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*“Where the world ceases to be the scene of our personal hopes and wishes, where we face it as free beings admiring, asking and observing, there we enter the realm of Science.”*

*Albert Einstein.*

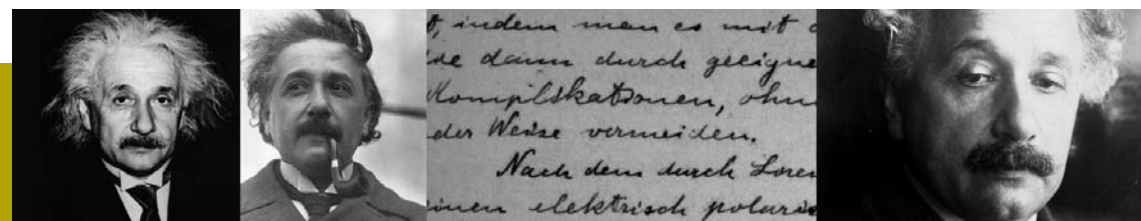


American Friends of The Hebrew University  
presents

2005 Academic Conference  
**The Legacy of Einstein's Science**

commemorating the  
**100th Anniversary of Albert Einstein's Annus Mirabilis**  
(his Miracle Year)

**Sunday, March 13th, 2005**



“I know of no public event that has given me such pleasure as the proposal to establish a Hebrew University in Jerusalem.”

-Albert Einstein, Founding trustee of the Hebrew University of Jerusalem

*Albert Einstein.*

**American Friends of The Hebrew University**  
Gratefully acknowledges and salutes the

# 2005 Academic Conference

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## 2005 Academic Conference – The Legacy of Einstein's Science

Sunday, March 13, 2005 – Skirball Cultural Center

Program

### Morning Session: 9:00 am

**Welcome from the Event Chair**  
Dr. William Isacoff

**“1905 - Einstein's Miraculous Year of Unification”**

Professor Hanoach Gutfreund - President Emeritus, Hebrew University of Jerusalem; Andre Aisenstadt Chair in Theoretical Physics; Chairman, Albert Einstein Worldwide Exhibitions - Hebrew University of Jerusalem

**“Einstein and the Quest for a Unified Theory”**

Professor David J. Gross - 2004 Nobel Prize recipient in Physics; Director, Kavli Institute for Theoretical Physics, UCSB; Director, Jerusalem Winter School in Theoretical Physics, Hebrew University of Jerusalem

**“Einstein and the Accelerating Expansion of the Universe”**

Professor Edward Wright - Professor & Vice Chair, UCLA Astronomy Department

**QUESTION & ANSWER SESSION with panel of professors**

**Break – 10 minutes**

**“Black Holes - the Ultimate Outcome of Einstein's General Theory of Relativity”**

Professor Tsvi Piran - Racah Institute for Physics, Hebrew University of Jerusalem; Visiting Professor at California Institute of Technology

**“Einstein (1905) Meets Biology (2005)”**

Professor Terrence Sejnowski - Head of the Computational Neurobiology Laboratory, Salk Institute for Biological Studies

**QUESTION & ANSWER SESSION with panel of professors**

### Luncheon: 12:30 pm

**Greetings from the Chairman**

Richard Ziman, Chairman of the Board, Western Region AFHU

**Hatikva & National Anthem**

Renae Jacobs-Anson

**Invocation & Hamotzi**

Rabbi Chaim Seidler-Feller

**LUNCH IS SERVED**

**Introduction of Keynote Speaker**

Professor Ronald M. Evans - Professor of Biology, Salk Institute for Biological Studies; Investigator, Howard Hughes Medical Institute

**Keynote Address: “How Physics has Influenced Modern Biology and Medicine”**

Dr. Harold E. Varmus - 1989 Nobel Prize Recipient - Physiology or Medicine, President and Chief Executive Officer of Memorial Sloan-Kettering Cancer Center

**Musical performance**

Lili Haydn - Renowned Violinist & Vocalist



## Message from the Chairman



### Richard S. Ziman

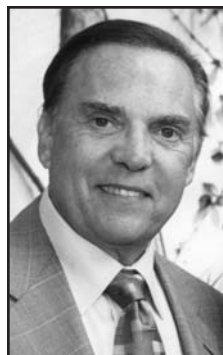
On behalf of the Board of Directors for the American Friends of The Hebrew University's Western Region, I am pleased to welcome you to our 2005 Academic Conference celebrating the legacy of Albert Einstein. Einstein is one of the illustrious founders of The Hebrew University of Jerusalem, which is heir to the Einstein archives, a priceless collection of 45,000 papers and artifacts, some of which are currently on display at the Skirball Cultural Center.

We are privileged to have a number of distinguished scientists among us today, including two Nobel Prize recipients, Dr. David Gross and Dr. Harold Varmus. Our entire panel is made up of acclaimed scientists from Israel and the United States, and together, we will pay tribute to the 100th anniversary of Albert Einstein's Annus Mirabilis — the "miracle year" in which three of his scientific papers were published, including his renowned theory of special relativity.

It is with great pride that we bring our own Hebrew University faculty together with their American colleagues and with American Friends from the Western Region for the purposes of today's discussions. In the realms of both theoretical and experimental sciences, The Hebrew University of Jerusalem is a world-class institution for research and higher education. Globally, Hebrew University scientists rank among the very best, winning accolades and international awards for their landmark discoveries.

We hope you will enjoy "the 100th Anniversary" and will join us for future events showcasing The Hebrew University of Jerusalem.

