Clore Foundation, said she was pleased to note the number of young women recipients this year. She gave a special thank you to President Prof. Daniel Zajfman for his efforts to promote women scientists in Israel.

Cycles



How does the chemistry of sulfur in the oceans affect the oxygen we breathe?

Over the last 550 million years, sulfur has played a crucial role in keeping the oxygen levels in the atmosphere at a nice, breathable 20%

You've heard of the global carbon cycle, maybe even the nitrogen cycle. But have you given much thought lately to the sulfur cycle? Institute research suggests that we should be paying a bit more attention to the way this element moves through the atmosphere, biosphere, oceans and land. It would appear that over the last 550 million years, sulfur has played a crucial role in keeping the oxygen levels in the atmosphere at a nice, breathable 20%.

This element – number 16 on the periodic table, just below oxygen – is found in everything from the biomolecules in living organisms to the gases released by volcanoes and burning fuels. Sulfur is washed into the ocean from sources on land, eventually exiting the seas when it settles to the bottom in mineral form and gets buried under ocean sediment. More importantly, as sulfur cycles in and out of seawater, it undergoes chemical changes involving other elements: e.g., carbon and oxygen. This means that on a planet-wide scale, sulfur cycles partially regulate the cycles of these other important elements. Until now, however, that regulation was thought to be minor.

To understand the ocean sulfur cycle and its role in other global cycles, the Weizmann Institute's Dr. Itay Halevy, together with Drs. Shanan Peters of the University of Wisconsin and Woodward Fischer of the California Institute of Technology, looked at rocks on land. Specifically, they used a database called Macrostrat containing detailed information on thousands of rock units in North America and beyond; they used this information to probe the ancient history of sulfur-bearing rocks – back to when they were buried under the oceans.

Two kinds of rocks are created when sulfur settles out of seawater. The first occurs mainly in shallow seas and basins as a result of evaporation. Such so-called evaporites include gypsum. The second type involves microbes in seafloor sediments, which use the sulfur to digest organic matter. These release the sulfur in an altered form, which

then chemically binds to iron to create pyrite (also known as fools' gold).

The difference between the evaporites and pyrite lies in the oxygen atoms that are chemically bound to sulfur in its most common compound in seawater. In evaporites, the same oxygen atoms remain bound to the sulfur throughout the cycle. But the sulfur-eating microbes change the compound's chemistry, releasing oxygen into the ocean and ultimately into the atmosphere. In other words, the pyrite-forming part of the sulfur cycle regulates atmospheric oxygen.

The research team found, to their surprise, that the production and burial of pyrite over the millennia has been much more significant than previously thought, accounting for more than 80% of all sulfur removed from the ocean (rather than the 30-40% in prior estimates). They also found that the weathering of pyrite on land is the main way that sulfur enters the ocean, thus closing the circle. Comparing the sulfur cycle with the more familiar carbon cycle suggests that sulfur chemistry could be nearly as important as that of carbon in keeping oxygen levels in the atmosphere steady.



Dr. Itay Halevy

“Freedom of science and research is fundamental to human civil rights and real democracies”

Dr. Manfred Gentz



Ingrid and Dr. Manfred Gentz



Institute President Prof. Daniel Zajfman addresses the Falling Walls Conference

Dr. Manfred Gentz to lead German Friends

In January, Dr. Manfred Gentz became Chairman of the German Association of the Friends of the Weizmann Institute, a key lay leadership role in which he will promote the Institute and lead a cadre of regional directors.

One of Germany's most highly respected and seasoned business leaders, Gentz was formerly CEO and CFO of Daimler-Benz AG in Berlin. Gentz was appointed to the board of management of DaimlerChrysler AG, where he was in charge of Finance and Controlling

until December 2004. He is Chairman of Germany's International Chamber of Commerce, and is a member of the board of several companies and scientific and cultural institutions. He has a doctorate in law from the Berlin Free University.

Gentz sees the pursuit of scientific research as a key component of a strong democracy – a core value that Germany and Israel share. “I strongly believe that freedom of science and research is fundamental to human civil rights and real democracies,” he says. “In the long run, human rights in democracies cannot be sustainable without freedom in the sciences, freedom of thought, freedom of expression, and the freedom to develop one's own personality and to design his or her own life.”

Science is “an excellent bridge to close gaps between societies and to bring people close to one another,” says Gentz. “One of the best examples of this is the relationship between Germany and Israel, initiated by Weizmann Institute and German scientists who passionately wanted to collaborate regardless of political boundaries. This led the leadership of both countries to broker diplomatic relations.”

As Chairman, Gentz plans to help lead the German Friends of the Weizmann Institute in continuing to support and strengthen connections and collaborations with German and other scientific institutions, as well as with German companies or individuals,

New Spanish Association of Friends launched

The European Committee of the Weizmann Institute of Science launched the Spanish Association of Friends in December, under the leadership of Ruben Lerner and his wife Susan Guenun, from Madrid.

The Association grew out of a visit the couple paid to the Weizmann campus last year, accompanied by two professors from the IESE Business School in Madrid. The professors conducted interviews with Institute management, scientists and students concerning the Institute's promotion of

excellence and innovation, which became the basis of a case study and curriculum for the IESE's MBA students.

The case study and curriculum were presented at events attended by several hundred participants from the business world and academia in Madrid and Barcelona in early December. A private cocktail party and festive dinner after each event marked the establishment of the Spanish Association of Friends of the Weizmann Institute of Science.



Spanish friends (l-r) José Mara Moreno de Tejada, Beatriz Peral, Prof. Israel Bar-Joseph, Monique Hachwel, Ruben Lerner and Susan Guenun

particularly those involved in and committed to scientific research.

At Falling Walls Conference, Prof. Zajfman says science literacy is critical

As keynote speaker for the closing dinner of the prestigious Falling Walls Conference, President Prof. Daniel Zajfman emphasized the importance

of German-Israeli partnership in science and the ability of science to foster ties between societies. The annual conference, the Falling Walls International Conference on Future Breakthroughs in Science and Society, is held in Berlin on the anniversary of the fall of the Berlin Wall, the historic event of November 9, 1989, that symbolized to the world the fall of communism; the date also marks the tragic events of Kristallnacht, the Night of Broken Glass, on November 9, 1938.

The conference brings together world-class scientists who present their breakthrough research with key decision-makers from business, politics, the arts, science and the humanities.

In his remarks, Prof. Zajfman said that

Israeli-German diplomatic relations began in 1965, in part thanks to existing scientific collaborations between Israeli scientists, mostly from the Weizmann Institute, and German colleagues from the Max Planck Institute. The relationship continues to this day. He emphasized that scientists have an obligation to educate the public about science, so that individuals and societies are equipped to make critical decisions that affect their lives.

The Weizmann Institute's Prof. David Harel, also an invited speaker, presented his research on computer modeling of biological behavior.

A History of Scientific Relations

It all began in Rehovot on a rainy December day in 1959, when a delegation headed by Prof. Otto Hahn, Nobel laureate and President of the Max-Planck-Gesellschaft, arrived in Israel to visit the Weizmann Institute of Science. Hahn was joined by other pioneers of German-Israeli scientific collaboration: Director of the Max Planck Institute of Nuclear Physics Prof. Wolfgang Gentner; Nobel laureate Prof. Feodor Lynen; Prof. Gerhard Schmidt, then administrative director of the Weizmann Institute; and Prof. Amos de-Shalit, who would soon become Weizmann's scientific director and, later, its director general. Hahn and Gentner felt immediately at home in the young Weizmann Institute, writing later that "the equipment has a standard equivalent to the best European or US labs, and the scientific problems being investigated are equally up-to-date."

In the context of the post-WWII era, the actions of these few scientists could be seen as both risky and visionary. Aided by the tireless efforts of Dr. Joseph Cohn,

once Dr. Chaim Weizmann's assistant, the Weizmann Institute became the first academic institution in Israel to accept German researchers and encourage its own young scientists to go to Germany.

The results of that historic meeting and the agreement that followed were, and continue to be, synergistic. Science in both countries has been boosted, as scientists and students are exchanged between the Weizmann Institute and German institutions. Nor have the payoffs been limited to science. Within a short period, the success of this initiative in German-Israeli relations paved the way for the establishment of formal relations between the two countries.

At any given time, the research of one out of every three Institute scientists is supported in some way by the Minerva Program for joint German-Israel research. It is precisely this concentration of scientific talent at Weizmann that makes the Minerva Program so workable: One committee can oversee the entire grant approval process by meeting the scientists and getting to know their work, thereby ensuring that support goes only to top-level research. In addition to scientific advances in all areas of the basic sciences, several leading Weizmann Institute scientists have served as

directors at Max Planck institutes, while others have been appointed external members of the Max Planck Society. Only three times in 87 years has the Harnack Medal, the highest award given for service to the Max Planck Society, been awarded to non-Germans, and two of these were Weizmann Institute scientists: Profs. Michael Sela and Haim Harari.

Prof. Daniel Zajfman, President of the Weizmann Institute says: "The universal language of science, by bridging cultural gaps, can lead to all sorts of dialog. For proof, one only need observe the present close friendship between Israel and Germany, and the wealth of knowledge that friendship has produced in the past 50 years. It all started with one brief scientific exchange."

Edelgard Bulmahn, former German Federal Minister for Education and Research: "It would be a difficult task to find a field of science or research where there is no cooperation. This dense network of friendships and institutional cooperation is an indicator that German-Israeli cooperation has developed positively and fruitfully over many years, up to the present day, and will continue to do so."

German-Israeli scientific cooperation: by the numbers

- 357 collaborations were initiated from 2000-2012 between German researchers and Weizmann Institute of Science academic staff (roughly 70% of all Weizmann Institute scientific personnel); 236 of these were with Max Planck Institute researchers.
- 595 grants were approved between 1988-2012 for Weizmann Institute-German research (150 of them for Weizmann-Max-Planck research).
- German Israeli Foundation (GIF) rates in 2009 were 52% for the Weizmann Institute of Science, as compared to the average for all Israeli universities (including Weizmann) of 23%.

Minerva: The Israel-Germany connection

The Minerva Foundation is managed by the German Max Planck Society. In 1964, an agreement was signed with the Weizmann Institute to enable the funding of joint Weizmann-German research projects by the German Federal Ministry for Education and Research. Since then, the program has been expanded to include a fellowship/scientific exchange program that extends to all Israeli research institutions, Minerva Centers in Israeli academic institutes, and Minerva Fellowships, Short-term Research Grants, Schools, Gentner Symposia and Junior Scientist Groups, many of which are intended to foster the research of and scientific relations between younger researchers from both countries.



