# THE INSTITUTE LETTER

INSTITUTE FOR ADVANCED STUDY

PRINCETON, NEW JERSEY · WINTER 2008


## ERIC S. MASKIN AWARDED NOBEL PRIZE IN ECONOMICS

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*Eric Maskin receiving his Nobel Prize in Sweden*

In his Nobel banquet speech in Stockholm on December 10, 2007, Eric S. Maskin, Albert O. Hirschman Professor in the School of Social Science, quoted Robert Kennedy: "Some men see things as they are and ask why. I dream of things that never were and ask why not." Kennedy's first line, according to Maskin, describes *positive* economics, which "explains economic events that have happened or, better yet, forecasts what will happen."

But Kennedy's second line, said Maskin, "captures the part of economics dearest to me: *normative* economics, the study of the things that never were but ought to be." In particular, the latter describes mechanism design, for which Maskin was awarded the 2007 Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel, alongside Leonid Hurwicz, whose pioneering work in mechanism design inspired Maskin to become an economist, and Roger B. Myerson, a former classmate at Harvard University with whom Maskin has collaborated.

Maskin describes mechanism design as the engineering part of economic theory that, like Kennedy, aspires to address how things ought to be rather than how they are. In other words, it reverses the direction of positive, or predictive, economics. "We start with the particular social or economic goals that we want to achieve, and then we ask, 'What kinds of institutions, mechanisms, or games could we design to achieve those goals?'"

Over more than four decades, mechanism design theory has played a central role in many areas of economics and political science with application to auction design, pollution control, public utility regulation, privatization, voting rules, and electoral systems. Used in labor negotiations, taxation, and pricing stock options, mechanism design works to align individual incentives with desired social outcomes when not everyone has the same information or goals.

In a recent interview with *The Institute Letter*, Maskin recalled being intrigued by the then-nascent field as a mathematics student at Harvard University in the 1970s, when it appealed to his desire to help improve the world. "I was a product, in a way, of the late 1960s and early 1970s when students were interested in overturning the status quo," said Maskin. "I wasn't a revolutionary by any means, but I was certainly influenced by that way of thinking."

Born in New York City in 1950, Maskin was raised in Alpine, New Jersey, where he attended a three-room schoolhouse and was drawn to music and mathematics at an early age. His mother was a concert pianist and his father an amateur violinist turned medical doctor. As a child, Maskin began playing the piano, then moved on to the

*(Continued on page 8)*

## MARTIN L. LEIBOWITZ: CHAIRMAN OF THE BOARD OF TRUSTEES

CLIFF MOORE

*Chairman Martin L. Leibowitz with Trustee Brian Wruble*

Martin L. Leibowitz's ties to the Institute for Advanced Study run deep. The Chairman of the Institute's Board of Trustees, who assumed the position when James Wolfensohn resigned last October, first read John von Neumann (Faculty, 1933–57) and Oskar Morgenstern's *Theory of Games* as an adolescent. As a teenager, he was introduced to the Institute through his sister, Lucille, a physicist who worked in the health physics division of the Oak Ridge National Laboratory.

At the University of Chicago, which Leibowitz began attending on a Ford Foundation scholarship at age fifteen, he took two classes from Marvin Goldberger, who later served as Institute Director (1987–91). And as the first house mathematician at Salomon Brothers, Leibowitz worked alongside Wolfensohn and Michael Bloomberg, Mayor of the City of New York and a former Trustee (1995–2002).

"The Institute name has always been held up as godlike to me," said Leibowitz in a recent interview with *The Institute Letter*. "I have always thought of it as an intellectual Camelot, which is not too far from the truth. I guess what is remarkable is that I never thought I would have anything to do with it. I still can't quite believe it."

A managing director at Morgan Stanley, Leibowitz will serve as Chairman of the Institute's Board until Trustee Charles Simonyi assumes the role in October. Leibowitz has been a Trustee since 1995, and currently serves on the Finance and Nominating Committees, as well as on the Endowment Campaign Task Force. He was chairman of the search committee for Director Peter Goddard, and has actively supported the School of Mathematics, the School of Historical Studies, systems biology in the School of Natural Sciences, and Institute programs such as the Park City Mathematics Institute. "Marty is greatly admired for his strong support of the Institute and his unstinting efforts on its behalf," said Goddard. "We all respect his wisdom and understanding of the Institute and its work."

In his book *Capital Ideas Evolving* (John Wiley & Sons, 2007), Peter L. Bernstein dedicates a chapter to Leibowitz's contributions to the field of finance, observing, "over Leibowitz's long career, he has demonstrated repeatedly how much power theory can contribute to practice." By translating theoretical concepts into pragmatic financial tools, Leibowitz has made key contributions to developing market innovations such as zero-coupon bonds, indexing strategies, bond dedication, and beta-based asset allocation.

Leibowitz has written more than 150 articles on various financial and investment analysis topics, as well as several books. He is the most frequently published author in both the *Financial Analysts Journal* and the *Journal of Portfolio Management*, and he recently received an award from the latter for the best paper in their 2006–07 cycle. Leibowitz has been honored by the Chartered Financial Analyst Institute with three of its highest awards: the Nicholas Molodowsky Award in 1995, the James R. Vertin Award in 1998,

*(Continued on page 7)*

# NEWS OF THE INSTITUTE COMMUNITY

CAROLINE WALKER BYNUM, Professor in the School of Historical Studies, was awarded the degree of Doctor of Humane Letters *honoris causa* by her alma mater, the University of Michigan, at its mid-winter commencement in December.

PHILLIP A. GRIFFITHS, Professor in the School of Mathematics, and Trustee VARTAN GREGORIAN, president of Carnegie Corporation of New York, have announced the creation of a joint commission to address the continuing concern that America's education systems are not providing the level of instruction in science, mathematics, and technology needed in today's global economy. The Carnegie-IAS Commission on Mathematics and Science Education, comprised of individuals representing government, academia, industry, cultural organizations, and educators, expects that their findings will be relevant to federal, state, and local officials, university and faculty administrators, and leaders of the business and philanthropic communities.

JONATHAN ISRAEL, Professor in the School of Historical Studies, presented a lecture, "Voltaire, Radical Philosophes and Anti-Philosophes: The Struggle of Modernity's Three World Outlooks (1750–89)," at Princeton University in October. His talk, designated as a James Moffett '29 Lecture in Ethics, was sponsored by the University Center for Human Values.

*Visible Spirit: The Art of Gianlorenzo Bernini*, the first volume of the collected works of IRVING LAVIN, Professor Emeritus in the School of Historical Studies, has been published by Pindar Press. Two additional volumes will follow.

Director's Visitor LAKHDAR BRAHIMI has been awarded the Four Freedoms medal by the Franklin and Eleanor Roosevelt Institute. Brahimi was recognized with the Freedom of Speech medal for his United Nations work, which has been "devoted to political freedom, opposition to militarism, and the search for peaceful solutions to the world's conflicts." In February, UN Secretary-General Ban Ki-moon appointed Brahimi as head of an independent panel charged with examining the safety and security of UN personnel and premises worldwide.

PIERRE RAMOND, Member in the School of Natural Sciences, will receive the first Lise Meitner Prize, presented by the Physics Center, a joint umbrella organization for the physics departments of Chalmers University of Technology and Göteborg University in Sweden. The prize, to be presented annually, is awarded to Ramond for his pioneering contributions to superstring theory.

ROBERT DIJKGRAAF, former Member in the School of Natural Sciences (1991–92; 2002–03), has been elected president of The Royal Netherlands Academy of Arts and Sciences.

NANCY BERNKOPF TUCKER, former Member in the School of Historical Studies (2004–05), has been awarded the National Intelligence Achievement Medal by the United States National Intelligence Agency. Tucker is a professor of history in the Edmund A. Walsh School of Foreign Service at Georgetown University.