## Message from the President



### Dr. Gerald Niznick

Welcome to the 2005 Academic Conference, "The Legacy of Einstein's Science," hosted by American Friends of The Hebrew University at the Skirball Cultural Center. Today's program is a noteworthy event for several reasons. Not least of these is the unique opportunity to celebrate the work of Albert Einstein on the 100th Anniversary of  $E=mc^2$  and additional landmark theories developed by this towering intellect.

To commemorate this milestone, our conference assembles a wealth of scientific talent from leading institutions in Israel and the United States: The Hebrew University of Jerusalem, UCLA, Memorial Sloan-Kettering Cancer Center, UC Santa Barbara and the Salk Institute for Biological Studies. We also have a special opportunity to congratulate Hebrew University alumnus and faculty member, Professor David J. Gross, a 2004 co-recipient of the Nobel Prize in Physics.

American Friends of The Hebrew University exists to promote awareness of, and support for, The Hebrew University of Jerusalem. Founded in 1918 by luminaries such as Albert Einstein, Sigmund Freud and Chaim Weizmann — since opening its doors in 1925, the Hebrew University has functioned as a perpetual source of leadership for the State of Israel. Forty percent of Israel's civilian research is produced by The Hebrew University. Graduates become innovators in essential fields ranging from physics and neuroscience to international relations and Jewish Studies. It is no coincidence that during 2004, three Nobel laureates in the sciences were graduates of The Hebrew University.

Thank you for being with us today, as our speakers highlight recent developments in such fields as physics, biology, medicine and astronomy. Einstein's intellectual legacy lives on in the progress being made by scientists at The Hebrew University of Jerusalem and throughout the world.

## Message from the Event Chair



### Dr. William Isacoff

On behalf of the American Friends of The Hebrew University, welcome to our annual Academic Conference "The Legacy of Einstein's Science."

We are here today to celebrate the profound accomplishments in science and physics of perhaps the greatest mind of the 20th century, Albert Einstein. As the 19th century closed, leading physicists believed that apart from some minor details, the tasks of understanding the physical world was completed. However, within the first five years of the new century, older perceptions of the physical world would be explained by a revolutionary theory that redefined the concepts of space, time, energy, and matter. It was in 1905 that Albert Einstein gave us the special theory of relativity. Also in that miracle year, in explaining the photoelectric effect, Einstein described the concept of quantum, suggesting that a beam of light is made up of particles. He thereby paved the way for the acceptance of the dual nature of light, which became the foundation of quantum mechanics. Brownian motion was also redefined by Einstein's prediction of the numbers and mass of molecules in a given volume of liquid, and as to how these molecules would flit around. Not since Isaac Newton in 1665 has one man accomplished so much in just one year.

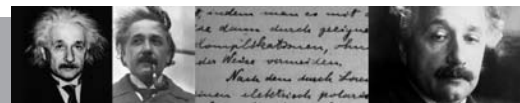
In 1909 Einstein was appointed to the University of Zurich as Extraordinary Professor of Theoretical Physics, his first academic job. By the summer of 1913 the celebrated German physicist Max Planck, inventor of quantum theory, and Walther Nernst, a brilliant experimental chemist, traveled to Zurich to offer Einstein the prestigious position as Professor at the University of Berlin and member of the Prussian Academy of Science. Einstein's response would not be immediate, nor would it be without flair. He informed the two esteemed scientists that he would present his decision by either holding a red flower if yes, or a white flower if no. The flower was red. Einstein arrived in Berlin in 1914 and stayed until the end of 1932, three weeks before Adolf Hitler became Chancellor of Germany. Einstein never returned.

While in Berlin, the best and (maybe the worst) was yet to come. In 1916 Einstein published the general theory of relativity, his greatest achievement. It would take into account the effect gravity would have in the real world in which bodies change speed and direction. He imagined gravity as an intrinsic property of space and time. Initially the general theory remained suspect and unproven. However, in 1919 Arthur Eddington, validated Einstein's general theory by measuring, during a total eclipse, how the sun bent light from a star. Once again Einstein had reshaped physics, and in doing so, he challenged the laws of Galileo and Newton which had been held as truth for over two centuries.

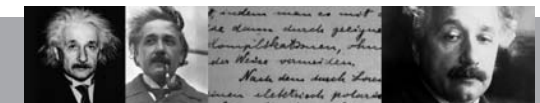
Suddenly Einstein who until then was known only within the scientific community, became a global celebrity, the world's first science superstar. However, in the environment of post war Germany, Einstein also became a target of hatred. As Einstein, the celebrity, traveled throughout Europe in the first half of the 1920's, there was increasing anti-Semitism developing in Berlin. Organized groups in Germany offered fees to scientists and science writers who would speak or write against Einstein. Meetings throughout Germany were arranged to attack Einstein and relativity. He and his science were defamed and slandered.

As a consequence of witnessing and experiencing the anti-Semitism of the European university system, Einstein was determined to create a place where Jews could gain an education unrestrained by prejudice. Although Einstein disliked Zionism's nationalist aspect, he was instrumental in the establishment of the Hebrew University in Palestine. When the Hebrew University finally came to fruition in 1923, it was Einstein who delivered the inaugural address in Jerusalem. He remained deeply committed to the welfare of Israel and the Jewish people for the rest of his life. After the Hebrew University opened in 1925, its founders, including Einstein, nurtured it and watched it flourish. To this day the Hebrew University's influence is profoundly felt throughout Israel and the world. Thank you, Albert Einstein. Thank you all for your support and participation.

Albert Einstein



Albert Einstein



## Message from the Regional Vice President



### Matthew R. Ross

On behalf of the American Friends of the Hebrew University, it is my pleasure to welcome you to the 2005 Los Angeles Academic Conference titled "The Legacy of Einstein's Science." In a tradition that has featured scholars and Senators, AFHU has sponsored a series of conferences over the years that have not only highlighted the intellectual brilliance of The Hebrew University of Jerusalem, but have illuminated subjects ranging from politics and history to religion and philosophy.