Four presidents (l-r) Fourth President of the State of Israel Prof. Eppbraim Katzir, fifth President of the State of Israel Yitzhak Navon, President of Germany Dr. Richard von Weizächer and sixth President of the State of Israel Chaim Herzog, 1985



Weizmann Institute Vice President Prof. Haim Garty and Germany's Chancellor Angela Merkel at the Weizmann Institute in 2008

New Horizons in Physics

Dr. Zohar Komargodski's work in theoretical physics is bringing him international recognition

In December, Dr. Zohar Komargodski got a call telling him that he was to receive a New Horizons in Physics Prize. Komargodski, who joined the Weizmann Institute Physics Faculty in 2011 said: "I am deeply humbled and honored that my work was recognized for this prize. I hope to be able to continue my approach to science, which always includes spending ample time thinking about hard and elusive problems. My experience so far is that this eventually pays off, often in unexpected ways. There are truly fascinating problems in the field of particle physics and Quantum Field Theory, and these are especially exciting times to be thinking about these topics."

Komargodski has been fascinated with physics ever since encountering Stephen Hawking's *A Brief History of Time*, at age 15. (Hawking received a Special Physics Prize from the Foundation this year.) After completing part of his B.Sc. while in high school and a fast-track Ph.D. at the Weizmann Institute, Komargodski conducted postdoctoral

"These are especially exciting times to be thinking about these topics"

studies at the Institute for Advanced Studies, Princeton, before returning to a senior scientist position at the Weizmann Institute at age 28.

A paper he published in 2011 with the Institute's Prof. Adam Schwimmer made something of a splash in the world of physics for its proof of a 23-year-old basic conjecture. First proposed by John Cardy in 1988, the theorem states that inequalities arise in systems with known "rules" involving large numbers of factors; and these inequalities transpire between degrees of freedom. Examples of such systems include stock markets, traffic patterns and weather, and it may be used to explain many phenomena

in physics, including the behavior of particles in the Large Hadron Collider, (LHC) at CERN.

Schwimmer and Komargodski had been discussing the Cardy problem on and off for several years. But the answer came to them one evening as the two were watching a sunset on the beach of the Aegean island where they were attending a conference. The idea seemed to float up to them: They realized that several ideas they had thought were dead ends could be combined into a framework on which they could erect the proof.

Currently, Komargodski is working on theories of phase transitions. Understanding the mathematical basis of phase transitions, which he describes as "beautiful, albeit poorly understood," is important for mathematical physics, particle physics and even quantum gravity. Recent work by Komargodski and his group demonstrating that concrete predictions can be made about a wide variety of phase transitions will soon be tested.

The Fundamental Physics Prize

Last July, high-tech billionaire Yuri Milner announced a new prize: the Fundamental Physics Prize. Nine leaders in various fields of theoretical physics first learned about the Prize when the \$3 million prize money was deposited in their bank accounts. Milner selected the initial winners himself, choosing them from among the top ranks of string theorists, cosmologists and theoretical quantum physicists. As opposed to the Nobel Prize in Physics, which can be given to a theoretician – but only once their theory has been substantiated in experiments – Milner wanted the new prize to celebrate research that delves into the deepest mysteries of physics and the universe. "This intellectual quest to understand the universe really defines us as human beings," he said.

One of the original nine was Prof. Nathan Seiberg, a Weizmann Institute alumnus and former member of its Physics Faculty. Seiberg and the other eight laureates from last year formed the committee to select this year's winners.

This year, the Fundamental Physics Prize Foundation initiated the New Horizons in Physics Prize for young researchers. Each of the three winners received \$100,000. Another three were chosen to receive Fundamental Physics Prizes and an additional two Special Fundamental Physics Prizes were awarded this year, to Hawking and the leaders of the LHC experiments that identified the Higgs boson.

Prof. Nima Arkani-Hamed, a member of the selection committee said: "I especially look forward to future breakthroughs from the first recipients of the New Horizons in Physics Prize."

Dr. Zohar Komargodski



The Cholesterol Conversation

Dr. Karina Yaniv's research suggests new avenues for preventing the blood vessels from clogging

We sometimes think of our arteries as being like "kitchen drainpipes" - the fat in them passively building up over time. In truth, however, those artery-clogging deposits are the result of an active process: Cells lining the blood vessel walls sense the fats in our bloodstream and even engage in a two-way conversation with them. These vessel-lining cells are what give the fat permission to cross through their barrier and settle just inside the vessel walls. If the process continues, our blood vessels can narrow to the point that our hearts must work harder and harder to get oxygen and nutrients through the constricted areas.

Dr. Karina Yaniv, incumbent of the Louis and Ida Rich Career Development Chair, believes that if we can understand the ins and outs of the fat-to-vessel-lining exchange, we might also learn how to direct it to prevent or treat atherosclerosis. To investigate, she and her research team study the process in zebrafish embryos. These are not only fast-growing and small (Yaniv's lab aquaria can house thousands of them) but the transparent embryos present an excellent window on blood vessel growth and development.

In recent research, Yaniv and her

team uncovered the mechanics of this discussion, revealing which proteins pass on and receive messages as well as what they are saying to one another.

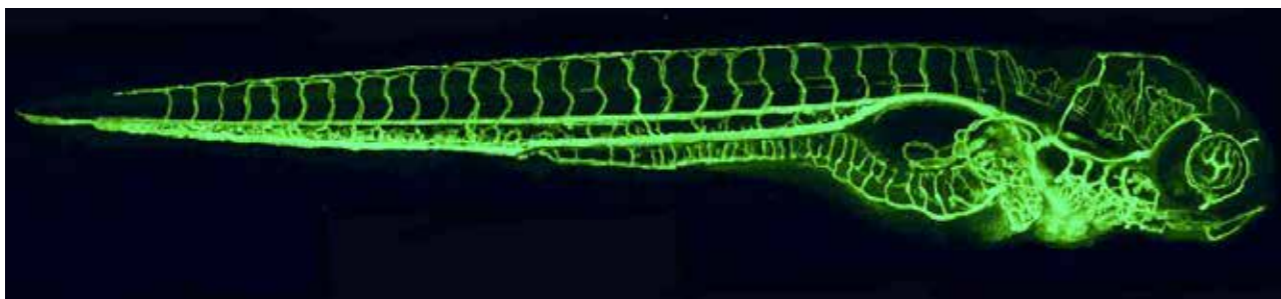
One "mouthpiece" that the scientists discovered taking part in the

LDL both promotes the build-up of fat deposits in the blood vessels and obstructs the formation of new blood vessels that could help bypass blockages

conversation is a protein called ApoB. ApoB is found packaged together with fats in a complex known as LDL - the "bad cholesterol." The researchers revealed that when the zebrafish embryos lacked the gene for this protein, not only did their bodies not produce LDL, but the embryos were able to produce around twice the normal amount of blood vessels.

Investigating further, the team found that ApoB sticks its nose into a second conversation - one involving a growth factor known as VEGF. VEGF binds to special receptors on the blood vessel cells' surface and tells them to begin proliferating to create new vessels. But when those cells are also engaged in dialog with the LDL lipoproteins, the ApoB protein convinces them to produce "dummy" receptors that are unresponsive to VEGF's message. Normally, a certain number of these dummy receptors is produced as a sort of double-check mechanism, but if the balance is skewed in their favor, new blood vessel creation can be seriously hindered.

That means that LDL can be a double whammy - it both promotes the build-up of fat deposits in the blood vessels and obstructs the formation of new blood vessels that could help bypass blockages. But the findings suggest that, in the future, a deep understanding of the ongoing conversation between the fat in our blood and the cells lining the walls of our blood vessels could lead to ways of turning it to our advantage - by either keeping harmful fats from crossing the barrier in the blood vessels' lining or encouraging the growth of new blood vessels to bypass blockages.



Microscope image of embryonic zebrafish blood vessels



Dr. Karina Yaniv

Schooling Teachers in Science

A unique program is improving Israel's science education by investing in that of its teachers



Sobair Sakhnini, of the first Rothschild-Weizmann graduating class, now a Ph.D. student

The Rothschild-Weizmann Program for Excellence in Science Teaching is a unique, long-term effort to significantly improve the quality of science education in Israel by focusing on its science teachers. The vision for the Program arises from the needs of today's science instruction, which, to remain relevant, must keep up with the increasing complexity and sophistication of science and technology. Teachers must continuously deepen their knowledge; the science literacy of society and, in turn, its economy, depend on it.

The Program thus takes good science teachers - those with a passion for their subjects and for teaching - and gives them the tools to become outstanding ones. It does this by boosting both the

teachers' level of scientific knowledge and their teaching skills. Graduates are expected to become leaders who will create ongoing networks of colleagues for the purpose of infusing stimulating, advanced scientific knowledge into the classroom.

Established in 2008, the Rothschild-Weizmann Program addresses common goals of both the Institute and the Rothschild Caesarea Foundation, which funds the Program: nourishing a science- and math-literate public in Israel, as well as developing the country's next generation of leaders in science, medicine and technology.

To date, a total of 86 teachers have received Master's degrees in three cycles of the Program, and an additional 68

teachers are currently enrolled. One of the most significant aspects of the Program is that participants hail from virtually all sectors of Israeli society. Many of the teachers travel long distances to the Weizmann campus; all juggle their studies with part-time teaching.

The Rothschild-Weizmann Program offers a two-year M.Sc. degree program. This track is directed by the Feinberg Graduate School with help from the Science Teaching Department and scientists in the various Institute disciplines. Some 50 courses were created especially for the Program in collaboration with Weizmann Institute scientists, who are also actively involved in teaching. In addition to coursework

and lectures, the teachers also participate in research in the Institute's labs. Their experience, along with the exposure to the latest scientific advances, helps them to develop new teaching tools for their final projects.

A second, non-diploma, track provides teachers already holding advanced degrees with an opportunity to develop and implement field initiatives under the guidance of the Science Teaching Department and Weizmann Institute scientists.

New confidence

Sohair Sakhnini, a chemistry and environmental studies teacher in the Carmelite Italian High School in Haifa, was a member of the first graduating class, in 2011. She enrolled, she says, because after more than 12 years teaching high-school science, she felt it was time to refresh her curriculum and advance her knowledge. The Program, she says, "made me face all the challenges and difficulties of teaching science, and it took my professional knowledge and skills to a new level. I now have greater confidence in the classroom because I don't hesitate to

answer questions. When I don't know the answer to a question, I don't feel insecure when I say: 'I don't know.' I am now familiar with the scientific resources, so I know where to get the answers."

Sohair had such a positive experience in the program that she decided to continue on to Ph.D. studies in science teaching. She is working with Dr. Ron Blonder in the Science Teaching Department, specializing in nanotechnology. Her knowledge will enable her to develop new models for instruction in nanotechnology - a new subject in most high-school curricula. Sohair - a mother of three - continues to teach part-time in Haifa, making the long commute to Rehovot for her studies.

Kobi Schwartzbord also graduated in the Program's first class. He teaches and coordinates the physics track in the Leo Baeck Education Center, also in Haifa, and teaches college-prep courses at the Technion. After graduating, he was chosen to participate in an international teachers' seminar at CERN, the European Particle Physics Laboratory near Geneva, which brought together physics teachers from 35 countries. Enthused by his

experience, he organized a one-week study mission for his Leo Baeck physics students to CERN.