## BAHCALL FELLOWSHIPS

Nadia Zakamska and Zheng Zheng, Members in the School of Natural Sciences, have received John Bahcall Fellowships effective January 1, 2008. SNS Member Aldo Serenelli continues his Bahcall Fellowship through this academic year. The fellowships were established to commemorate John Bahcall (1934–2005), who was a member of the Faculty in the School of Natural Sciences for thirty-four years and formed the world-leading astrophysics group at the Institute. He was named Richard Black Professor of Astrophysics in 1997 and served in this position until his death.

*Nadia Zakamska*

Zakamska received her B.S. and M.S. from the Moscow Institute of Physics and Technology, and her Ph.D. from Princeton University in 2005. Since then, she has been at the Institute on a Spitzer Space Telescope Postdoctoral Fellowship. Her research specialty is the discovery and observation of "hidden" quasars—obscured by dust and gas—using telescopes at optical, infrared, and X-ray wavelengths, including the Sloan Digital Sky Survey, in which the Institute is a partner.

Zheng received his B.S. from Peking University, his M.S. from the Beijing Astronomical Observatory at the Chinese Academy of Sciences, and his Ph.D. from Ohio State University in 2004, at which time he came to the Institute. His research is focused on the formation and evolution of galaxies, and their relation to the distribution of dark matter, gravitational lensing, and the intergalactic medium.

*Zheng Zheng*

To commemorate John Bahcall's outstanding achievements, the Institute is seeking to endow further John Bahcall Fellowships to support Memberships in Astrophysics in the School of Natural Sciences. If you are interested in supporting the Bahcall Fellowships, please contact Michael Gehret, Associate Director of the Institute, at (609) 734-8218. ■

Questions and comments regarding
*The Institute Letter* should be directed to
Kelly Devine Thomas, Publications Officer,
via email at kdthomas@ias.edu or by telephone at (609) 734-8091.

## IAS SCHOLARS RECEIVE AMS HONORS

At the Joint Mathematics Meetings in San Diego, California, held January 6–9, the American Mathematical Society (AMS) honored a number of individuals affiliated with the Institute for Advanced Study.

Avi Wigderson, Herbert H. Maass Professor in the School of Mathematics, was selected to present the prestigious AMS Josiah Willard Gibbs Lecture, which was titled "Randomness—A Computational Complexity View." The AMS Council established the Josiah Willard Gibbs Lectureship in 1923 in order to illustrate aspects of mathematics and its applications to the public. The speakers for these public lectures are selected by invitation, and the aim is to bring greater awareness to the contribution that mathematics is making to present-day thinking and to modern civilization. Previous presenters of the Gibbs Lecture affiliated with the Institute include Freeman Dyson, Albert Einstein, Kurt Gödel, Marston Morse, John von Neumann, Hermann Weyl, Edward Witten, and Chen Ning Yang.

The 2008 Joseph Doob Prize was presented to Enrico Bombieri, IBM von Neumann Professor in the School of Mathematics, and Walter Gubler of the University of Dortmund in Germany. The Doob Prize is awarded every three years to recognize a single, relatively recent, outstanding research book that makes a seminal contribution to the research literature, reflects the highest standards of research exposition, and promises to have a deep and long-term impact in its area. Bombieri and Gubler were honored for their book, *Heights in Diophantine Geometry* (Cambridge University Press, 2006).

The 2008 Levi L. Conant Prize was presented to Wigderson, Shlomo Hoory of IBM Haifa Research Labs, and Nathan Linial of the Hebrew University of Jerusalem. The Conant Prize is awarded annually and recognizes an outstanding expository paper published in either the *Notices of the AMS* or the *Bulletin of the AMS* in the preceding five years. The three authors were honored for their article, "Expander graphs and their applications," *Bulletin of the AMS*, Vol. 43, No. 4 (2006), pp. 439–561.

The 2008 Leroy P. Steele Prize for a Seminal Contribution to Research was presented to Endre Szemerédi, Member in the School of Mathematics. Szemerédi, of Rutgers University and the Alfred Renyi Institute in Budapest, was honored for his landmark paper, "On sets of integers containing no k elements in arithmetic progression," *ACTA ARITHMETICA XXVII* (1975), pp. 199–245. The paper was a founding basis for the special program on arithmetic combinatorics that was sponsored by the School of Mathematics last fall.

Ohio State University's C. Herbert Clemens, former director of the Institute for Advanced Study/Park City Mathematics Institute (PCMI), received the AMS Award for Distinguished Public Service for his superb research in complex algebraic geometry, for his efforts in education at the local and national levels, and for his seminal role in the founding and continuation of PCMI.

# IAS FACULTY AND MEMBERS WIN WOLF AND CRAFOORD PRIZES

Three members of the Faculty of the Institute for Advanced Study, two former Members, and a former Visitor have been honored with major prizes. Pierre Deligne, Professor Emeritus in the School of Mathematics at the Institute (see article below); Phillip A. Griffiths, Professor in the School of Mathematics and former Institute Director (1991–2003); and David B. Mumford, former Member (1962–63, 1981–82) in the School of Mathematics and currently university professor at Brown University, have been chosen to receive the 2008 Wolf Prize in Mathematics.

The Royal Swedish Academy of Sciences announced that it will present the 2008 Crafoord Prize in Astronomy and Mathematics to Edward Witten, Charles Simonyi Professor in the School of Natural Sciences at the Institute; former joint Member (1992–93) in the School of Mathematics and the School of Natural Sciences Maxim Kontsevich of Institut des Hautes Études Scientifiques in France; and former Visitor (2005–06) in the School of Natural Sciences Rashid Sunyaev of the Russian Academy of Sciences in Moscow.

"We are delighted to see the seminal work in mathematics and astrophysics being done by our Faculty, Members, and Visitors receive further international recognition by the award of these important prizes," commented Director Peter Goddard. "The Institute is very proud of the achievements of these mathematicians and physicists, which have had profound impact on the development of their subjects over recent decades."

The Wolf Prize committee selected Deligne for his work on mixed Hodge theory, the Weil conjectures, the Riemann-Hilbert correspondence, and for his contributions to arithmetic. Griffiths was honored for his work on variations of Hodge structures, the theory of periods of abelian integrals, and for his contributions to complex differential geometry. Mumford was chosen for his work on algebraic surfaces, on geometric invariant theory, and for laying the foundations of the modern algebraic theory of moduli of curves and theta functions. The prizes will be presented by Shimon Peres, the President of Israel, in the Chagall Hall of the Knesset in Jerusalem on May 25.

This year's Crafoord Prize rewards mathematical discoveries that are significant for the fundamental laws of nature and research on black holes and the early universe. Half of the prize is shared by Witten and Kontsevich for "their important contributions to mathematics inspired by modern theoretical physics." The other half goes to Sunyaev for "his decisive contributions to high energy astrophysics and cosmology."

The Crafoord Prize promotes international basic research in disciplines that complement those for which the Nobel Prizes are awarded. These include astronomy and mathematics, geosciences, and biosciences (with a particular emphasis on ecology). There is also an occasional prize awarded in polyarthritis (also know as rheumatoid arthritis, the disease from which the prize founder suffered) when a special committee recognizes major advances in the field. The Crafoord Prize award will be presented in Stockholm on April 23, in the presence of Sweden's King Carl XVI Gustaf. ■

# PIERRE DELIGNE HONORED BY GOVERNMENT OF BELGIUM

ANDREA KANE

*Professor Emeritus Pierre Deligne*

In addition to receiving the 2008 Wolf Prize in Mathematics, Pierre Deligne, Professor Emeritus in the School of Mathematics, has been honored by King Albert II of Belgium, who made him a Vicomte. The Belgian post office has also issued a postage stamp in honor of his achievements in fundamental mathematics.