Rarely, however, have we been privileged to shine a light on the realm of science and medicine. At this year's conference, some of the world's most renowned scientists and scholars will discuss the physical world itself in language aimed at professionals and laymen alike.

With the assistance of two Nobel Laureates, including Hebrew University graduate Dr. David Gross, today's conference will honor the career of The Hebrew University's most noted founder, Albert Einstein. To commemorate the 100th anniversary of Albert Einstein's "Miracle Year" of 1905, when he published theories that revolutionized the way we understand our world, our scholars will talk about how the world we live in one hundred years later is still a world that owes much to Einstein's work.

I'd like to extend a special thanks to Dr. William Isacoff, the Chairman of today's conference, without whose initiative this day would not have taken place.

Thank you for attending "The Legacy of Einstein's Science." Please enjoy the day's activities.

## Conference Speakers – Distinguished Nobel Laureates



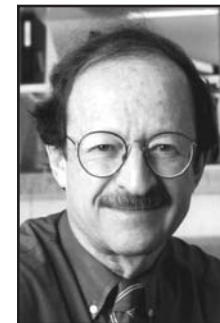
### Dr. David Jonathan Gross

**2004 Nobel Prize recipient in Physics**

**Director, Kavli Institute for Theoretical Physics, University of California Santa Barbara**

**Director, Jerusalem Winter School in Theoretical Physics, Hebrew University of Jerusalem**

Born in Washington, D.C., Dr. David Jonathan Gross received his undergraduate degree from The Hebrew University of Jerusalem and his Ph.D. in physics from the University of California, Berkeley. After serving as a junior fellow at Harvard University Dr. Gross began his professional teaching career at Princeton University in 1969 and was appointed professor of physics in 1972. He was named director of the Institute of Theoretical Physics at the University of California, Santa Barbara in 1997, a position he holds until this day. In 2002 he was named the Frederick W. Gluck Chair in Theoretical Physics, an endowed chair for the director of the Kavli Institute for Theoretical Physics. On October 5, 2004 the Royal Swedish Academy of Sciences announced Dr. Gross as the 2004 Nobel Prize recipient in Physics, along with Frank Wilczek and H. David Politzer, "for the discovery of asymptotic freedom in the theory of the strong interaction," and were credited with bringing "physics one step closer to fulfilling a grand dream, to formulate a unified theory comprising gravity as well-a theory for everything." In addition to receiving the Nobel Prize, Dr. Gross has received numerous awards for his work, including the J. J. Sakurai Prize of the National Academy of Sciences in 1986, a MacArthur Foundation Fellowship in 1987, the Dirac Medal in 1988, the Oscar Klein Medal from Stockholm University in 2000, the 2003 European Physical Society Prize in Elementary Particle Physics, the Grande Medaille D'Or of the French Academy of Science, as well as an honorary degree from The Hebrew University.



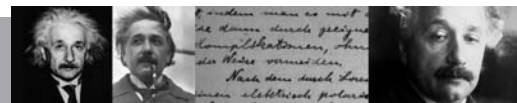
### Dr. Harold Varmus

**1989 Nobel Prize recipient in Physiology or Medicine**

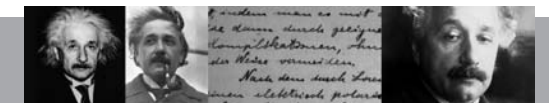
**President and Chief Executive Officer of Memorial Sloan-Kettering Cancer Center**

Harold Varmus, former Director of the National Institutes of Health and co-recipient of a Nobel Prize for studies of the genetic basis of cancer, has served as the President and Chief Executive Officer of Memorial Sloan-Kettering Cancer Center in New York City since January 2000. He is a graduate of Columbia University's College of Physicians and Surgeons and worked as a medical student in a hospital in India. Much of Dr. Varmus' scientific work was conducted during 23 years as a faculty member at the University of California, San Francisco, working alongside distinguished colleague, Dr. J. Michael Bishop and with their co-workers, demonstrated the cellular origins of the oncogene of a chicken retrovirus. This discovery led to the isolation of many cellular genes that normally control growth and development and are frequently mutated in human cancer. For this work, Bishop and Varmus received many awards, including the 1989 Nobel Prize for Physiology or Medicine. Varmus is also widely recognized for his studies of the replication cycles of retroviruses and hepatitis B viruses, the functions of genes implicated in cancer, and the development of mouse models for human cancer (the focus of much of the current work in his laboratory at Memorial Sloan-Kettering Cancer Center). In addition to authoring over 300 scientific papers and four books, including an introduction to the genetic basis of cancer for a general audience, Varmus has been an advisor to the Federal government, pharmaceutical and biotechnology firms, and many academic institutions. He served on the World Health Organization's Commission on Macroeconomics and Health, chairs the Board of Directors of Public Library of Science and the Scientific Board of the Grand Challenges in Global Health, and is involved in initiatives to promote science in other countries.