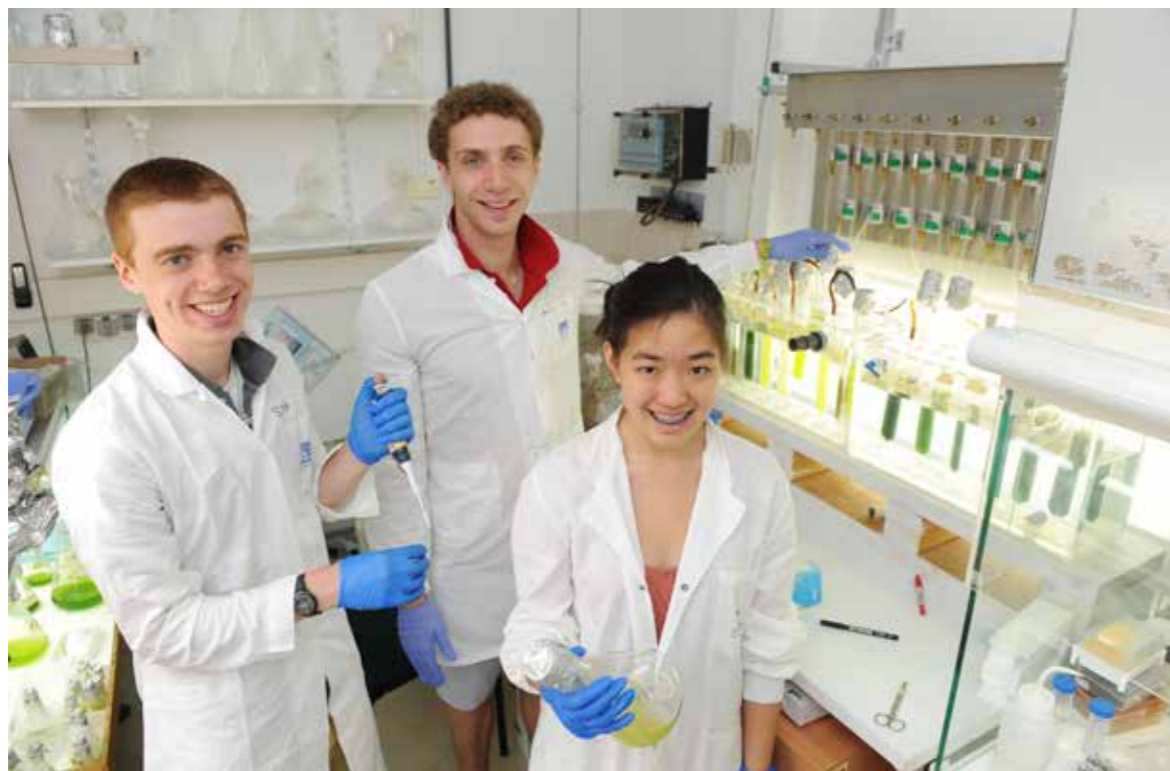
Even now, the Program is generating benefits that extend well beyond the teachers' individual classrooms. Graduates are assuming leadership roles in developing and disseminating new curricula, as well as organizing local groups of teachers who share materials, methods and experiences. Meanwhile, alumni connections foster a unique communication network throughout Israel.

"This Program is not a one-step intervention," says Prof. Bat Sheva Eylon, who heads the Program (and the Science Teaching Department). "Two things happen to the graduates after they complete their studies: First, they continue to cultivate their own knowledge of science. Second, they enrich those beyond themselves - through the creation of teacher communities, new programming for students and numerous creative initiatives. In the end, they enhance Israeli society."



Kobi Schwartzbord at CERN

For the Love of Science



Experiencing life in the lab at the Bessie F. Lawrence International Summer Science Institute

At his high school in Celle, Germany, Max Schult developed a love for both physics and chemistry. When he applied to the Dr. Bessie F. Lawrence International Summer Science Institute (ISSI) at the Weizmann Institute of Science, he thought that the experience “would help clarify for me which path to choose. But instead, what I learned was that I didn’t have to choose – I could do both – and in fact I should do both, as this is the way of modern science.”

Since 1969, about 70 highly talented, recent high-school graduates from around the world have come together on the Weizmann Institute of Science campus for the month-long ISSI. The

program’s roots were laid in 1964, in the Youth Science Camp geared toward Israeli students living in and around Rehovot. The Camp’s quick success caught the eye of many educators, including Dr. Bessie Lawrence, then deputy superintendent of Chicago public schools.

Despite her high-powered career as deputy head of one of America’s biggest city school systems, Lawrence – now 98 and still living in Chicago – had always dreamed of becoming a scientist. So in 1969, she and several generous friends wishing to honor her years of hard work on behalf of students created an endowment that launched the Dr.

Bessie F. Lawrence International Summer Science Institute (ISSI). In the years since, many more Weizmann friends have supported the increasingly popular program.

ISSI students hit the ground running. Their first three weeks are spent working in laboratories, experiencing the challenges and rewards of scientific research firsthand, and learning about the Weizmann Institute and Israel. The students are mentored by graduate students.

Vincent Poon from the UK said he was thrilled at the level of responsibility he was given to take the initiative on science projects and utilize scientists’



International contingents show their flags at the ISSI

labs and equipment. “I really felt free to explore my own ideas and I think that freedom helps everyone to learn and get excited about learning.”

Afternoons are for lectures by Weizmann Institute scientists on such topics as robotics, gene therapy and brain research. Students are also encouraged to lead seminars on their subjects of interest and give written and oral presentations on their work. Students stay at the Laub International Science Youth Village, and they take part in fun evening activities on and off campus.

The teens spend the final week at a field school near the Dead Sea, where

they study Israel’s unique ecosystem and wildlife, and explore its history and archeology through nature hikes and expert talks.

One of the 19 American participants in 2012, Soyeun Yang – whose ISSI project involved the role of protein signaling pathways in cancer development – wrote about her experience for the *Huffington Post*: “While science has connected me to Weizmann, Weizmann has connected me to the world,” she wrote. “The research process was always collaborative and never competitive.”

Gero Heusler attended in 1988 – one of hundreds of Germans who have participated in the program over the

years. Today, he is a project leader in high-power lasers for Philips in Germany. After his ISSI experience, he received a diploma in nuclear physics from the University of Heidelberg and a Ph.D. from the Max Born Institute in Berlin. He is still in touch with many friends he met that summer and gets together with them often during his travels. At Weizmann, he says, “I had the chance to see how scientific research works and how scientists collaborate.”

For an interview with Dr. Bessie Lawrence, see the next page.



Dr. Bessie Lawrence started her career as a public school teacher in Chicago, eventually becoming a principal, then deputy superintendent overseeing 500 schools. In these roles, she pioneered new approaches to working with troubled students, and she had a special interest in encouraging gifted students.

“I wished back then that I had been able to study science there. There’s nothing like Weizmann”

Q&A with Dr. Bessie Lawrence

How did you get involved with the Weizmann Institute?

BL: I was inspired after visiting Israel as a tourist. I was a teacher, so I had the summers off and traveled everywhere – Europe, Turkey, many other countries. When I arrived in Israel, I said, ‘Wow. This is a small country that is doing something big.’ I visited the Weizmann campus, which was in its early years. It was a joy to behold. It was like living in a beautiful garden. And I wished back then that I had been able to study science there. There’s nothing like Weizmann. It’s all about curiosity.

How did the Bessie Lawrence ISSI come about?

BL: I always had an interest in science, math and education. When I was growing up, I wanted to be a doctor or a pharmacist or a scientist. In fact, one of my brothers became a doctor and the other a pharmacist. But I was told, ‘No. You’re a woman.’ And it was difficult getting in to some schools if you were Jewish. So when I got the chance, I decided to do something related to science. I was able to do for students what I couldn’t do for myself. At the time, I didn’t realize how popular the program would become.

What is your approach to philanthropy?

BL: I’ve always told my kids there are three things you should do with your money: You should spend a little, save a little. And give some of it away. And that’s what I did.

What did you hope to accomplish by investing in science education?

BL: I wanted to give bright, talented kids a future in science. They could be of any faith. And I wanted to give opportunities to young women to study science. I hoped that the program would allow young adults who had never been to Israel, who had no connection to it, to experience the country.

And the Institute has indeed accomplished so much over the years with this program. Of course in science but in other ways as well: Two students, from Kazakhstan and Canada, met on the program and got married. Next to my children – because I’ve got really wonderful children – this science program is one of my greatest accomplishments. The alumni call themselves “the Bessies”!



Top that: a new Guinness world record for dreidel spinning?

On a special date – 12.12.12 – the Clore Garden of Science hosted an attempt to break the Guinness World Record of the most dreidels spun simultaneously. A whopping 846 children and adults from all over the country took part in the event, which was timed to 12:12 in the afternoon.

The previous world record was set in Hong Kong in 2010: 377 people spun dreidels simultaneously. Confirmation of whether the attempt on the Weizmann Institute campus indeed breaks the existing record is expected in the near future.

The event was planned and carried out according to the Guinness World Record guidelines, supervised and documented as required by the organization’s rules. Israel’s Minister of Science and Technology, Prof. Daniel Hershkowitz, the Mayor of Rehovot Rahamim Malul and the Chairperson of the Association of Museums and ICOM (the International Council of Museums in Israel) Dorit Wolenitz, attended the event. The official timekeepers were Dr. Ariel Heimann, Director General of the Davidson Institute of Science Education, and Dr. Moshe Rishpon, founder of the Clore Garden of Science.



Ofri Kabana, a 17-year-old high-school student from Netanya, won a trip to Stockholm in December for a week-long International Youth Science Seminar that culminated in attending the Nobel Prize ceremony. Kabana won a country-wide competition for her research paper that used computer simulations to explain how pigeons in a coop find a place to settle. The prize includes a full university scholarship

Mind and Brain

Weizmann alumnus and former faculty member Prof. Henry Markram is at the helm of the ambitious Human Brain Project



Prof. Henry Markram in his lab at the Weizmann Institute

Prof. Henry Markram wants the world to “get serious about understanding the human brain. We need to collaborate on a massive scale.” Indeed, he is now leading a new research initiative involving hundreds of labs in 26 countries. The ambitious Human Brain Project, which aims to construct a computerized simulation of the human brain, was recently chosen to be one of the European Commission’s Future Emerging Technologies (FET) Flagships, with a grant of more than €1 billion over the next 10 years.

The South-African-born Markram first came to the Weizmann Institute when he was a medical student at the University of Cape Town. Looking for a break before immersing himself in clinical work, he applied and was accepted to the Institute’s Karyn Kupcinec International Summer Program. He asked to work in the lab of Prof. Menahem Segal of the Neurobiology Department. Markram had read several of Segal’s scientific papers,

and was fascinated by his vision of how the brain worked.

The six-week program, says Markram, opened his eyes to the possibility of conducting cutting-edge research: “The whole world seemed to be at my feet, and I lived in the lab.” Segal, impressed with the fervor and intelligence of the young South African, invited him to join his lab for Ph.D. research. Back at the University of Cape Town, Markram asked for two years’ leave and returned to the Weizmann Institute.