In association with his Vicomte honor, Deligne designed a coat of arms inspired by the song (to the tune of "Twinkle twinkle little star …"):

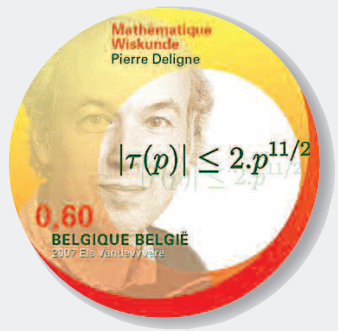

*Deligne's tautology-inspired coat of arms*

*Quand trois poules vont aux champs,*
*La première va devant,*
*La deuxième suit la première,*
*La troisième est la dernière,*
*Quand trois poules vont aux champs,*
*La première va devant.*

The song is a tautology, Deligne explained, "and one can view mathematics as being also (long) chains of tautologies."

At the Institute for Advanced Study, Deligne has brought new insight to deep problems in geometry and number theory. He was a Member (1972–73, 1976–77) and Visitor (1981–82) in the School of Mathematics and was appointed to the Faculty in 1984. He transferred to Emeritus status as of January.

Born in Brussels on October 3, 1944, Deligne went to the University of Brussels where he was a student of the Belgian algebraist Jacques Tits. While a foreign student at the École Normale Supérieure in Paris, he attended the seminars of Jean-Pierre Serre and of Alexandre Grothendieck. He received his doctorate from the University of Brussels in 1968 and, after a year as a junior scientist at the Fond National de la Recherche Scientifique in Brussels, he joined the Institut des Hautes Etudes Scientifiques, Bures-sur-Yvette.




*A Belgian stamp honors Deligne's achievements.*

A member of the Académie Royale de Belgique, the Accademia Nazionale dei Lincei, the American Academy of Arts and Sciences, the National Academy of Sciences, and the Paris Académie des Sciences, Deligne was awarded a Fields Medal in 1978, the Crafoord Prize of the Swedish Academy in 1988 (jointly with Grothendieck), and the Balzan Prize in mathematics in 2004. Other awards include the François Deruyts Prize from the Belgian Royal Academy in 1974, the Henri Poincaré Medal from the Paris Académie des Sciences in 1974, and the A. De Leeuw-Damry-Bourlart Prize in 1975.

When the London Mathematical Society elected Deligne an honorary member in 2003, he was recognized for his monumental contributions to algebraic geometry and for turning Grothendieck's philosophy of motives from a conjectural program into the driving force behind many of the most subtle areas of current algebraic geometry and arithmetic.

"There are very few mathematicians whose impact on modern mathematics comes close to that of Deligne," School of Mathematics Professor Peter Sarnak has noted. "Deligne's research in algebraic geometry and arithmetic geometry have shaped these fields and led him to the solution of a number of long-standing problems, including the Weil Conjectures (which are the analogues of the notorious Riemann Hypothesis for varieties over finite fields) and the celebrated Ramanujan Conjecture in the theory of modular forms."

Deligne pursues a fundamental understanding of the basic objects of arithmetical algebraic geometry—motives, L-functions, Shimura varieties—and applies the methods of algebraic geometry to trigonometrical sums, linear differential equations and their monodromy, representations of finite groups, and quantization deformation. His research includes work on Hilbert's 21st problem, Hodge theory, the relations between modular forms, Galois representations and L-series, the theory of moduli, tannakian categories, and configurations of hyperplanes.

In 2005, a conference was held at the Institute in honor of Deligne's sixty-first birthday. One of the organizers, Hélène Esnault of the Universität Duisburg-Essen, former Member (1993–94) in the School of Mathematics, described Deligne's work as "having structured the language in which generations of algebraic geometers and arithmeticians think and write." Deligne has explained the practice of mathematics as akin to searching for a lost key on a street at night—one looks under the light. Esnault observed, "He omitted to mention that to a large extent, he provides the light."

# BLOOMBERG HALL: NEW HOME OF THE SIMONS CENTER FOR SYSTEMS BIOLOGY

The Institute celebrated the opening of The Simons Center for Systems Biology as an extension to Bloomberg Hall last fall. The completion of the three-story, 13,750 square-foot addition, designed by Pelli Clarke Pelli (see article, page 6), marks a milestone in the Institute's history in terms of its commitment to biology, and provides a singular home for the School of Natural Sciences.

"With the opening of the new wing on Bloomberg Hall, the Institute's commitment to biology takes a concrete or, rather, bricks-and-mortar form," said Director Peter Goddard. "Professor Arnold Levine has established a group that both maintains essential contact with experiment and also brings in highly talented young theorists from physics and mathematics, effectively addressing the concerns that inhibited earlier development of biology as a field of research at the Institute."

The extension enhances Bloomberg Hall, whose opening in 2002 was generously facilitated by Michael Bloomberg, Mayor of the City of New York and Institute Trustee from 1995 to 2002. The original Bloomberg Hall linked two buildings constructed in 1948 and 1953 to create a 30,000 square-foot structure that unified the School of Natural Sciences for the first time since its founding in 1966.

"The extension to Bloomberg Hall seamlessly incorporates systems biology into the School of Natural Sciences, encouraging collaboration in the many scientific fields supported by the School—from molecular biology to mathematical physics—and literally opening the door for any number of scientific innovations," said Mayor Bloomberg. "I am extraordinarily proud of the research and accomplishments that have been achieved in Bloomberg Hall and at the Institute by all who work there, and I am certain that the collaborative and pioneering approach to systems biology will transform research in the field and lead to more powerful and important discoveries."

Generous benefactors have played a vital role in furthering the Institute's efforts in biology. In 2005, the center was named The Simons Center for Systems Biology to reflect the generosity of Trustee James H. Simons, a former Member (1972–73) in the School of Mathematics, and his wife Marilyn Hawrys Simons, who have endorsed the Institute's work in systems biology with a $10 million challenge grant from their foundation, The Simons Foundation.

*"The extension to Bloomberg Hall seamlessly incorporates systems biology into the School of Natural Sciences, encouraging collaboration in the many scientific fields supported by the School—from molecular biology to mathematical physics—and literally opening the door for any number of scientific innovations."*

*—Michael Bloomberg,*
*Mayor of the City of New York and*
*former Institute Trustee, 1995–2002*

"We are delighted to be among those who have facilitated the initiation of this collaboration and we have every confidence that over time the Institute will become as effective in advancing our knowledge of life as it has our knowledge of the physical world," said James Simons.

An anonymous pledge of $10 million has also been received, and this income is being used to supplement research in biology. Additional support for systems biology has come from the Leon Levy Foundation, Helen and Martin Chooljian, Sarah and Martin L. Leibowitz, and many other donors.

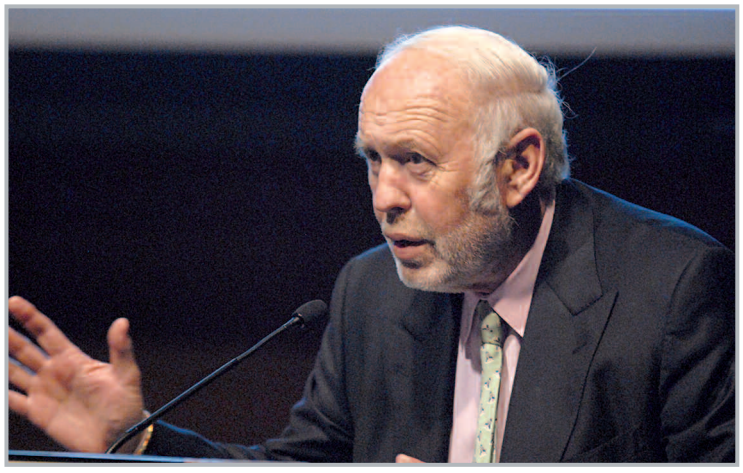
CLIFF MOORE

*The Pelli Clarke Pelli-designed extension to Bloomberg Hall houses The Simons Center for Systems Biology, and unifies the School of Natural Sciences. The double-height central space, shown here in a preliminary state, is intended to be an active hub, encouraging the kind of interactions that are at the core of The Simons Center's interdisciplinary mission.*

"As one of the leading centers for theoretical research in the sciences, the Institute is a natural magnet for the next generation of life scientists who will require extensive skills in mathematics, physics, computer science, and chemistry," said James D. Wolfensohn, who as Chairman of the Institute's Board of Trustees from 1986 to 2007 oversaw the building of the extension. "With the establishment of systems biology at the Institute, The Simons Foundation and other donors have capitalized on an extraordinary opportunity to improve the quality of life for future generations."