Albert Einstein



Albert Einstein



## Conference Speakers



### **Professor Ronald M. Evans**

*Head of the Gene Expression Laboratory – Salk Institute for Biological Studies  
Recipient of the 2004 Lasker Award for Basic Medical Research*

Dr. Evans is a professor at the Salk Institute Gene Expression Laboratory, where in 1985 he isolated the first of a series of gene control switches that have widespread medical significance for the understanding and treatment of cancer, heart disease, diabetes and inflammation. He is also an Investigator at the Howard Hughes Medical Institute, holds the March of Dimes Chair in Developmental and Molecular Biology and is an Adjunct Professor of Biomedical Sciences, Biology, and Neuroscience at the University of California, San Diego. He received his Ph.D. degree in microbiology and immunology from the University of California, Los Angeles, School of Medicine. After postdoctoral training with James Darnell at the Rockefeller University, Dr. Evans joined the faculty of the Salk Institute. His honors include the Fred Koch Award from the Endocrine Society, the City of Medicine Award from Duke University, the Bristol-Myers Squibb Award in metabolic research, the March of Dimes Prize in developmental biology, the Alfred P. Sloan Medal from the General Motors Cancer Research Foundation, and the 2004 Albert Lasker Award for Basic Medical Research. Dr. Evans was named the 1994 California Scientist of the Year. He is a member of the National Academy of Sciences, the Institute of Medicine of the National Academies, and the American Academy of Arts and Sciences.



### **Professor Hanoch Gutfreund**

*President Emeritus, Hebrew University of Jerusalem, Andre Aisenstadt Chair in Theoretical Physics  
Chairman, Albert Einstein Worldwide Exhibition, Hebrew University of Jerusalem*

Hanoch Gutfreund is the current chairman of The Hebrew University of Jerusalem's worldwide exhibitions on Albert Einstein. Born in Cracow, Poland, Professor Gutfreund immigrated to Israel in 1948. He began a long professional association with The Hebrew University, obtaining a M.Sc. in Physics in 1962 and a Ph.D. in Physics in 1966. His professorship at The Hebrew University's Racah Institute of Physics was followed by administrative leadership roles: as Head of the Racah Institute (1981-1984), Rector (1990-1992) and President (1992-1997). Professor Gutfreund's research interests include theoretical Solid State Physics and Computational Neuroscience. He is a member of Hebrew University's Interdisciplinary Center for Neural Computation. Internationally recognized, he has been a visiting scientist at Stanford University and a professor at the University of Paris VI and Ecole Normale Supérieure. Within the realm of higher education in Israel, Professor Gutfreund is known for his service on the National Committee on Science Education, the Pedagogical Council of the Ministry of Education and for chairing a National Committee on University-Industry Relations.

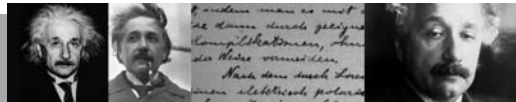


### **Professor Tsvi Piran**

*Racah Institute for Physics, Hebrew University of Jerusalem, Visiting Professor  
at California Institute of Technology*

Born in Tel Aviv, Israel, Professor Tsvi Piran holds the Schwartzmann Chair at The Hebrew University and is a 2004-05 Moore Distinguished Scholar at the California Institute of Technology. He received his B.S. in Physics, Cum Laude, and M.S. in Space Science, Magna Cum Laude from Tel Aviv University, later achieving his Ph.D. in Physics from Hebrew University of Jerusalem. Prof. Piran has served as Visiting Professor for various prestigious academic institutions such as, New York University, Columbia University, Harvard University, and is a Long term Member at the Institute for Advanced Studies of Princeton University. Prof. Piran's current body of research includes General Relativity, Relativistic Astrophysics, Black Hole Physics and Cosmology. His major efforts in the last years were devoted to the study of gamma-ray bursts. A mysterious phenomenon discovered in the sixties which remained unexplained until recently. Prof. Piran has also edited numerous scientific books and is the author of The Big Bang Theory (in Hebrew) and over 200 publications in scientific journals. His many honors include the Freund Prize for best scientific popular article in Hebrew, the Gravity Research Foundation (USA) award (2001, 1999, 1996, 1992, 1990, 1987), and the Mifal Hapais Award for best PhD thesis, 1976.

Albert Einstein



## Conference Speakers



### **Professor Terrence J. Sejnowski**

*Head of the Computational Neurobiology Laboratory, Salk Institute for Biological Studies*

A pioneer in the field of computational neuroscience, Dr. Sejnowski is an Investigator with the Howard Hughes Medical Institute and is the Francis Crick Professor at The Salk Institute for Biological Studies where he directs the Computational Neurobiology Laboratory. He is also Professor of Biological Sciences and Adjunct Professor in the Departments of Physics, Neurosciences, Psychology, Cognitive Science, and Computer Science & Engineering at the University of California, San Diego, where he is Director of the Institute for Neural Computation. Dr. Sejnowski received a B.S. in physics from the Case-Western Reserve University, an M.A. in physics from Princeton University, and a Ph.D. in physics from Princeton University in 1978. Dr. Sejnowski received a Presidential Young Investigator Award in 1984, the Wright Prize from the Harvey Mudd College for excellence in interdisciplinary research in 1996, and the Hebb Prize for his contributions to learning algorithms by the International Neural Network Society in 1999. In 2003 he was elected to the Johns Hopkins Society of Scholars. In 1989, Dr. Sejnowski founded Neural Computation, published by the MIT Press, the leading journal in neural networks and computational neuroscience. The long-range goal of Dr. Sejnowski's laboratory is to understand the computational resources of brains and to build linking principles from brain to behavior using computational models. This goal is being pursued with a combination of theoretical and experimental approaches at several levels of investigation ranging from the biophysical level to the systems level.