When Markram reminisces about the time he spent in Segal’s group, he remembers conducting “incredible experiments – I published eight papers in three years.” He identified a connection between acetylcholine – a neurotransmitter – and a receptor in the brain that is tied to synaptic plasticity and memory. He remembers the unique atmosphere in the lab, working with the other students and the lab’s technician, Varda Greenberger, who “helped us

above and beyond anything we could have expected.”

Segal, the Harry and Leona Levine Professor of Neurosciences, recalls Markram as tall, handsome and polite, an exceptional student and a dedicated one: “I was once in the US for a conference, back when the Internet was still new and not widely used. Henry was already sending me lab reports online at 2:00 AM.” Segal also appreciated Markram’s enthusiasm for Israel: Though not Jewish, Markram served in the army, learned to speak Hebrew, and eventually married and had children in the country.

After postdoctoral research as a Fulbright fellow at the National Institutes of Health in the US and the Max-Planck Institute for Medical Research in Germany, Markram returned to the Weizmann Institute and set up a lab in the Neurobiology Department. There, Markram began to take his first steps toward modeling the brain. “I had researched the brain on the genetic,

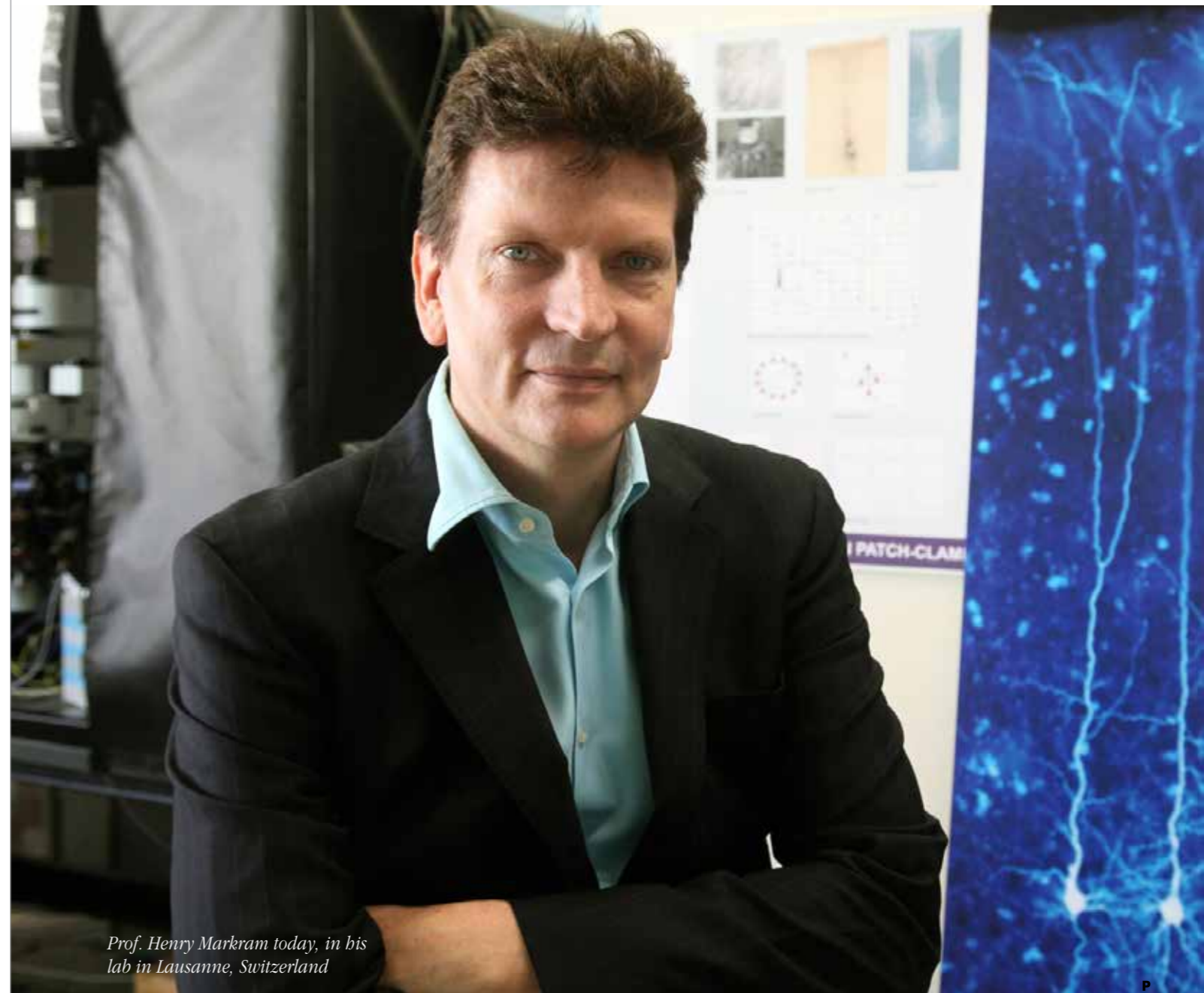
molecular and biochemical levels,” he says, “but I believed that to understand how the brain works, we needed to put those things back together.”

Since 2002, Markram has been at the École Polytechnique Fédérale de Lausanne in Switzerland, where he founded and directs the Brain Mind Institute. In 2005, he launched the Blue Brain Project, which recently produced a simulation of a mouse brain neocortical column generated on a supercomputer. This simulation

was a triumph – and a source of new challenges. It highlighted the incredible scientific potential of a complete model of a human brain, but it also hinted that this undertaking would be need to be immense – on par with the huge LHC project at CERN.

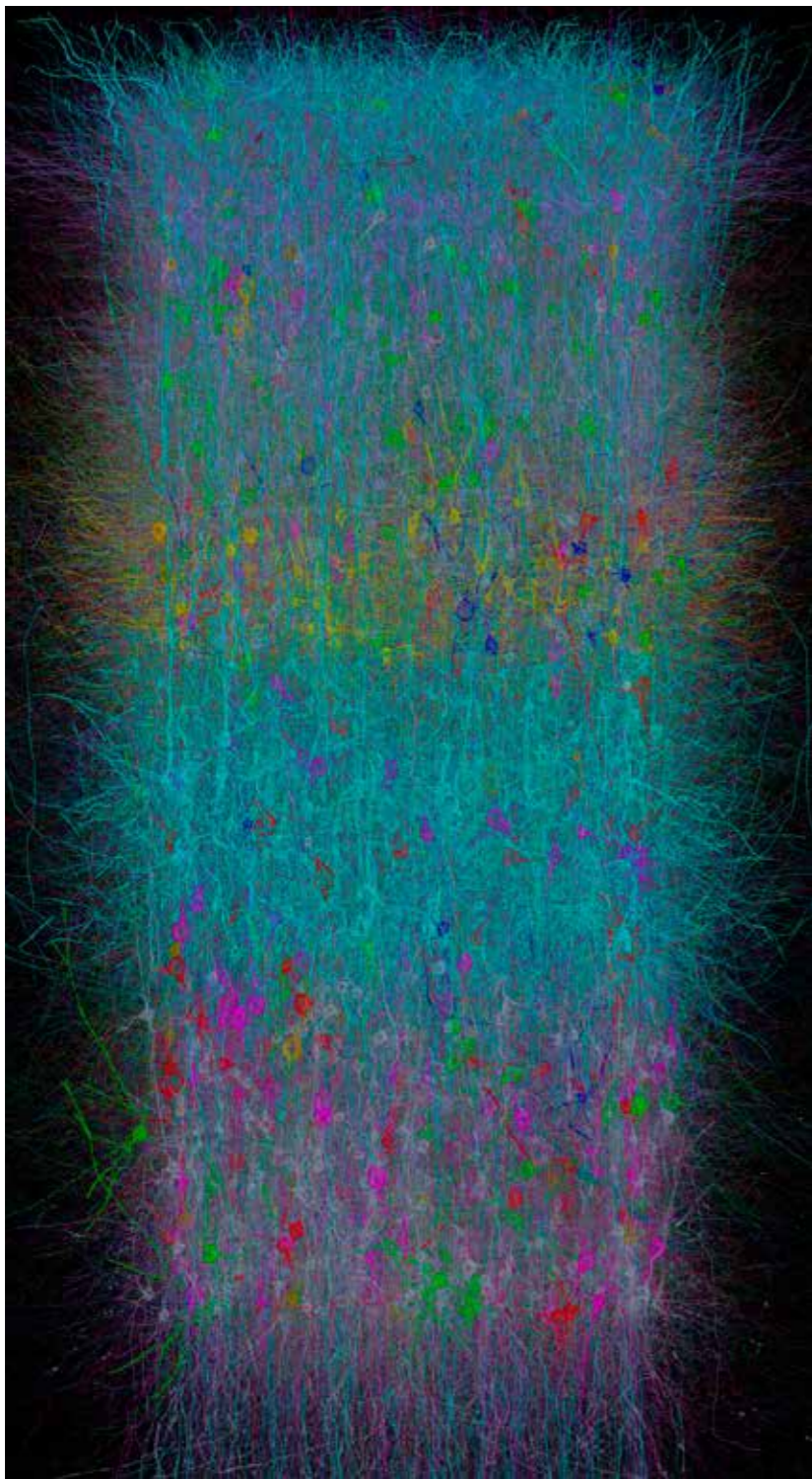
The Human Brain Project now getting underway involves researchers in some 80 institutions – from biologists, neurobiologists and biochemists to computer scientists and engineers. Markram believes that the Project may

lead not only to a sweeping revision of our understanding of the brain and the means of treating its illnesses, but it could also provide new, innovative concepts for designing computers and robots. He says he is looking forward to working with the Israeli scientists involved in the Project, especially the Weizmann Institute’s Prof. Yadin Dudai, who was Markram’s mentor in his days at the Institute and is today a co-coordinator of the Israeli section of the Project.



Prof. Henry Markram today, in his lab in Lausanne, Switzerland

The Human Brain Project



Computerized model of a juvenile rat neocortical column from the lab of Prof. Henry Markram

The goal of the Human Brain Project: Generate massive data on the structure and function of the human brain by combining multidisciplinary research methods; employ new and existing knowledge to reconstruct brain functions and capabilities in supercomputer-based models and simulations. Such models offer the prospect of a new understanding of the human brain and the diseases that affect it, as well as advancing completely new computing and robotic technologies. Federating more than 80 European and international research institutions, the Human Brain Project is slated to continue for 10 years (2013-2023). The total cost is estimated at €1.19 billion, to be supplied from various sources.

Israeli scientists have been involved in the Project from its inception; their significant role is testament to the high position Israeli science holds at the forefront of international brain research. The scientific coordinators of the Israeli section of the HBP are Prof. Idan Segev of the Hebrew University of Jerusalem and Prof. Yadin Dudai, the Sara and Michael Sela Professorial Chair of Neurobiology, of the Weizmann Institute of Science. Other Weizmann Institute researchers participating in the Project are Prof. Rafael Malach, the Barbara and Morris L. Levinson Professor in Brain Research, Dr. Rony Paz, incumbent of the Beracha Foundation Career Development Chair, Prof. Michail Tsodyks, the Gerald and Hedy Oliven Professor in Brain Research, and Prof. Shimon Ullman, the Ruth and Samy Cohn Professor of Computer Sciences. As the Project gets underway, other Israeli research groups are likely to join in the endeavor.