At The Simons Center for Systems Biology, a diverse and highly promising group of theoretical physicists, mathematicians, computer scientists, and biologists has been focusing on analyzing the enormous databases of genomic information that have been created over the past several years. The tools of modern physics and mathematics, when applied to biological investigation and clinical outcomes, can reduce by years the time leading to significant breakthroughs in the diagnosis and treatment of cancer and other diseases.

For the first half of the twentieth century, biology was largely a descriptive science. When the structure of DNA was discovered in 1953, the field of molecular biology was born, leading to technological advances in the past twenty years that have made it possible to collect large datasets of information about life processes. Current research at The Simons Center involves the detailed and sophisticated analysis of DNA data at the molecular, cellular, and organismic levels, to understand how genes develop and interact and to discern what goes wrong in certain disease states, as well as to address important problems in biology that concern genetics and genomics, polymorphisms and aspects of evolution, signal transduction pathways and networks, stress responses, and pharmacogenomics in cancer biology (see article, page 5).



CLIFF MOORE

*Trustee James H. Simons (pictured) and his wife Marilyn Hawrys Simons have provided vital support for systems biology at the Institute.*

Discussion of whether biology should be included within the work of the Institute goes back to its early days (see article, page 5). Although occasional work was done on biological topics at the Institute in the 1940s and 1950s, it was not until the beginning of the 1960s that Director J. Robert Oppenheimer revisited the question of whether, following the recent dramatic advances in molecular biology, the Institute had a role to play in the area. As before, the absence, and perhaps inappropriateness or infeasibility, of laboratories at the Institute was an obstacle to the development of a subject where experiment is ubiquitous in research.

Still, the subject remained on the agenda. In 1998, Martin Nowak, then a professor at Oxford University, was appointed to lead a program in theoretical biology concentrating in the areas of ecology and evolution dynamics. When Nowak left in 2003 to establish a program in evolution dynamics at Harvard, Arnold Levine, former president of Rockefeller University, came to the Institute to create a center for systems biology, first as a Visiting Professor and then, from 2004, as the Institute's first Faculty member in biology.

Today the program in biology hosts twelve Members

*(Continued on page 10)*

# *Analyzing Databases of Genomic Information*

At The Simons Center for Systems Biology, led by School of Natural Sciences Professor Arnold Levine, a group of theoretical physicists, mathematicians, computer scientists, and biologists has been analyzing databases of genomic information in the context of complex diseases, such as cancers and HIV, in order to improve early diagnosis through identification of high-risk populations, or to improve outcome with targeted drug therapy. The group has developed unique algorithms and approaches to study disease genes that are now in the literature.

For example:

- Research done jointly at The Simons Center and the Cancer Institute of New Jersey over the past three years has helped to identify genomic differences that appear to predispose premenopausal women to increased risk of breast, lung, and colon cancers. In practical terms, this could mean that women who need to be screened early for cancers might be reliably identified by a genotyping test that could be administered in a doctor's office.
- Members of The Simons Center have discovered significant differences in nucleotide sequence motifs in the HIV genome and its human host, which could lead to a new approach to developing a vaccine for HIV and to make present treatments more effective.
- It has been possible to identify differences in the mutational preferences that occur when influenza viruses replicate in birds or in humans. Because the incubation of influenza infections in birds can lead to worldwide pandemics when these viruses enter into the human population, these distinctions provide a clue to the strains that may jump species and to what happens when this occurs. In addition, the segregation of the influenza chromosomes into progeny viruses can also be shown to be a nonrandom process—a prediction that has been confirmed experimentally. These types of nonrandom events may well permit the prediction of next year's epidemics and the production of vaccines in advance of an epidemic.
- The herpes viruses are unusual because they initiate a primary infection, then reside in the body in a latent or dormant state until, in response to stress signals, they reactivate and cause disease. Employing novel algorithms that match a viral or cellular gene product to a gene it regulates, Members at The Simons Center have been able to explain how these viruses enter latency in the body—predictions that have been verified experimentally with one of the herpes viruses.
- Polymorphisms in several genes that are known to play a role in the origins of cancers in humans, have been identified and shown to be associated with the early onset of cancers in individuals. The molecular basis of how these variations alter the activity of a gene and create a predisposition to cancerous growth is now understood experimentally.
- Novel approaches to identify sequence variations that have functional consequences are now available and being tested. Information theory has been employed to analyze the kinds of variation observed in human genes in a defined population. It has become possible to identify a particular sequence or pattern of changes that have more recently entered the population but represent a larger than expected share of the polymorphic forms observed in this population. This has been observed with two genes in humans that have subsequently been shown to play a role in reproduction of embryos in females. Here, again, the theory has led experimentalists to test and confirm ideas that help to explain the predictions. ■

CLIFF MOORE

*Professor Arnold Levine*

# *Biology at the Institute for Advanced Study*

## AS RECOLLECTED BY FREEMAN DYSON

*This sketch of earlier attempts to bring biology to the Institute for Advanced Study is not a history. I have not dug into the archives to find official documents and exact dates. I am only recording my own fallible memories of events that I either saw for myself or heard other people talk about. Much of the information comes from my son George Dyson, who has examined the Institute archives for his forthcoming biography of John von Neumann.*

Around the year 1936, long before I came here, our first Director, Abraham Flexner, invited the British biologist John B. S. Haldane to come to the Institute. This would have been a good way to start a biology program here. Haldane was a population biologist who made important contributions to the mathematical theory of evolution. He was one of the pioneers in the study of "inclusive fitness," which means the additional fitness that an individual derives from sharing genes with relatives. He explained the concept by saying, "I would jump into a river to save two brothers or eight cousins from drowning." This was because he shared one half of his genes with a brother and only one eighth with a cousin. He was, like Darwin, a theoretical biologist who did not need a laboratory for his work.

Unfortunately, when Flexner invited him, he declined the offer. The Spanish civil war was raging, and Haldane was on his way to Madrid to organize the defense of the population against poison gas attacks. He had become an expert on chemical warfare as an army officer in World War I. He taught the citizens of Madrid how to improvise gas masks out of the empty wine bottles that were the only raw material available in sufficient quantity to protect the whole population. Fortunately, Franco's troops besieging the city never used chemical weapons, and Haldane's wine-bottle gas masks were never tested in action.

The first theoretical biologist who came to the Institute was Nils Barricelli, who was invited by John von Neumann in 1953 and stayed here for two terms. Using the computer that von Neumann had built at the Institute, Barricelli simulated the evolution of populations of artificial organisms. Each organism was represented by a genome consisting of a string of numbers. Random mutations and sexual exchange of genes caused populations to evolve. Barricelli observed the phenomena of speciation, parasitism, and predation arising spontaneously in his computer runs. He also observed punctuated equilibrium, the tendency of dominant species to remain static for many generations and then suddenly give way to new dominant species of a different character. He was a pioneer of the new science of Artificial Life, forty years before it became fashionable. With astonishing ingenuity he was able to simulate sophisticated evolutionary processes on a machine with a total memory of four kilobytes. Von Neumann had a strong interest in biology, but he died in 1957 and never had a chance to go further along the route that Barricelli explored. After von Neumann died, the Institute computer was closed down and no more biologists were invited to use it.