### **Professor Edward L. Wright**

*Professor & Vice Chair, UCLA Astronomy Department*

Edward L. (Ned) Wright received his ABScI and PhD degrees from Harvard University, and was a Junior Fellow in the Society of Fellows. After teaching in the MIT Physics Department, Professor Wright has been at UCLA since 1981. Prof. Wright is interested in infrared astronomy and cosmology and is the principal investigator of the Wide-field Infrared Survey Explorer (WISE) Midex project. He has been working on the Cosmic Background Explorer (COBE) since 1978. In 1992 he received the NASA Exceptional Scientific Achievement Medal for his work on COBE. Prof. Wright is also working on the Wilkinson Microwave Anisotropy Probe (WMAP) which was launched in June 2001. As an Interdisciplinary Scientist on the Space InfraRed Telescope Facility (SIRTF) Science Working Group, Prof. Wright has worked on the SIRTF project (renamed the Spitzer Space Telescope) since 1976. From 1994-1998, he served as a Science Editor of The Astrophysical Journal and was named the CSEOL Distinguished Scientist of the Year in 1995. Prof. Wright also conducts work on the Wilkinson Microwave Anisotropy Probe (WMAP), a mission to follow-up the COBE discovery of fluctuations in the early Universe. It will observe the structure of the Universe 300,000 years after the Big Bang with better angular resolution than the COBE mission, and thus be able to detect the seeds of present day superclusters of galaxies. WMAP was launched on 30 June 2001 and released in first year of data on 11 Feb 2003.

## Special Guest Entertainer

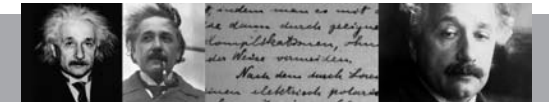


### **Lili Haydn**

*Renowned Violinist & Vocalist*

George Clinton calls her "the Jimi Hendrix of the violin." Rolling Stone called her music "an impassioned mix of classical, pop, rock, and funk." In a time of countless sound-alike bands and musicians, Lili Haydn is a true original; seamlessly tying together her passionate blend of musical styles with the soulful, nakedly emotional sound of her violin and voice. The violinist of choice in the rock world, Lili has worked with everyone from Funkadelic to Jimmy Page and Robert Plant, Sting, Josh Groban and the LA Philharmonic. As a solo artist, Lili has released two critically acclaimed major label recordings and continues to perform domestically and internationally.

Albert Einstein



## The Hebrew University of Jerusalem

Established in 1925 on Mount Scopus, overlooking the Old City of Jerusalem and the Judean Desert, The Hebrew University of Jerusalem has played an essential role in the development and continued strength of the State of Israel. Founded in 1918 by such brilliant minds as Albert Einstein, Chaim Weizmann and Sigmund Freud, Hebrew University was established to provide leadership for the Jewish state in virtually every field of endeavor.

Today, with 24,000 students and 1,200 faculty, The Hebrew University is Israel's pre-eminent institution of higher education. Responsible for 40% of the nation's civilian research, the university is in the vanguard of disciplines ranging from medicine and agriculture to public policy and law. Faculty and students pursue initiatives and forms of outreach that are essential to Israel's future and benefit humanity. The university's strong ties to business and industry, and commitment to research and development, provide the impetus for innovation and discovery. It has laid the foundations for Jerusalem's development as a center of international hi-tech activity with the development of the Har Hotzvim hi-tech industrial park and the Matam business-incubator on the Edmond J. Safra Campus, Givat Ram.



### A Strong Focus on Science & Research

Hebrew University scientists and researchers are contributing to developments at the cutting edge of science and technology—in the biological sciences, computer technology, chemistry and physics—as well as improving the quality of our lives through environmental and medical research. The university is the leading scientific research institute in Israel. 30% of Israel's Ph D degrees are awarded by The Hebrew University. About 3,500 research projects are in progress at the university and 800 new projects are started each year.

Scientific cooperation characterizes research conducted at the university's scientific departments and its nearly 100 interdisciplinary centers, and its scientists actively engage in ongoing collaborative efforts with their colleagues around the world.

### Leading the Way in Scientific Innovation

The rapid pace of change that characterizes the hi-tech industry represents a major challenge when creating programs to train tomorrow's pioneers. What is "cutting-edge" today is obsolete tomorrow and "state-of-the-art" means being one step ahead of the next product.

The School of Engineering and Computer Science provides an ideal environment for tackling these challenges. It ensures that its students gain an in-depth understanding of the theory that lies behind the technology and of the principles that underpin its development. Since its opening in 1999, enrollment figures for the School of Engineering and Computer Science have risen steadily. Over the next few years, the School is expected to hum with over 1,200 undergraduate and graduate students, 50 faculty members, 40 technical engineers, and over 25 research laboratories. The University has already launched a bold campaign to recruit more faculty and world-class researchers to the School.

With a record of excellence in mathematics, computer sciences, physics and chemistry, The Hebrew University provides a solid foundation for nurturing the next wave of hi-tech leaders. Focusing on computer software and communications engineering, the School is committed to harnessing this excellence in order to train the future leaders of Israel's hi-tech industries, thus contributing to the country's economic vitality.

The ongoing expansion of The Hebrew University's teaching activities and programs bears testimony to its emphasis on educational advancement. Research conducted at the University has made its name synonymous with reputable scholarship and pioneering investigative endeavors. As Israel's major center for civilian scientific research, the University is the home of world-ranking innovations in agriculture, technology and medicine. These contribute both to Israel's status as a source of modern technological development and to its economic advancement. Hebrew University remains committed to building for tomorrow and invests in the creation of high-tech facilities for teaching and research.



The University looks forward to the future with full confidence that it will enhance its status as one of the world's leading universities and centers of scientific research and technological innovation.

## Scientific Highlights of 2004

**The Hebrew University has helped to shape and strengthen the Jewish State for more than eight decades, and its remarkable contributions to the field of science extend far beyond Israel.**



- 2004 Nobel Prizes were awarded to three Hebrew University alumni: Professors Avram Hershko and Aaron Ciechanover, co-recipients for Chemistry and Professor David J. Gross, a co-recipient for Physics.