When it was announced that the Human Brain Project was chosen as one of two European Commission Future Emerging Technologies (FET) Flagship projects, Israel's President Shimon Peres said: "Israel has put brain research at the heart of its efforts for the coming decade, and our country is already spearheading the global effort toward the betterment of our understanding of mankind. I am confident that the forthcoming discoveries will benefit a wide range of domains, from health to industry, as well as our society as a whole and I will do my best to promote it further."



Prof. Yadin Dudai

Prof. Yadin Dudai on the Human Brain Project

"That Israelis are involved in the Human Brain Project from its inception says something rewarding about Israeli science and the Weizmann Institute. The project was envisaged by Prof. Henry Markram when he was still a faculty member in the Institute's Neurobiology Department. I remember Henry describing initial sketches of

his bold idea when we were members of that Department (and I, as dean, admiring the bustling imagination and intellectual courage of our young faculty). It was clear that the stimulating, multidisciplinary and free intellectual atmosphere at the Institute contributed to the cultivation of Markram's vision. Indeed, Israeli involvement in the project attests to the important role of Israeli neuroscience in general, and Weizmann neuroscience in particular, on the international scene.

"My roles in the HBP are multiple. In addition to serving on the internal international advisory board of the HBP (with two scientists from Germany and Switzerland), and to serving as one of the two Israeli coordinators (with Prof. Idan Segev), I am also coordinating the international 'work package' on memory research. My own research will further explorations into human episodic memory, the type of memory we all cherish most – of the events in our lives. I am joined in this work package by an outstanding young member of our department, Dr. Rony Paz, and a world renowned computational neuroscientist, Prof. Misha Tsodyks, as well as additional

investigators from Germany, the UK and Norway. Other Weizmann scientists, Profs. Rafi Malach and Shimon Ullman, are engaged in other parts of the project. The majority of Israeli HBP participants are currently from the Weizmann Institute; we hope to take on more from our faculty and other institutions in Israel as the project proceeds.

"I am also involved in the international team that is responsible for the ethical and social implications of the project. This European Flagship is exceptional, and highly commendable, in paying attention to potential repercussions of scientific outcomes on individuals and society.

"I hope that 10 years from now, we will have a significantly better understanding of how the human brain functions, what goes wrong in some disease states, and possibly ways to prevent and ameliorate certain malfunctions. I also hope that the project as a whole will be able to emulate the new findings in computational and technological models, as well as developing novel brain-inspired robotic technologies that could help to make human life a bit better."



Remembering Dr. Chaim Weizmann



In the 60th year after his death, the first President of the State of Israel and of the Weizmann Institute is memorialized in books, song and events around the county

“Chaim Weizmann was the ‘Great Enabler’ of the State of Israel. Without his ability to translate the Zionist vision into sustainable political reality, it is doubtful whether Theodore Herzl before him or David Ben-Gurion after him would have had their place in history.” This is the view of Prof. Moti Golani, a historian at Haifa University who is writing a new biography of Weizmann. Golani was the keynote speaker at an event marking the 60th anniversary of Weizmann’s death held

for the Weizmann Institute faculty and staff.

“I hope and believe that he would be proud of what has been built here at the Weizmann Institute,” said Institute President Prof. Daniel Zajfman. He noted that Chaim Weizmann founded the Hebrew University of Jerusalem and the Weizmann Institute of Science in the belief that economic prowess must be built on a solid foundation of higher education and research. On a lighter note, he told the audience that

“‘Weizmann’s organism’ is not used anymore for producing acetone (as it was in WWI), but recently a large Scottish brewery proudly announced it is using the bacterium to ferment butanol for biofuel from the leftover grain.”

The event ended with a debut performance of a song, *Personal Charm*, sung by Israeli singer Raz Shmueli. The original poem, by Nathan Alterman was written in 1946 following the 22nd Zionist Congress in Basel, Switzerland, at which Weizmann gave an impassioned



Weizmann Institute dedication, 1949. In the center (l-r) are Dr. Chaim Weizmann and Israel's Prime Minister David Ben-Gurion

speech. Alterman intended his piece to criticize those who were swayed by Weizmann’s charm, rather than his words, but the poem remains a testament to the charisma of the country’s first president.

Scientist and Statesman of Science

The annual official memorial ceremony held next to the graves of Dr. Chaim and Dr. Vera Weizmann on the grounds of the Weizmann Estate on campus, took

place on November 6, 2012. Vice Prime Minister Silvan Shalom, Knesset members, Supreme Court Justice Uri Shoham, Rehovot Mayor Rahamim Malul, senior army and police officers, and students from the Katzir High School in Rehovot were among those attending the ceremony.

The Annual General Meeting of the International Board later in the month also honored Weizmann’s memory. The opening evening featured a film on Weizmann’s life produced for the event.

The film, accompanied by live narration from Israeli actor Alex Ansky of the Habima National Theatre of Israel, looked back on Weizmann’s life, particularly the period when he was working to help establish the State of Israel and founding the Weizmann Institute, as well.

Other events commemorating the anniversary took place around the country.

A conference held at Tel Aviv University in November was dedicated to the memory of Chaim Weizmann

The poem remains a testament to the charisma of the country's first president



and celebrated 50 years since the establishment of the University's Chaim Weizmann Institute for the Study of Zionism and Israel. Over a dozen speakers presented different aspects of Weizmann's history and his contributions to the Jewish state.

In January, The Israel Academy of Sciences and Humanities held a day-long conference entitled *Dr. Chaim Weizmann - the Scientist and the Statesman of Science - Commemorating Sixty Years since His Death*. The conference, which included sessions chaired by Institute President Prof. Daniel Zajfman and former President Prof. Michael Sela, as well as a closing talk by the Institute's Prof. Ruth Arnon, President of the Academy, focused on Weizmann's scientific achievements and academic legacy - both in the field of chemistry and in the State of Israel.

Dr. Chaim Weizmann (r) presented US President Harry Truman with a Sefer Torah in the White House Rose Garden on his first official visit to the United States as President of the State of Israel, in April, 1949

Opening a Window to Science

The remodeled Barbara and Morris Levinson Visitors Center, which recently reopened its doors, is now a fully interactive experience conveying the excitement and wonder of research conducted at the Institute, the stories of the people who conduct that research and ways we all benefit from their work.

The Visitors Center was dedicated at the International Board Meeting in November in the presence of Barbara and Morris Levinson's son Joshua Levinson and Barbara's son Bob Machinist, as well as other honored guests and friends.

The number of visitors to the Institute is growing every year - dramatically so in the last year. In 2012, more than 37,000 individuals visited the Institute, up from 28,600 - an increase of over 30 percent.

Machinist described the Levinson Visitors Center as the "mezuzah," or doorpost, to the Weizmann Institute of Science, and said he was very proud of its position as the "doorman of goodwill" for foreign visitors to Israel. Joshua Levinson expounded on the long-time relationship between his parents and the Weizmann Institute of Science.

Lecture Series for Scientists

A series of monthly meetings initiated three years ago by Prof. Eytan Domany, Chair of the Scientific Council, offers a wide variety of lectures to enrich and enlighten Institute researchers.

Each meeting hosts a prominent figure in his or her field, which can range from culture to philosophy, art, politics and more. The speakers are selected by members of the Scientific Council. Participant numbers are kept relatively low (up to 60 scientists) so as to encourage dialog between the speaker and the audience.

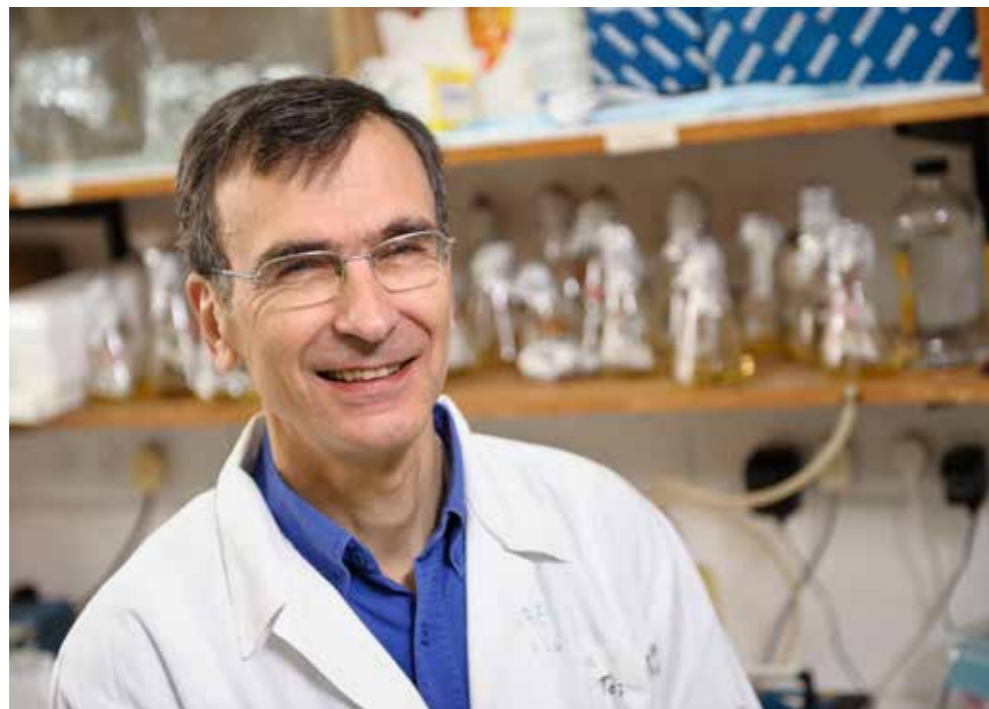


(l-r) Robert Machinist and Joshua Levinson officially open the newly renovated Barbara and Morris Levinson Visitors Center



*Profs. Michal Neeman and Eytan Domany welcome Dror Moreh, director of the critically acclaimed documentary *The Gatekeepers*. The meeting, which was held on February 11 on campus, included a special screening of the film followed by a lively discussion. Soon after the event, Moreh traveled to Los Angeles for the Oscar awards ceremony. His film was nominated for best documentary film.*

The Science of Fat



Prof. Michael Walker

More and more people are loosening their belts these days: Obesity rates worldwide have doubled since 1980, according to the World Health Organization. A whopping one-fifth to one-quarter of the global population is estimated to have metabolic syndrome - the medical result of obesity - and they are far more likely to have type 2 diabetes and to suffer, and die, from a heart attack or stroke than others, according to the International Diabetes Federation.

Metabolic syndrome is characterized by one or more interrelated conditions, including obesity, insulin resistance and type 2 diabetes, elevated cholesterol or fat in the blood, hypertension and cardiovascular disease, sleep apnea, osteoarthritis and polycystic ovary disease.

Body clock, stress and anxiety are factors

At the Weizmann Institute, a growing number of scientists are tackling the issue from a variety of angles.