As long as J. Robert Oppenheimer was Director, he made sporadic efforts to bring famous biologists here for short visits. Each of them was invited to consider staying here and starting a serious program of research in biology. I remember three of these visitors having private conversations with Oppenheimer and giving one or two public lectures. The first was Jacques Monod, a philosophical Frenchman who had discovered the Lac Operon, the first example of a pair of proteins, one excitatory and the other inhibitory, jointly controlling the activity of a gene. He told us sternly that without a working laboratory we would not be able to attract any first-rate biologist. For him, a biologist without a laboratory was a contradiction in terms. After Monod came in succession Francis Crick and James Watson, the discoverers of the double helix. They gave us the same message. We also had discussions with Jacques Fresco, who was then the chairman of the biology department at Princeton University. In the end nothing came of these efforts.

Another opportunity was missed when Joseph Atick, a young theoretical physicist who was a long-term Member in the School of Natural Sciences, switched his interest from physics to neurology. While working at the Institute he solved an important problem in neurology, finding by theoretical analysis the architecture of color-sensitive photoreceptor cells and ganglion cells in the mammalian retina that would optimize the flow of useful information through the optic nerve to the brain. The ganglion cells are the crucial organizers of the information that comes out of the photoreceptor cells. Since the input of optical information to the retina is about a hundred megabytes per second, while the capacity of the optic nerve is only about one megabyte per second, the architecture of the ganglion cells has a decisive effect on the efficiency of vision. Experimental neurophysiologists at Rockefeller University tested Atick's theory and found it to be correct. After that, Rockefeller University offered Atick a job. The Institute made no effort to keep him here, and the chance of starting a serious program in theoretical neurology was missed.

Real progress only became possible in the 1990s, when Martin Nowak was invited to lead a group of theoretical biologists at the Institute. Nowak's group made important contributions to the theory of the evolution of cooperation in social species, including as a special case the evolution of human language. Once again, the Institute failed to establish the group on a permanent basis. Nowak went to Harvard, where his group is now flourishing.

At long last, the Institute made a decisive plunge into biology with the opening of The Simons Center for Systems Biology, led by Arnold Levine, a full member of the Institute Faculty since 2004. Systems biology means the study of organisms or populations as dynamical systems rather than as collections of molecules. This step became possible for an Institute without a laboratory because a large part of systems biology is concerned with exploring databases rather than exploring living creatures. Massive databases contain information about genomes, chemical signaling networks, evolutionary lineages, epidemics, and ecologies. Theoretical physicists and computer scientists, whose primary skill is the mining of data from large databases, can easily transfer their expertise to problems on the frontiers of biology. The ghost of Jacques Monod, telling us that biology without a laboratory is worthless, has now been finally exorcised.

—Freeman Dyson, Professor Emeritus
School of Natural Sciences

# DESIGNING A LABORATORY FOR IDEAS

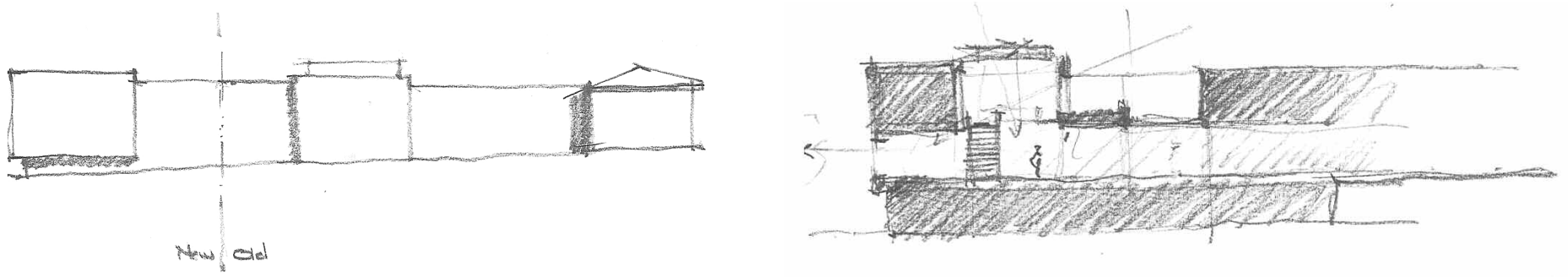
The new home for The Simons Center for Systems Biology, designed as a wing to the existing Bloomberg Hall, provides office space for Faculty, Members, Visitors, and administrative staff as well as a variety of spaces for formal and informal meetings. The lower floor, programmatically distinct from The Simons Center, is occupied by the Institute's computer center.

The building is configured to eliminate corridors, with the majority of the rooms arranged in a ring around a double-height space that functions as lobby, library, and stair hall. A lightweight public staircase within the central space connects the two floors of The Simons Center for Systems Biology, underneath which is a stairway to the entry level. The central space is intended to be an active hub, encouraging the kind of interactions that are at the heart of the interdisciplinary mission of the Center. The meeting spaces are located strategically at the end of pathways of movement, so that as you enter you will always be moving toward light and views out to the landscape, concluding in a large terrace overlooking a new courtyard.

The courtyard features a sculpture by artist Richard Long (see article below) and provides a protected and intimate outdoor space with southern exposure to sunlight. The Simons Center has incorporated many sustainable design strategies to reduce the building's environmental impact.The building has a green roof, the first in Princeton Township, designed to increase the insulation of the roof while serving as a storm water management solution without building new cisterns or retention ponds. All of the interior materials were selected to off-gas little or no volatile organic compounds. The interior systems will optimize energy use by capturing and reusing waste heat and adjusting lighting and temperature levels based on occupancy.

The overall design completes the strategy of Bloomberg Hall, which preserved two older buildings as pavilions at the end of a new connecting building. While The Simons Center is itself a distinct structure with its own sense of place, it emulates the sensibility of the existing pavilions, taking cues from their proportions and details and interpreting them in a contemporary way. A terra-cotta tile wall with high-performance aluminum windows was selected and detailed to recall the expression of the brick walls and punched wood windows of these original structures. The building will be a wonderful laboratory for ideas, and a beautiful new counterpart to the stately brick buildings that originally defined the campus.

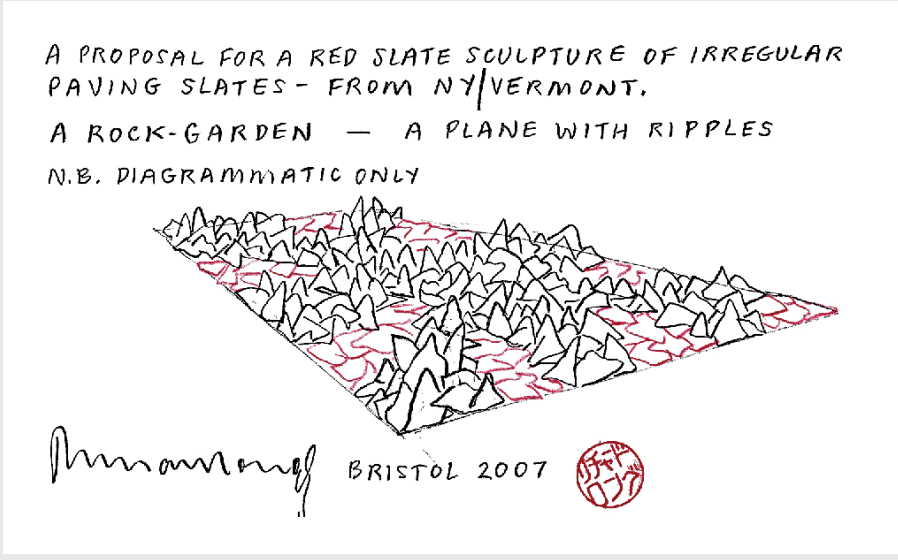
—Rafael Pelli
Pelli Clarke Pelli Architects




*Early sketches of the Bloomberg Hall extension, which takes its cues from the original structure*

Richard Long (pictured at bottom of photo) spent three days at the Institute constructing on-site a sculpture in the small courtyard created by the new extension on the southeast side of the building. The work, SLATE OASIS, comprises more than ten tons of slate, primarily red in color with some naturally occurring blue and green pieces, quarried from the New York-Vermont border. The standing slates form organic patterns and interlock on a flat ground of gray limestone chippings.