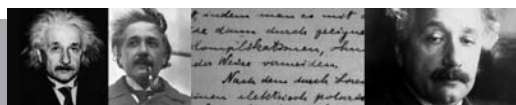
- Professor Amnon Shashua, chair of the School of Engineering and Computer Science, was the principal researcher to invent the EyeQ chip—a processing system that analyzes signals from car-mounted cameras to warn drivers of potential road hazards.

- The School of Pharmacy's Dr. Shela Gorinstein has discovered that the Israeli-developed pomelit fruit can significantly lower blood cholesterol and stimulate antioxidant activity.

- Professor Roi Baer and a team from the Institute of Chemistry are developing a nano-scale "molecular motor," the basis for a tiny machine that may one day operate within individual cells.

- In a project led by Prof. Eilon Vaadia of the Interdisciplinary Center for Neural Computation, scientists are developing a robotic arm that connects to the brain via electrodes. The limb responds when a user simply "thinks" of a physical movement.

Albert Einstein



Albert Einstein

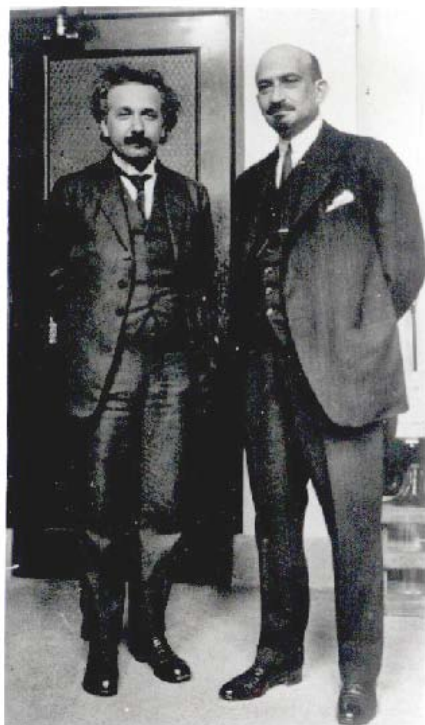


### By Prof. Hanoch Gutfreund

Andre Aizenstadt Professor of Theoretical Physics

On April 1st, 1921 Albert Einstein arrived in the US for the first time. He came with a group of Zionist leaders under the stewardship of Israel's first president-to-be Chaim Weizmann. Together, they were to take a six-week coast-to-coast tour to promote the cause of the Jewish national home and to raise funds for the establishment of a Jewish university in Jerusalem. The following day, The New York Times reported that thousands of people had waited four hours to welcome Professor Einstein to America.

On the group's arrival, Chaim Weizmann told reporters: "Professor Einstein has done us the honor of accompanying us to America in the interest of the Hebrew University of Jerusalem. Zionists have long cherished the hope of creating in Jerusalem a centre of learning in which the Hebrew genius shall find full self-expression and which shall play its part as interpreter between the Eastern and Western worlds." To this, Albert Einstein added: "I know of no public event which has given me such delight as the proposal to establish a Hebrew University in Jerusalem." Indeed, on another occasion, Einstein referred to the establishment of the Hebrew University as "the greatest thing in Palestine since the destruction of the Second Temple."



This visit to the US, his first trip outside Europe, made a lasting impression on Albert Einstein. He was received everywhere as a hero. Thousands of American Jews greeted him with cheers, with American flags, with blue and white flags of the Zionist movement, and escorted him in a motorcade from the Harbor to the City Hall. That was the case in every city he visited. The New York Times reported on his visit to Cleveland on May 25th: He was greeted by a near riot of fan frenzy, a military band and a motorcade of two hundred cars. He was saved from possibly serious injury only by strenuous efforts by a squad of Jewish war veterans who fought the people off in their mad efforts to see him.

Years later he wrote: "It was in America that I first discovered the Jewish people. I have seen any number of Jews, but the Jewish people I had never met either in Berlin or elsewhere in Germany. This Jewish people, which I found in America, came from Russia, Poland and Eastern Europe generally. I found these people extraordinarily ready for self-sacrifice and practically creative. They have, for instance, managed in a short time to secure the future of the projected University in Jerusalem, at any rate so far as the Medical Faculty is concerned."

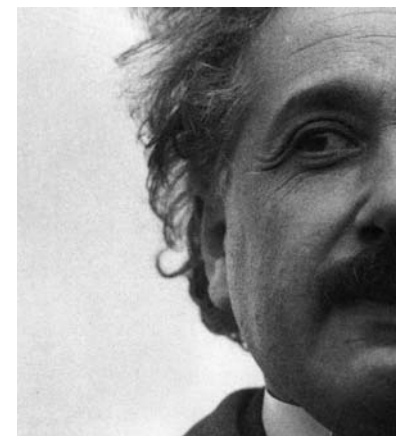
The end of Einstein's statement refers to a Gala Dinner which took place in May 1921 at the Waldorf Astoria Hotel in New York City. It was sponsored by the American Jewish Physicians Committee — the forerunner of today's American Friends of The Hebrew University (AFHU) — and attended by 800 Jewish doctors. They were inspired by Einstein's speech to fund the University's first medical sciences laboratory and to purchase additional land on Mount Scopus. On that single evening, they raised \$250,000 for these projects.

Einstein's fame comes from his achievements in science. When one talks about Einstein one cannot avoid explaining at least briefly what made him so famous. Over the first two decades of the last century, he has not only revolutionized forever our understanding of the physical world, but also made a lasting affect on our daily lives. In the year 1905, the 26 year old Albert Einstein made groundbreaking contributions to three areas in physics, each of which separately would merit a Nobel prize. Each of which could have won him the Nobel prize.