Dr. Gad Asher is trying to figure out how the body's circadian clock plays a role in metabolism. The circadian clock - the internal biological timing system that regulates the daily fluctuations in heartbeat, blood pressure, kidney function, hormones, body temperature and sensory perception - is controlled by the brain and synchronizes peripheral "clocks" in other organs. Shift workers, for instance, whose circadian clocks are disrupted by irregular sleep cycles, have a higher incidence of cancer, diabetes and obesity.

Recently, Asher discovered that a protein called SIRT1, which plays a

central role in cellular metabolism, also controls the function of the circadian clock. He has also identified molecular mechanisms by which eating times help synchronize the peripheral clocks, suggesting that these clocks are highly sensitive to the metabolic states of cells.

Dr. Alon Chen's work is helping scientists understand how stress and anxiety affect metabolism. His research focuses on a family of proteins in the brain responsible for managing a chain of molecular events that occurs when we are coping with pressure. Recently, he identified three of the proteins responsible for turning off this "stress response." Mice lacking these proteins, called urocortins, were unable to return to normal behavior after experiencing stress. Chen believes that the findings have implications for anxiety and eating

"We believe that in obesity, these fatty acid receptors are essentially put on 'overload,' thereby triggering insulin resistance and other harmful effects"

Prof. Michael Walker

disorders, including anorexia and overeating.

Obesity and diabetes

How does obesity lead to diabetes? Prof. Michael Walker, the Marvin Myer and Jenny Cyker Professor for Diabetes Research, has offered some major insights into this crucial question. Type 2 diabetes begins with insulin resistance, in which cells fail to use the insulin produced by the pancreas properly. Walker has identified receptors on cells in the pancreas that sense fatty acid levels in the blood, enabling them to

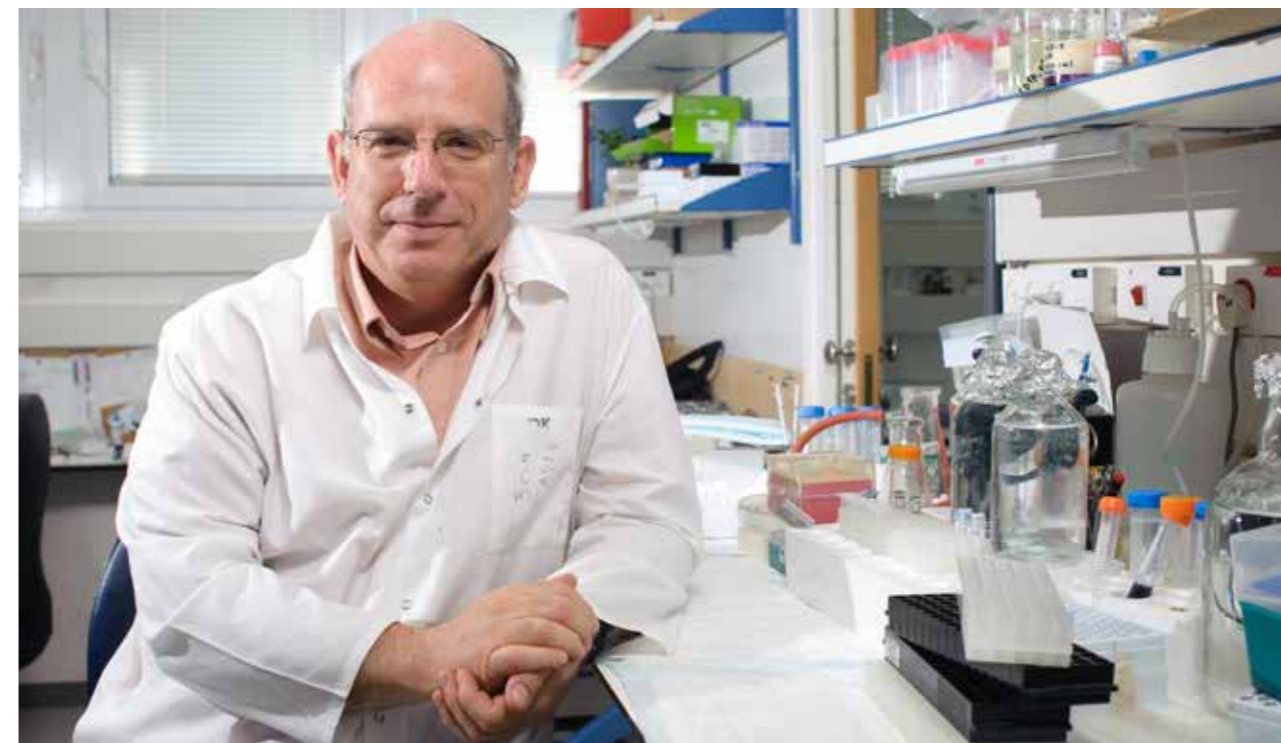
export the correct amounts of insulin to the body.

"We believe that in obesity, these fatty acid receptors are essentially put on 'overload,' thereby triggering insulin resistance and other harmful effects," says Walker. His work may lead to the use of stem cell-based cell replacement therapy for diabetes.

Basic research on obesity began to take off in the early 1990s with the discovery of leptin, the hormone involved in appetite control. Although leptin was initially thought to be a "wonder cure," researchers soon found that giving

people leptin did not affect their weight, since obese individuals are resistant to this hormone's activities. Prof. Ari Elson, the Marshall and Renette Ezralow Professor, has identified a protein produced in the brain that blocks leptin signals. This protein appears to play a role in leptin resistance.

"While public health solutions like campaigns to increase exercise and improve eating habits are important," says Walker, "basic research is absolutely essential in order to better understand the link between obesity and metabolic syndrome."



Prof. Ari Elson

The Personalized Nutrition Project

High blood sugar levels are associated with many diseases, including diabetes, heart disease, cancer and obesity. In the case of obesity or overweight, high blood sugar levels cause a rise in insulin levels, which leads to fat storage. Prof. Eran Segal and Dr. Eran Elinav believe that a widespread hyperglycemia epidemic can be averted, but only with the right tools.

Different people respond differently to the same or similar foods. That explains why the one person on diet may lose weight, while another on the exact same diet may stay the same weight.

Segal and Elinav have launched a 10-day experiment that is expected to garner many insights about how certain sugars

are taken up in the digestive process. Recent theories suggest that variability across individuals may be explained, in part, by differences in their absorption and processing of different types of simple sugars. That absorption takes place mostly in the small intestine, thanks to the hard work of a vast array of microbes – the gut microbiota.

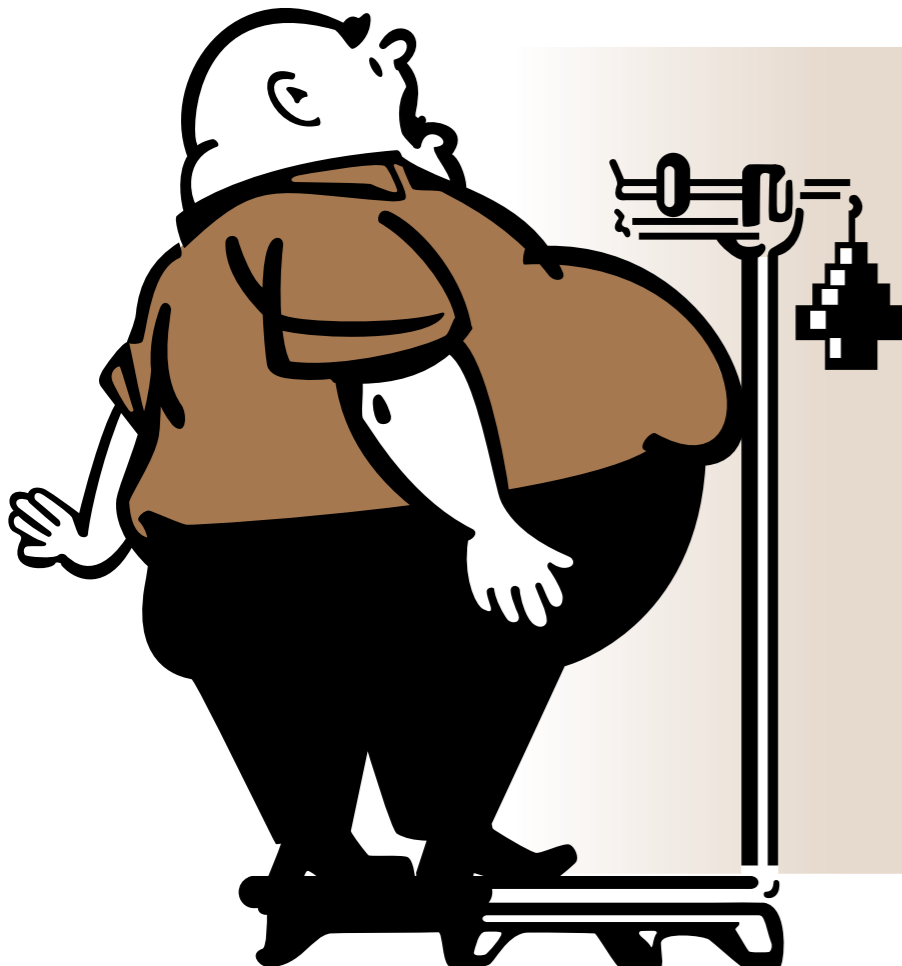
The experiment will help them better understand the microbiota and its role in glucose absorption on an individual level. At the same time, it could pave the way toward an era of personally tailored diets and nutrition based on scientific data on each person's microbial makeup.

Segal, a mathematician and cell biologist, develops computational models aimed at understanding how molecular components interact to carry out complex biological functions;

immunologist Elinav is focused on understanding inflammatory bowel disease, and thus he investigates the microbes of the gut.

As part of the data collection, subjects can keep tabs on their own blood sugar levels as they rise and fall throughout the day. Using that data, the scientists will develop algorithms that will predict individuals' personal response to a wide variety of foods. Subjects receive access to a website with these predictions, a profile of their own gut microbes with an analysis of how these affect the blood sugar, and – for a nice plus – a diet tailored personally for them.

The study is expected to be the first comprehensive profile of microbiota of the small intestine, as well as the first tool for predicting individualized glucose response to complex meals.



The Skinny on Metabolic Syndrome, Obesity and Diabetes

- Some 230 million people worldwide have diabetes. Each year, 3.2 million of them die from complications associated with diabetes.
- Nearly 25 percent of the world's adult population has metabolic syndrome. The Persian Gulf countries have the fastest rate of growth of metabolic syndrome.
- People with metabolic syndrome are three times as likely to have a heart attack or stroke than others, and twice as likely to die from such an event, than people without the syndrome. They have a fivefold greater risk of developing type 2 diabetes.
- Healthcare costs for diabetes are estimated at \$286 billion. It is likely that this figure will rise to \$396 billion by 2025.