JAMES STEPHENS




## SLATE OASIS

From there and here to the New York Vermont border
To a blue-green/red rockface to the Tatko family
To water snakes to slate mud to the Cairngorm Mountains
To White Water Line to A Disappearing Number
To the Idiot Wind to a Chakra blanket
To Penn Station to stone to stone to choice to chance
To a unique diminishing resource to a change of plan
To sedimentary time to a map of reverie
To sweaty gloves to infinite variety
To the cawing of crows (Mind Rock) to parallel worlds
To Autumn leaves to then and now.

Richard Long  Institute for Advanced Study 2007

# INSTITUTE CELEBRATES JAMES WOLFENSOHN'S SERVICE AS CHAIRMAN

On October 26, 2007, the Institute celebrated the achievements of James D. Wolfensohn, who retired from his post as Chairman of the Board of Trustees after twenty-one years of service, becoming Chairman Emeritus. Family, friends, and colleagues gathered for dinner in the Institute's Dining Hall to listen to speeches about Wolfensohn's impact on the life and character of the Institute over the past two decades, and his unwavering dedication to the institution. Wolfensohn was joined by his wife Elaine and his daughters Naomi and Sarah, sons-in-law Jascha Preuss and Neil Mayle, and grandson Benjamin Mayle.

Phillip Griffiths, Professor in the School of Mathematics and former Director (1991–2003), spoke about his personal and professional history with Wolfensohn, who helped recruit him as the Institute's seventh Director. Heinrich von Staden, Professor in the School of Historical Studies, praised Wolfensohn's keen insights and diplomacy and eloquently recounted Wolfensohn's deft handling of crises. School of Natural Sciences Professor Stephen Adler shared lively anecdotes relating to the School's move to Bloomberg Hall, and Wolfensohn's formidable ability to diffuse heated situations. Joan Scott, Harold F. Linder Professor in the School of Social Science, highlighted Wolfensohn's connection with the School, especially his willingness to impart his experiences as former head of the World Bank, and his understanding of the issues being explored by Faculty and Members in the School.

RANDALL HAGADORN

*Chairman Emeritus James Wolfensohn (center) with Professors Avishai Margalit (right), Nathan Seiberg (left), and Edna Ullmann-Margalit*

Long-time friend and fellow Institute Board member Vartan Gregorian spoke animatedly about his special friendship with Wolfensohn, noting a fondness for his sense of humor and honesty. Charles Simonyi, who will become Chairman in October 2008, humorously acknowledged the challenges his new role would bring. After remarks from Director Peter Goddard, who presented Wolfensohn with a crystal bowl engraved with signatures from past and present Faculty and Directors, Wolfensohn remarked upon his love of the Institute and the importance of its existence in the world. He mentioned many past Trustees by name, and recounted the incredible range of people affiliated with the institution.

In honor of Wolfensohn's service to the Institute, incoming Chairman Martin L. Leibowitz announced the creation of a fund in Wolfensohn's name that would support a Professorship at the Institute. Of the $5 million that needs to be raised, $1.5 million has been given by Faculty, Emeriti, and Trustees thus far, and an anonymous donor has pledged a matching gift of up to $2.5 million. ■

## LEIBOWITZ *(Continued from page 1)*

and the Award for Professional Excellence in 2005. He was elected a fellow of the American Academy of Arts and Sciences in 2003 and is a past chairman of the board of the New York Academy of Sciences.

Leibowitz was born in York, Pennsylvania in 1936. Neither of his parents went to college and Leibowitz is not certain if either finished high school. His father, who died when Leibowitz was four, owned a small men's clothing store. "My mother struggled to make a living in various ways after his passing," said Leibowitz. "We came from very modest circumstances."

In 1948, Leibowitz, along with his mother and two older sisters, moved to Oak Ridge, Tennessee. The late mathematician and chess champion Bob Coveyou (a former collaborator of Robert MacPherson, Hermann Weyl Professor in the School of Mathematics) was a family friend and introduced game theory and chess to Leibowitz, who went on to win the Junior Chess Championship of Tennessee at age fourteen.

Leibowitz discovered an early and enduring appreciation of mathematics. "I remember I was just thrilled when I first caught the idea of differential calculus," he said. In particular, he was intrigued by the possibility of applying math to practical problems. "I was interested, even as a kid, in trying to figure out how a newsstand worked in terms of making a profit, or trying to figure out various problems that applied to real-life issues. I was interested in how people made money."

By the time he was age twenty, Leibowitz had earned a B.A. in liberal arts and an M.S. in physics from the University of Chicago. He worked at the Stanford Research Institute before deciding, in 1959, to move to New York City where his first job was at Systems Research Group, a computer simulation laboratory. He earned his Ph.D. in mathematics by attending night classes at New York University's Courant Institute of Mathematics. In 1964, he took a job at a carpet manufacturing company, earning two patents in materials handling and employing his mathematical skills to figure out how to cut carpet with minimum waste.

In 1966, Leibowitz married Sarah, a leading neurobiologist at Rockefeller University, with whom he has three daughters (all of whom are medical doctors). Early in the couple's marriage, Sarah's uncle, Sidney Homer, a senior partner at Salomon Brothers who was working on a book about the mathematics of bonds, asked Leibowitz to help him resolve some calculations. When Leibowitz realized to his amazement that the Wall Street firm had no in-house mathematician, he set out to obtain the job. "I was determined to talk my way into it," said Leibowitz.

At Salomon Brothers, Leibowitz manned the single time-shared computer terminal on the trading floor that could calculate the price of a bond or its yield once interest rates moved in the 1970s beyond levels available in trader yield book tables. He also discovered that "some of the formulaic calculations that were being used for various types of trades were wrong," said Leibowitz. "For the most part, they facilitated some kinds of trades that shouldn't have been done and they blocked a lot of other trades that should have been done. By puzzling through this, we were able to unlock some value for a lot of clients."

*"The Institute name has always been held up as godlike to me. I have always thought of it as an intellectual Camelot, which is not too far from the truth. I guess what is remarkable is that I never thought I would have anything to do with it. I still can't quite believe it."*

Soon Homer and Leibowitz were coauthoring memoranda that were widely distributed and used in investment training programs, even at Wall Street firms outside of Salomon Brothers. In 1972, the memoranda were expanded into a book, *Inside the Yield Book: New Tools for Bond Market Strategy*, published by Prentice Hall and the New York Institute of Finance.

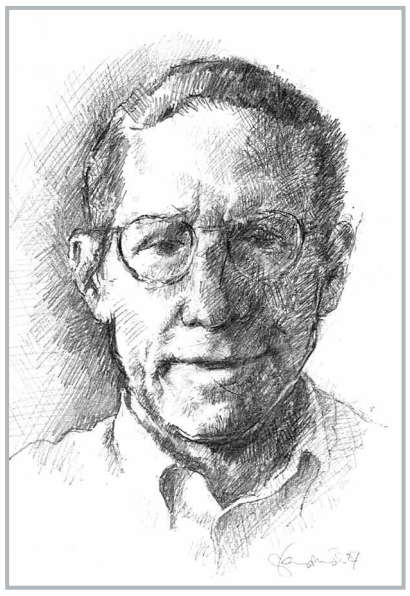
As Bernstein writes in *Capital Ideas Evolving*, "Thanks to Homer and Leibowitz, theory now played an important role in helping to transform the practice of bond management in ways no one had in any way anticipated." When the standard primer in the field was reprinted in 2004 by Bloomberg Press, Institute Trustee Brian Wruble observed, "When my son earned his M.B.A., I gave him an engraved wristwatch and a dog-eared copy of *Inside the Yield Book*. The watch will help him get to work on time, but the book was the real gift. You cannot succeed as an investor without understanding the concepts *Inside the Yield Book* teaches."