He asserted that light sometimes propagates as a bundle of discreet particles. That gave rise to the understanding of the photoelectric effect (light on surface metal produces current) and to the development (much later) of lasers. Thus, one can say that every photocell and every laser with their numerous technological applications can be viewed as Einstein's intellectual grandchildren. He established that matter is composed of molecules, showed how their size and mass can be derived and deduced rules that describe their motion in matter. In the same year he also developed his Special Theory of Relativity that led to the most famous combination of 5 symbols:  $E = mc^2$ . This equation tells you that a small amount of mass can be converted into a huge amount of energy. To achieve that, you either build an atom bomb where this energy is released in a devastating manner, or you construct a nuclear reactor, where this energy is released in a controlled way.



What this young man achieved in one year is truly miraculous. Had it not been by Einstein, it all would have been discovered sooner or later, probably not by a single scholar, probably over the span of years, because different experiments in physics laboratories raised questions, puzzles and contradictions which called for such answers. This cannot be said about Einstein's most impressive intellectual achievement — his General Theory of Relativity — which is purely a product of Einstein's conviction that this is how the world has to behave. The General Theory applies to the structure of the Universe. It is the basis of modern cosmology. It led to the present theory of the origin of the universe — the Big Bang theory - and one of its consequences is the existence of black holes.



Two years before his US visit, Einstein became a world celebrity overnight when a team headed by the British physicist and astronomer Eddington confirmed one of the basic predictions of Einstein's General Theory of Relativity, namely that light traveling in the vicinity of a very massive object follows a curved trajectory. To verify such a statement, astronomers looked at light from distant stars in the neighborhood of the sun, acting as the massive object. In order to look in the direction of the sun they had to wait for a full eclipse. That happened in 1919. What they saw and measured was exactly what Einstein predicted.

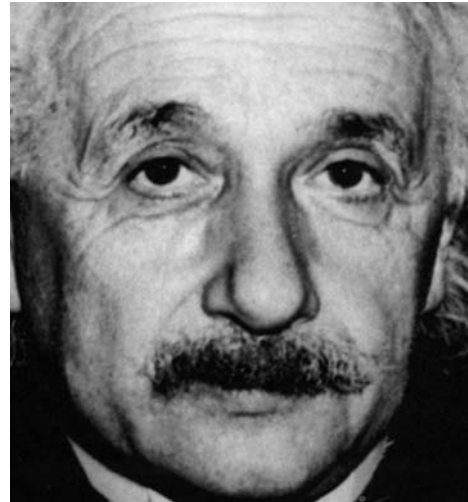
In the same year Einstein accepted Weizmann's invitation to join the Zionist movement and, shortly after, The Times of London described him as an ardent Zionist who had promised to participate in the effort to establish a Hebrew University in Jerusalem. In fact, Einstein's partnership in the Zionist program was most evident in his association with this initiative. He perceived the proposed University as the stage on which the inventiveness of the Jewish people and the Jewish quest for learning would come into prominent play.

Between 1921-25, Einstein's frequent lecture tours took him elsewhere in the world and Weizmann arranged for him to plead the University's cause in Jewish communities as distant as Singapore. In 1923, on a stopover to Japan, Einstein raised funds for the Hebrew University in Singapore. Addressing the Jewish community there, he said: "One may ask — why do we need a Jewish University?" Science is international but its success is based on institutions owned by nations. Up to now as individuals we have helped as much as possible in the interest of culture and it would be only fair to ourselves if we now, as a people, add to culture through the medium of our own institutions."

On the way back from that trip to Japan, Einstein made his only visit to Palestine. There, in a British police academy hall on Mount Scopus, he delivered the University's first-ever scientific lecture. The event was chaired by the Zionist leader Menachem Ussishkin who concluded his introductory remarks by saying: "Professor Einstein, please rise to the podium that has been waiting for you two thousand years." Einstein began his lecture in Hebrew and then apologized for being unable to continue in the language of his own people, and resumed in French. Those present heard in Einstein's voice the birth song of the long anticipated Jewish University — "national celebration" exulted the newspaper Ha'aretz.



On the University's opening in 1925, Einstein joined its Board of Governors and became founding chairman of its Academic Committee. Here began some years of differences over policy with the University's Chancellor Judah L. Magnes. These led to Einstein's resignation from the Board in 1928 and to a review of his concerns and objections by the governing bodies of the University, which ultimately ended in Einstein's favor. By that time, Einstein was ensconced at Princeton, but his commitment to the Hebrew University remained. University officials and representatives continued to consult with him on such issues as presidential powers and academic appointments, while Hebrew University professors on fundraising tours carried his personal letters of introduction. Indeed, his correspondence shows the careful attention to detail that could only arise from much deliberation and concern.



Einstein helped in the University's major expansion drive that followed World War II, serving as chairman of the AFHU's national council in 1947 and as its honorary president in 1951. He was conferred an honorary doctorate by the University in 1949.

In 1950, Einstein gave profound expression to his lifelong commitment to the Hebrew University: he bequeathed his own true wealth — in this case intellectual: his personal papers and literary estate — to the University. Together with his library, which the University received in 1987, they today make up the Albert Einstein Archives at the Jewish National and University Library, which constitute a cultural asset of supreme importance to mankind. Its holdings are unique — they consist of numerous manuscripts, prolific correspondence, and a large variety of additional material about Einstein. The material in the archives sheds light on the multifaceted aspects of Einstein's scientific work, his political activities and his private life.