Data from the International Diabetes Federation



(l-r) Dr. Eran Elinav and Prof. Eran Segal



Prize Possession

The history of the John F. Kennedy Memorial Research Awards, established by the Weizmann Institute 50 years ago in the wake of the Kennedy assassination

The night of December 5, 1963, was to have been a night of all nights for the American friends and supporters of the Weizmann Institute in those years: President John F. Kennedy was slated to be the guest speaker at the 18th Annual Dinner of the American Committee for the Weizmann Institute of Science (ACWIS). When JFK was assassinated on November 22, the event was, of course, cancelled. America, and the world, bowed its head in mourning.

Immediately afterwards, the government of Israel, led by Prime Minister Levi Eshkol, brainstormed ways to memorialize the beloved late President. At the Weizmann Institute and at the American committee headquarters in New York, an idea percolated quickly. The Institute would establish annual awards for outstanding science students and postdoctoral fellows at the Weizmann Institute: the John F. Kennedy Memorial Research Awards.

Abba Eban was then Deputy Prime Minister to Eshkol and was at the same time serving as President of the Weizmann Institute. He was thus in a position to marry the two interests

– Israel's and the Institute's – in memorializing Kennedy. That winter, Eban flew to the US. In Washington, he paid his condolences to Robert Kennedy and told him about the idea for a memorial research fund at the Weizmann Institute to honor his late brother. The younger Kennedy, who had served as an adviser to JFK during his presidency, fully endorsed the project.

With this move, "Israel's commitment was complete: to the family, to the President and to the American people," wrote a secretary taking notes at a meeting, several months later, of the establishment committee of the Kennedy Memorial Fund.

The American Committee for the Weizmann Institute scheduled a new date for its gala, February 6, 1964, at the Waldorf Astoria Hotel, with US President Lyndon Johnson as the guest speaker. When he took the podium, President Johnson put forward, for the first time, his idea of an Israeli-American research collaboration in the desalination of seawater using nuclear power, a project that became a theme in Israeli-American relations during his term. The

establishment of the Kennedy Memorial Fund was also announced, and a telegram from Prime Minister Eshkol read aloud: Eshkol pledged \$1 million from the State of Israel for the prize, originating from both philanthropy and government.

The funding of the Kennedy awards was a genuine international collaboration from its outset, mirroring the breadth of the Weizmann family and the global outpouring of support for America. The Institute had a \$5 million target in mind for an endowment fund, including \$3 million from the US, \$1 million from the UK and Europe, and \$1 million from Israel. By April, American donors had collectively written checks amounting to \$1 million. In Israel, to help fulfill Eshkol's pledge, Abba Eban mailed letters to 160 Israeli companies asking for donations; the banks, utilities companies and El Al were among the first to give.

The original selection committee of Kennedy Memorial Fund, whose job was to identify worthy recipients, also reflected the stature and global nature of the Weizmann community. Lord Victor Rothschild of the legendary family of financiers and philanthropists to Israel



Abba Eban addresses the American Committee for the Weizmann Institute of Science

– a zoologist and later adviser to British Prime Minister Margaret Thatcher – was the committee's chairman. Princeton physicist J. Robert Oppenheimer was another member. Oppenheimer, known as the "father of the atomic bomb" for his role in the Manhattan Project, had just been awarded the prestigious Enrico Fermi Award by President Kennedy for lifetime achievement in the sciences. Prof. Isidor Isaac Rabi, the Jewish-American physicist and Nobel laureate recognized for his discovery of nuclear magnetic resonance, was also on the committee. So was renowned French microbiologist Prof. André Lwoff.

What the recipients say

The Memorial Fund, it was decided, would consist of scholarships and travel grants for research students, postdoctoral fellows and visiting scientists. It would also allocate several annual prizes for the most outstanding Ph.D. students, called the John F. Kennedy Prize. The first JFK Prize was awarded in 1972, with three students receiving \$2,500 each. It is the prize of highest honor awarded by the Feinberg Graduate School. For

Weizmann leadership, the JFK Prize has historically been viewed as a mark of excellence signaling which scientists to keep an eye on during their postdoc years, so as to recruit them back to the Institute as faculty members. Some 141 graduates have received the prize since its inception, 49 of whom are members of the Weizmann faculty today.

Prof. Yoram Groner, the Dr. Barnett Berris Professor of Cancer Research, received the JFK Prize in its first year. It helped support him during his postdoctoral research at Albert Einstein Medical Center in New York. "The grant was a great honor and it enabled my exposure to the big world of science by helping me finance my postdoctoral research," he says.

Dr. Avraham Aizenbud, one of the newest additions to the Weizmann faculty, received the JFK Prize in 2010. He said: "The JFK prize was a very happy surprise: Studying at the Institute was a very joyful experience, and when it came to an end, I was sorry to leave. Getting the JFK prize at that point was a sort of sign that I would return to the Weizmann Institute as a scientist."

Prof. Lia Addadi, the Dorothy and Patrick Gorman Professor, is a former recipient of the JFK Prize. Today, as Dean of the Feinberg Graduate School, she helps select the new recipients.

"Receiving the prize gave me new self-confidence," she recalls. "If somebody decided that the work I had done was worth being recognized with the highest prize, I must have done something right. I believe that the recognition gave me the confidence I needed to even consider going for an academic position, including dragging my whole family, Ruben, and our children Yael and Sefi, to the other side of the globe with all the difficulties attached."

"I'm sure that getting the Kennedy prize still represents a major step in the career of a graduate: It establishes the winners as the best students of the year at the Weizmann Institute out of a group of around 140. Besides the importance that this may have for their perceptions of themselves, this is a stamp of academic quality recognized all around the world."

Extreme Chemistry

It takes a team to produce chemical reactions at ultracold temperatures

The vast regions of interstellar space are very cold – just a few degrees Kelvin above absolute zero (-273.15° Celsius). Too cold, according to classical chemistry, for chemical reactions to occur. But they do: Interstellar space is full of molecules resulting from such reactions. “At ultracold temperatures,” explains chemical physicist Dr. Ed Narevicius, incumbent of the Ernst and Kaethe Ascher Career Development Chair, “chemical reactions are influenced by quantum effects. For example, atoms and molecules acquire wave-like properties.” Quantum chemistry is the subject of calculation-heavy theories – but few experimental findings.

A theoretician-turned-experimentalist, Narevicius tackled the challenge of building a research system for probing quantum effects in chemical reactions at ultra-low temperatures. He based his efforts on earlier, Nobel Prize-winning work that involved colliding two low-temperature, supersonic beams. Unfortunately, the energy of such collisions prevented quantum effects from playing a significant role.

Narevicius's idea: Merge instead of

collide. One supersonic beam would go straight, while the second would be bent under a strong magnetic field, until it was parallel to the first. Thus even though the beams would be racing at high speeds, the relative speed of the particles in both beams would be zero. The collision energy – or temperature – would be low enough to facilitate a quantum regime.

**“Excellent ideas
abound, but you need
people who are not
afraid to try them”**

“Excellent ideas abound,” says Narevicius, “but you need people who are not afraid to try them, to get their hands dirty.” Thus he enlisted his long-time collaborator – and wife – Julia, an electrical engineer. The two had met at a startup company and went on to

collaborate during Ed's postdoctoral research at the University of Texas.

The couple invested months in intensive discussion, planning and preliminary checks, together with Shlomo Assayag of the Institute's Research Services Division. Around 20 iterations later, they arrived at a feasible set-up for the experiments. Ph.D. student Sasha Gersten, whom Narevicius dubs “the lab's mechanical genius,” took the plans and breathed life into them using 3D design software.

She then proceeded to construct the system. The distinctive vacuum conditions and strong magnetic field required to bend one of the beams necessitated consultation with experts in various fields. The vacuum chambers, for instance, had to have extra-thin walls, yet withstand enormous vacuum pressures.

Ph.D. student Alon Henson led the system integration, combining the various sub-assemblies into one working unit. Julia led the electronics side of the work, devising a complex control system based on a series of fast, precisely timed digital pulses.

Once the group had a working

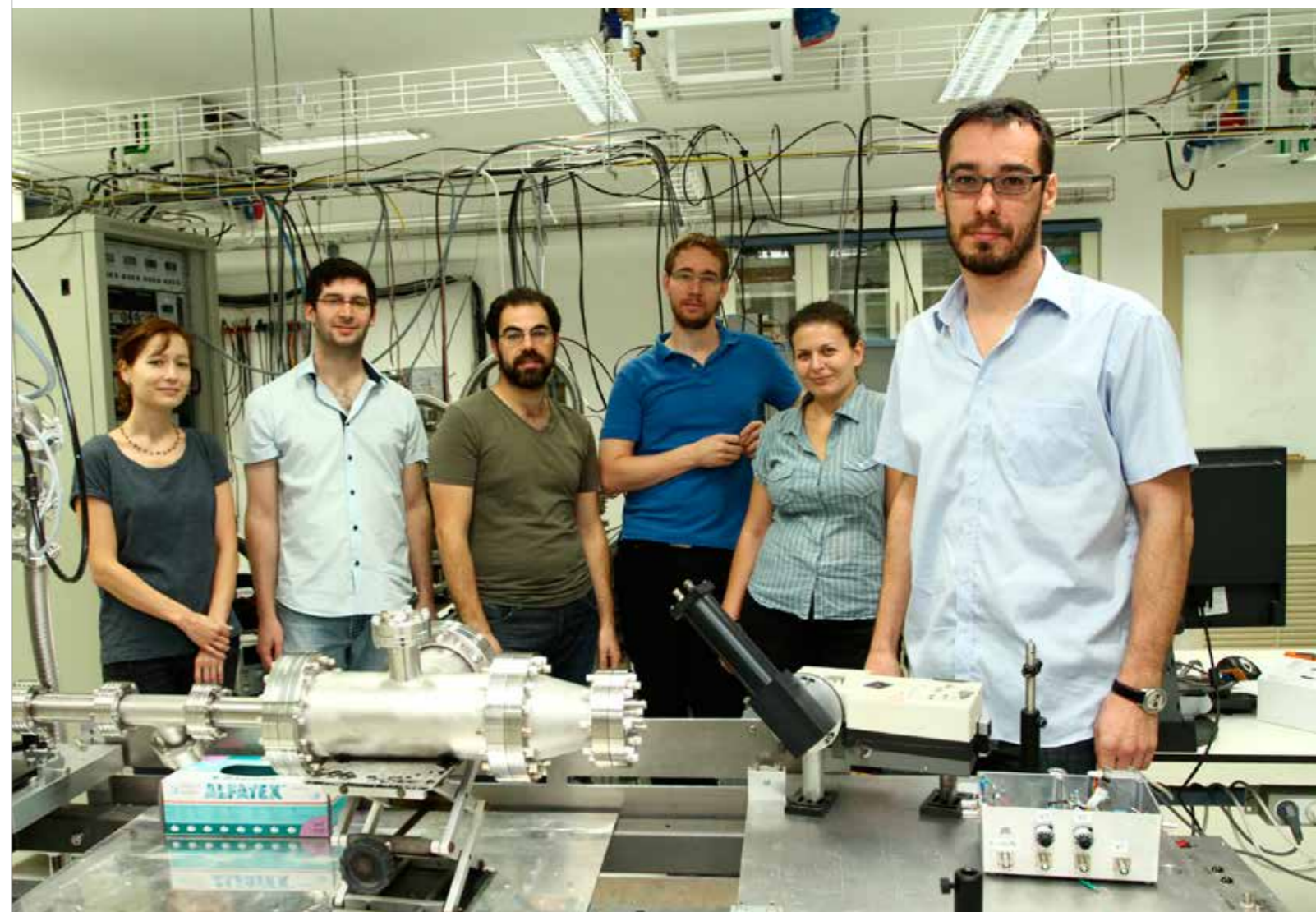
system in place, they proceeded, together with then-M.Sc. student Yuval Shagam, to demonstrate that below a certain temperature (3° Kelvin), instead of slowing down, the reaction rate suddenly picks up. The team's explanation: The wave-like behavior of particles in the quantum regime enabled them to overcome barriers that are impassable to classical particles. This is the first experimental proof that a reaction that would, in theory, have a

very low probability of occurring can proceed rapidly at certain energies, due to quantum effects.