After twenty-six years at Salomon Brothers, Leibowitz served as vice chairman and chief investment officer of TIAA-CREF from 1995 to 2004. He was named managing director at Morgan Stanley in 2004. As one of the country's foremost authorities on securities markets and portfolio theory, Leibowitz serves on the investment advisory committees for the Harvard Management Corporation, The University of Chicago, the Carnegie Corporation (of which he is former vice chairman), and the Rockefeller Foundation.

When he was invited to join the Institute's Board in 1995, Leibowitz recalled, "I couldn't believe that I was being asked to ascend to that altitude, even though it was just the Board. The real stuff goes on with the Faculty." The Institute has "shown how it is able to renew itself and get stronger as it does so," said Leibowitz. "As new Faculty members are recruited, the Institute and Faculty go through an arduous process. We have a small number of Faculty positions and they are basically for life. It is important that they be filled with the very best scholars who can do their very best work in the Institute's unique environment."

The Institute has also grown financially stronger. "The Institute is different than many institutions insofar as an extraordinarily high percentage of the Institute's needs come directly from the endowment," said Leibowitz. "We have to be particularly cautious in our investments even though we aim to generate good returns as well. That is the tall order, and it is one that we have been able to meet over quite a span of years thanks to some extraordinary finance committees, led by some truly legendary chairs, and—thankfully—some very good fortune in the market."

Commenting on his appointment as Chairman of the Board, Leibowitz noted, "It is very exciting to be part of what is really a modest role in moving things forward. The Institute is a remarkable place and all too rare. The scholars here are at the frontiers of their fields and the Institute provides them with an environment unfettered by organizational and other distractions that are all too commonplace elsewhere. When you have something that works so right and so well, the basic message is: just treasure it and keep it strong!!!" ■



COURTESY OF TOM PHILLIPS

*Director's Visitor Tom Phillips, whose other portraits of Nobel Laureates include Samuel Beckett and John Sulston, sketched Maskin last fall. The drawing is now in the collection of the National Portrait Gallery in Washington, D.C.*

clarinet, which he continues to play today, including a performance at the Institute in 2006. His brother is a professional oboist and English horn player with the Charlotte Symphony.

A leading economist whose work has been drawn on extensively by researchers in industrial organization, finance, development, and other fields in economics and political science, Maskin explores many areas of economic theory in addition to mechanism design, including game theory and social choice theory. Much of his current research focuses on the theory of coalition formation, comparing different voting systems, the theory of repeated games, and the pros and cons of intellectual property rights.

Maskin joined the Faculty of the Institute's School of Social Science in 2000, after fifteen years as a professor at Harvard University, where he earned his A.B., A.M., and Ph.D. Before his Harvard appointment, Maskin taught at M.I.T. from 1977 to 1984, where he gave the economics department's first class on game theory.

As a student at Harvard in the early 1970s, Maskin wandered, almost by accident, into an information economics course taught by Kenneth Arrow. Today Maskin describes the course as a seminal influence in his decision to become an economist. "A large component of the course was devoted to the work of Leo Hurwicz and mechanism design theory," said Maskin. "I thought it was really exciting. I liked the fact that it was rigorous—that is, all of the concepts were carefully, in fact, mathematically defined and the arguments were often quite beautiful and sophisticated. At the same time, the content seemed socially highly relevant. I felt it was important."

While the origins of mechanism design thought can be traced to the nineteenth century, the modern theory in large part grew out of a debate dating from the 1930s between Oskar Lange and Abba Lerner on the one hand and Friedrich von Hayek and Ludwig von Mises on the other. "Lange and Lerner put forward the view that central planning, at least potentially, could replicate markets and perhaps even surpass them by correcting market failures," Maskin explained. "On the other side, von Hayek and von Mises were very skeptical of the idea that central planning could ever work well."

*"Particularly where the stakes are high, people will have incentives to exaggerate in one direction or another, to overstate or understate. The challenge is to find mechanisms that eliminate the incentive to misstate."*

The debate involved terms—such as centralization, decentralization, command economy, and market economy—that were not adequately defined at the time. Hurwicz was the first to give unambiguous definitions for all of the important concepts that arose in that debate, according to Maskin, and he also led the way in showing how technical tools, such as game theory and mathematical programming, could give some answers to the issues that the debate posited.

Fascinated by Hurwicz's ideas about creating mechanisms to achieve social goals, Maskin struggled to address the following questions: "When can we implement social goals? If they are implementable, what mechanisms will do the trick? And finally, which social goals are not implementable?"

In the mid-1970s, Maskin arrived at a key concept for implementation at a very general level. In recognizing his work with the Nobel Prize in Economics, the Swedish Academy singled out a paper, "Nash Equilibrium and Welfare Optimality," that identified a property of social goals called "monotonicity" as necessary and almost sufficient for their implementability. "If a social goal violates monotonicity, then no mechanism can implement it," said Maskin. "But if it satisfies monotonicity, then provided another (weak) condition holds, implementing mechanisms will exist. Indeed, the paper shows how you can actually design such mechanisms."

Maskin first presented the paper at the summer workshop of the Econometric Society in Paris in June 1977. Its impact on the field was immediate and profound, so much so that he delayed actually publishing it until 1999, when it appeared in the *Review of Economic Studies*. "People were interested because mechanism design was such a hot topic," Maskin recalled. "Previous work had been looking at particular social goals and asking, 'Can this particular social goal be implemented?' Now I was giving a general answer that would apply to any social goal."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*The face of the medal for The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel features Nobel's portrait and the Sveriges Riksbank's crossed horns of plenty (top); the reverse shows the North Star emblem of the Royal Swedish Academy of Sciences, dating from 1815. The medal, which is made from 18 carat green gold plated with 24 carat gold, was designed by Gunvor Svensson-Lundqvist.*

In the planned economy versus free market debate between Lange and Lerner and von Hayek and von Mises, mechanism design provides a broader perspective. "I think the consensus now in the economics profession is that for certain kinds of goods, you can't really beat free markets, but those goods tend to be private goods that individual citizens consume," said Maskin. "For public goods, like clean air or national security or a stable climate, there are good theoretical reasons why markets will not work well. For those goods, alternative mechanisms—not necessarily involving central planning—have to be found, and it was that imperative, I think, that inspired Leo Hurwicz."