Einstein inspired the entire Jewish world and many in the academic world with his vision of the Hebrew University. In the mission statement that he published for the

1925 opening of the University, he wrote: "A university is a place where the universality of the human spirit manifests itself," and he expressed the wish that "Our University will develop speedily into a great spiritual center which will evoke the respect of cultural mankind world over." The Hebrew University of Jerusalem has been guided by this vision throughout its history.



*Opening Day Ceremony*  
of The Hebrew University of Jerusalem, 1925



Continuing the Legacy of Einstein's Science



**Hebrew University Scientist One of Four Profiled In Nature Magazine in Connection With Einstein Centenary**

Dr. Dorit Aharonov, of the Benin School of Engineering and Computer Science at The Hebrew University of Jerusalem, has been chosen by the science journal Nature as one of four young theorists being profiled in the magazine to mark the 100th anniversary of Albert Einstein's publication of three of his landmark theories in 1905, when he was 26 years old.

Dr. Aharonov's work focuses on a new computational model based on the law of quantum physics that has caused a revolution in the theory of computer science. Quantum computers, if ever built, will be able to solve certain computational problems dramatically faster than any standard computer. Many laboratories all over the world are currently trying to create large-scale quantum computers.

Dr. Aharonov's work concentrates on overcoming the main problem with quantum computers: large-scale quantum systems are very sensitive to errors whose effect might ruin the computation process. In her Ph.D. project, Dr. Aharonov, together with advisor Prof. Michael Ben-Or, showed how to protect the quantum computer from errors by theoretical means. Dr. Aharonov hopes to develop new techniques for solving difficult computational problems with the aid of the laws of quantum physics.

"I was very happy about being chosen by Nature," said Dr. Aharonov, 34, who was born in Washington, D.C., earned her academic degrees at The Hebrew University and has done post-graduate work at the Institute of Advanced Study at Princeton and at the University of California, Berkeley. "This shows the great importance that the world scientific community attributes to quantum computation. The field brings together ideas from physics and mathematics to investigate fundamental questions, such as: What is the computational power of nature and how does the transition between classical and quantum physics occur?"

***"The most beautiful moments in Science are those in which surprising links are discovered between seemingly unrelated things. Computational science, with its incredibly versatile plethora of open problems, is a wonderful playground for such discoveries"***

**- Dr. Dorit Aharonov**







## American Friends of The Hebrew University

*Nurturing Israel's Greatest Asset*

American Friends of The Hebrew University (AFHU) is a national, not-for-profit organization which provides programs, events, and fundraising activities in support of The Hebrew University of Jerusalem, Israel's foremost center of higher education and research. Forging a meaningful partnership between American Jewry and the people of Israel, AFHU helps to ensure the nation's well being by nurturing Israel's greatest asset: the intellectual strength of its people.

AFHU cultural and educational programs attract people from all walks of life, including Hebrew University and Rothberg International School alumni, and American scholars and scientists.

These initiatives promote greater understanding of the University's contributions in fields ranging from technology, medicine and law to agriculture, public policy and Jewish Studies.

Founded by the American philanthropist, Felix M. Warburg in 1925, AFHU has been a central force in The Hebrew University of Jerusalem's rise to international prominence. Today, AFHU is part of an international Society of Friends organizations spanning more than 25 countries.

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# The Mission of Our University

By ALBERT EINSTEIN

 THE opening of our Hebrew University on Mount Scopus, at Jerusalem, is an event which should not only fill us with just pride, but should also inspire us to serious reflection.

A University is a place where the universality of the human spirit manifests itself. Science and investigation recognize as their aim the truth only. It is natural, therefore, that institutions which serve the interests of science should be a factor making for the union of nations and men. Unfortunately, the universities of Europe today are for the most part the nurseries of chauvinism and of a blind intolerance of all things foreign to the particular nation or race, of all things bearing the stamp of a different individuality. Under this regime the Jews are the principal sufferers, not only because they are thwarted in their desire for free participation and in their striving for education, but also because most Jews find themselves particularly cramped in this spirit of narrow nationalism. On this occasion of the birth of our University, I should like to express the hope that our University will always be free from this evil, that teachers and students will always preserve the consciousness that they serve their people best when they maintain its union with humanity and with the highest human values.

Jewish nationalism is today a necessity because only through a consolidation of our national life can we eliminate those conflicts from which the Jews suffer today. May the time soon come when this nationalism will have become so thoroughly a matter of course that it will no longer be necessary for us to give it special emphasis. Our affiliation with our past and with the present-day achievements of our people inspires us with assurance and pride *vis-à-vis* the entire world. But our educational institutions in particular must regard it as one of their noblest tasks to keep our people free from nationalistic obscurantism and aggressive intolerance.

Our University is still a modest undertaking. It is quite the correct policy to begin with a number of research institutes, and the University will develop naturally and organically. I am convinced that this development will make rapid progress and that in the course of time this institution will demonstrate with the greatest clearness the achievements of which the Jewish spirit is capable.

A special task devolves upon the University in the spiritual direction and education of the laboring sections of our people in the land. In Palestine it is not our aim to create another people of city dwellers leading the same life as in the European cities and possessing the European bourgeois standards and conceptions. We aim at creating a people of workers, at creating the Jewish village in the first place, and we desire that the treasures of culture should be accessible to our laboring class, especially since, as we know, Jews, in all circumstances, place education above all things. In this connection it devolves upon the University to create something unique in order to serve the specific needs of the forms of life developed by our people in Palestine.

All of us desire to cooperate in order that the University may accomplish its mission. May the realization of the significance of this cause penetrate among the large masses of Jewry. Then our University will develop speedily into a great spiritual center which will evoke the respect of cultured mankind the world over.

*Albert Einstein*