An additional lab member – and Ed's first student – Etay Lavert-Ofir, is involved in another ingenious plan to decelerate super-cooled molecules and atoms from supersonic speeds to a more leisurely pace, in which quantum properties are more pronounced and become amenable to study. Former student Liron David, currently at Intel

Corp., developed the electronics for the decelerator's 2nd generation system.

The investigations of this team into “extreme” chemistry are already proving that the current understanding of even the simplest reactions is limited and will require a thorough rethinking. “We expect that our method will be used to solve many puzzles in reactions that are especially relevant to interstellar chemistry,” says Narevicius.



(l-r) Julia Narevicius, Yuval Shagam, Alon Henson, Etay Lavert-Ofir, Sasha Gersten and Dr. Ed Narevicius

Students Who Teach

"The kids in my group are strong students - super-bright ones who are into science. When I go off-track and talk about my lab work, or the latest scientific controversy, they catch on right away," says Tslil Ast, a Weizmann Institute genetics student who volunteers to teach twice a month in a high school for Arab students in Lod, a mixed Arab-Jewish city near Rehovot.

Kfir-Baruch Umansky, another volunteer, says: "Though they come from a population with problems, I don't feel those problems when I am teaching. I do feel that I am giving these kids something they would not be getting otherwise."

Asaf Levy, who teaches biology, says: "The fact that they show up on a Friday (which is not a school day) means that they are serious. The group I teach is mainly made up of Muslim girls, which is nice because the shy ones feel free to speak up."

Teaching in Hebrew to Arabic speakers can be a challenge - especially for Ezra Waxman, who teaches math. The American-born Waxman has been in Israel for less than two years, so he is trying to communicate in a language that is neither his nor his students' first language. But he enjoys it: "The kids seem enthusiastic about the material, and it's a fun challenge trying to relay to them my passion for mathematics," he says.

These Institute students - and around 20 others - are participating in an unusual volunteer project. Organized by the Institute's Dr. Eran Bouchbinder, it is a completely independent initiative. Students hear about the program through emails Bouchbinder sends out or from friends. Every other week they travel to Lod with lesson plans they have put together based on the high school curriculum and spend two hours

teaching small groups of 6-10. Since the project began, in 2011, participating high school students have reported a better understanding of the subject matter, higher test scores, and even motivation to study science and get to the Weizmann Institute, one day.

The Weizmann students report satisfaction, as well. "Teaching has helped me learn to explain what I do at Weizmann," says Ast. "I enjoy teaching, in general, so I get a lot of satisfaction from this," says Umansky.

Prof. Edriss Titi also joined Bouchbinder's call to volunteer. He says: "I grew up and still live in Akko (Acre), so I know firsthand the kind of problems and background these kids have. Having Jewish students and professors volunteering in an Arab school in response to a casual appeal by one of their colleagues is, for me, inspiring and a model to follow."

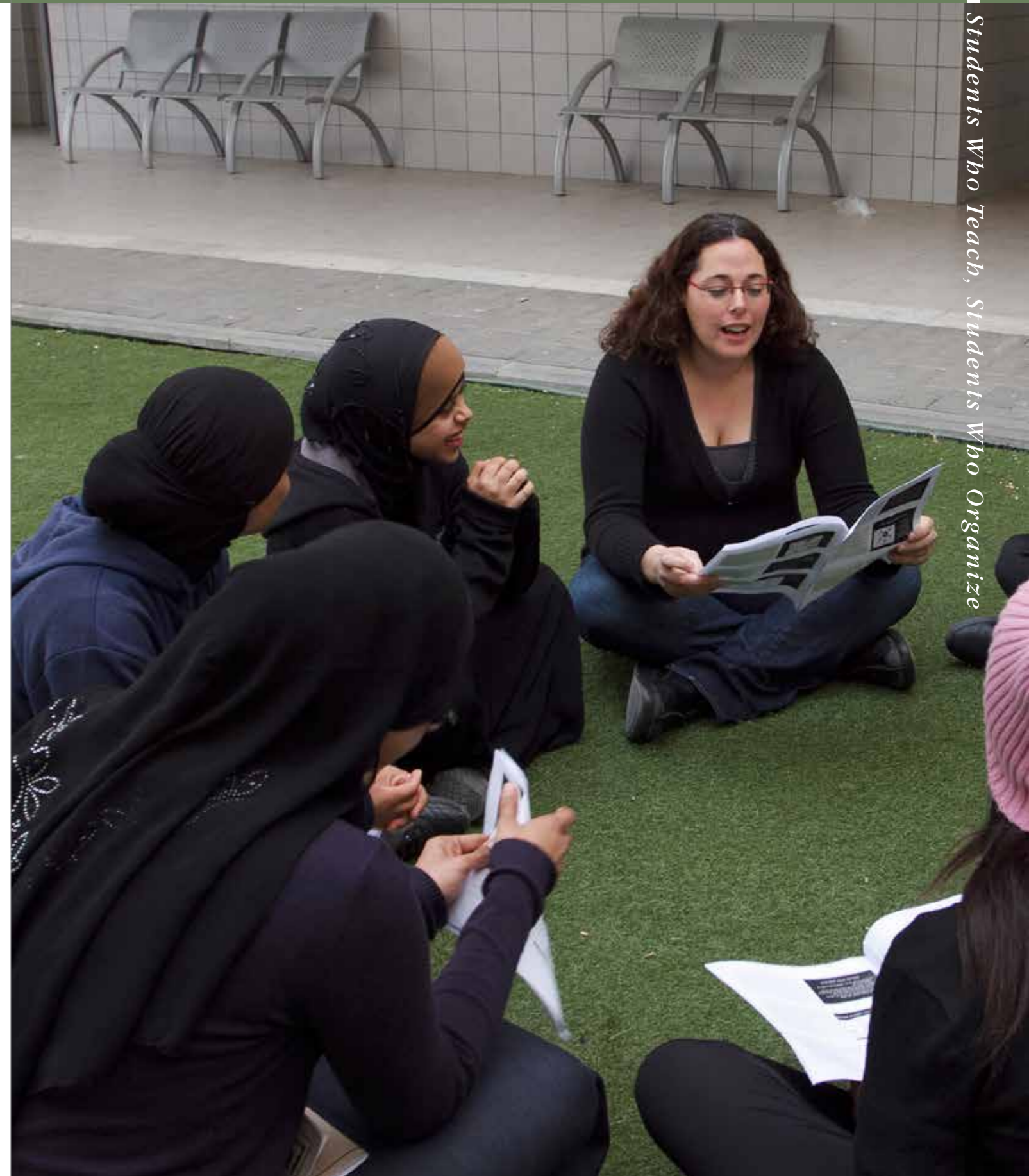
Students Who Organize

When a group of students wants to know more about a certain subject, they might just get together and organize a conference. Thus, for instance, research students Itamar Harel, Elik Chapnik, Yulia Shwartz, Liron Gibbs-Bar and Noam Leviatan, all of whom investigate different aspects of developmental biology in different Institute departments, put their heads together and came up with the *Evo-Devo 2012 Conference*. Around 200 research

students and scientists from research institutes around Israel, as well as 10 guest scientists from Israel and abroad, attended the conference.

Both the invited lectures and the informal discussions that followed gave the participants a broader view of the field and a deeper one - covering millions of years of evolution. Lecture topics included the development of stem cells, the genetic differences between humans and their closest

primate relatives, and the evolution of insect organ development. For the students participating, the conference was a unique opportunity to meet with other students working in similar lines of research, as well as getting face time with top researchers in the field. The organizers were so pleased with the results of their efforts, they are now writing a "students' guide to conference organizing."



Galia Zerkavod, a student in the Weizmann Institute's Science Teaching Department, with students in the ORT Lod High School

Thank You

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Biological Regulation
Karen Siem Fellowship for Women in Science
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Yeda-Sela Center for Basic Research
Ms. Lois Rosen, Los Angeles, CA
Edith Frumin, Havenford, PA

10 THINGS

we didn't know
about **Dr. Chaim Weizmann**



1. George Bernard Shaw's play *Arthur and the Acetone* imagines a meeting between Chaim Weizmann and Lord Arthur Balfour, in which Weizmann agrees to give the British his formula for fermenting acetone. The real meeting, which helped the British win WWI, is thought to have helped Weizmann obtain the Balfour Declaration, enabling Jewish settlement in Palestine.
2. In England, many knew him as Charles Weizmann.
3. His sister, Dr. Anna (Anushka) Weizmann, was a chemist who worked in his Daniel Sieff Research Institute lab (later the Weizmann Institute). Several patents to come out of that work are registered in her name. His brother, Prof. Moshe Weizmann, headed the Chemistry Faculty at the Hebrew University. Another brother, Shmuel, was a communist who remained in the Soviet Union and was executed in 1939 as a traitor.
4. His salary as president of the World Zionist Congress was one dollar a year.
5. While heading the Daniel Sieff Research Institute, he laid the foundations of Israel's first pharmaceutical company, Trima, which still manufactures dozens of drugs today.
6. He proposed and established three academic-scientific institutions: the Hebrew University of Jerusalem, the Daniel Sieff Research Institute and the Weizmann Institute, but he never earned the title "professor."
7. He refused a gift of an Arabian horse from Emir Faisal because, he said, he did not accept presents that had to be fed.
8. In January 1951, he wrote to Prime Minister David Ben-Gurion proposing formalizing the rights and responsibilities of the president. He wrote: "I have a lab in which everything – as opposed to political life – is clear and precise. If I focus on problems there, I can better serve the country, rather than as a shadow of a ghost...If it is not convenient for you to accept my proposal, then I would inform you that I do not intend to continue in my post." The letter was never sent.
9. He never lost hope that his son, Michael, an RAF pilot whose plane was downed in the Battle of Britain, had somehow survived. Michael was listed as "missing," and Weizmann made a provision for him in his will, in case he returned.
10. After his death in 1952, his sister, Dr. Masha Weizmann, who had remained in the Soviet Union, was seen crying near the Israeli Embassy in Moscow. She was arrested shortly afterwards. Eventually, she was allowed to come to Israel, and she worked as a doctor in Rehovot.