At a basic level, mechanism design theory engages game theoretic tools to make truth and honesty compatible with individual incentives. "It's not that people are fundamentally untruthful. There is actually a lot of evidence that suggests they are remarkably honest, but unfortunately we often can't depend on honesty when it comes to economic matters," said Maskin. "Particularly where the stakes are high, people will have incentives to exaggerate in one direction or another, to overstate or understate. The challenge is to find mechanisms that eliminate the incentive to misstate." ■

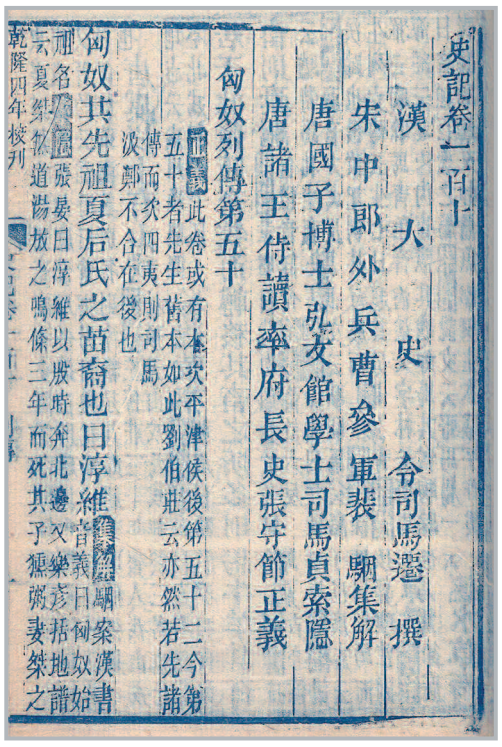
Eric Maskin is the third Nobel Laureate to live in Albert Einstein's former home at 112 Mercer Street (pictured right) and the only Laureate to receive the honor while residing there. Einstein received his Nobel in 1921 before moving to Princeton, while former School of Natural Sciences Professor (1988–2000) Frank Wilzcek left the home four years before attaining his award in 2004. Every Halloween Maskin dresses up as Einstein, while his wife Gayle Sawtelle, a lecturer in history at Princeton University, typically carves an $E = mc^2$ pumpkin. The couple has two children.

Among the reasons Maskin opted to join the Institute in 2000 was the fact that there are "so few constraints on Faculty members' time," said Maskin, who also teaches and supervises Ph.D. students as a visiting lecturer at Princeton. "I was chronically overscheduled at Harvard and so freeing up time was an enormous plus. But, also, I've always liked being in a place where many disciplines are mixed in together. Here, you talk to people in other fields every day."

In addition to his regular interactions with School of Social Science Faculty and Members, Maskin has often discussed topics of mutual interest with economic historians in the School of Historical Studies and has attended the computer science seminars run by Avi Wigderson, Herbert H. Maass Professor in the School of Mathematics. He notes that his regular squash partner is astrophysicist Peter Goldreich, Professor in the School of Natural Sciences. "There are a lot of nice opportunities," said Maskin, "to learn about what people in other fields are doing."

DINAH KAZAKOFF

# THE HISTORY OF OTHERS: FOREIGN PEOPLES IN EARLY CHINESE HISTORIOGRAPHY


史記卷一百十
漢 大 史 令司馬遷 撰
宋中郎外兵曹參軍裴 駰集解
唐國子博士弘文館學士司馬貞索隱
唐諸王侍讀率府長史張守節正義
匈奴列傳第五十
匈奴其先祖夏后氏之苗裔也曰淳維

*From Sima Qian's* The Records of the Grand Historian

Sima Qian, the father of Chinese historiography, recorded the history of the nomadic steppe empire of the Xiongnu, a "barbarian" power that emerged on China's northern frontier during the Han dynasty, in *The Records of the Grand Historian*. In his text, Sima Qian connected the history of Xiongnu to China and in "attempting to explain the Xiongnu in terms of Chinese history, also gave them a history of their own," according to Nicola Di Cosmo, Luce Foundation Professor in East Asian Studies in the School of Historical Studies.

Di Cosmo explored the production and characteristics of alien history in the Chinese tradition in a public lecture, "The History of Others: Foreign Peoples in Early Chinese Historiography," last October. "If all history is history of the present, no history is so transparently history of the present as Chinese history," said Di Cosmo. "Multinational nations still need unified histories, and one of the most interesting developments of recent Chinese historiography has been the incorporation of the histories of so-called 'minority nationalities' in the larger stream of national history. To put it bluntly, we may ask: On what terms does the history of Mongols, Tibetans, Muslims, and the other fifty-two officially recognized nationalities belong to the history of China? And when should we place the beginning of this unified national history?"

In creating a historical past for the Xiongnu that made sense in terms of Chinese written sources, Sima Qian created "a model of 'barbarian history' for the first time in Chinese historiography that gave the nomads a historical (rather than cultural or moral) identity vis-à-vis China," said Di Cosmo. "Sima Qian's narrative of the nomads, which is still not innocent of some stereotyping, is nonetheless the best ethnographic account of nomads produced in the whole ancient world."

Why did Sima Qian write about Xiongnu peoples? According to Di Cosmo, "Sima Qian aimed to understand the cycles of greatness and weakness of the nomads so that China could protect itself from them. China and the nomads were destined to alternate with each other in positions of weakness and strength, like the sun and the moon, like yin and yang. The Xiongnu were understood by Sima Qian not just as another culture, or as generic barbarians, but as a special phenomenon, an empire that merited a place in history because it represented a political alter ego to the still young Chinese empire."

Sima Qian's revolutionary model for the history of the Xiongnu can be fully appreciated if compared to Ban Gu's subsequent view of the Xiongnu in *History of the Han Dynasty*. Ban Gu's "ideological" view partially reverted to old, pre-imperial models of barbarians whereby, in Di Cosmo's words, "there is no difference between the Xiongnu and all other barbarians: they cannot be educated or civilized as they represent a different moral universe with which any compromise is futile, and contact is best avoided. What Ban Gu did not (and could not) change was that the 'barbarians' had, with Sima Qian, acquired a rightful place in Chinese historiography; nor could he alter the narrative structure of Xiongnu history."

A "Xiongnu" *topos* developed in later Chinese history, according to Di Cosmo, which was invoked, for instance, during the Tang dynasty (618–907), when Turks and Uighurs were often compared to Xiongnu leaders, and discussions on foreign policy often were based on historical precedents. Di Cosmo suggested that "we should consider carefully whether Chinese historiography, by collecting not only Chinese views of barbarians, but also historical knowledge of the exploits by nomadic 'empire-builders,' may have contributed more than any native oral tradition to the preservation and transmission of a nomadic imperial tradition." In other words, the history of the nomads invented by Sima Qian is "one that may have been ultimately responsible for the rise of self-conscious nomadic empires on the other side of the Great Wall; empires that so often ruled China, in alternation as Sima Qian prophetically saw, with Chinese dynasties," said Di Cosmo. "So the question is: Was this a self-fulfilling prophecy? Did the writing of history create real history?"

*Nicola Di Cosmo, Luce Foundation Professor in East Asian Studies in the School of Historical Studies since 2003, works on the history of the relations between China and Inner Asia from prehistory to the modern period. He specializes in the cultural, political, and military history of China's northern frontiers and in the traditions of Inner Asian peoples, in particular ancient nomads, Mongols, and Manchus.*

## *IAS Receives Heissig Collection*

The Historical Studies-Social Science Library at the Institute for Advanced Study has received the Walther Heissig Collection in Mongolian and Inner Asian Studies in an arrangement with Princeton University. The collection, some of which has been gifted to the Institute with the remainder on deposit, was celebrated at the Institute in December with a reception that was made possible by the Gerda Henkel Stiftung.

The first-class collection of Central Asian materials belonging to Heissig, a renowned German scholar, will be an important resource for Members whose fields are East Asian and Mongolian studies. It will also be accessible to graduate students and faculty of Princeton University, whose Department of East Asian Studies, East Asian Studies Program, East Asian Library, and Princeton University Library provided vital assistance in bringing the collection to the Institute.

Walther Heissig (1913–2005), formerly head of the Department of Central Asiatic Studies at the University of Bonn, pursued a lifelong study of Mongol and Tibetan culture with a special focus on religion and epic poetry. His personal library was purchased by the Program in East Asian Studies at Princeton University in the 1980s, with an agreement that it would be physically acquired by Princeton University upon Heissig's death. Two years ago, an agreement was reached between the Institute and the University that the bulk of the collection, including all materials inherent to Mongolian and Central Asian Studies, would be housed in the Institute's library. Of the monographs, journals, and microfilms in the collection, the Institute has processed and catalogued some eight hundred books, about a fifth of the collection, to date.

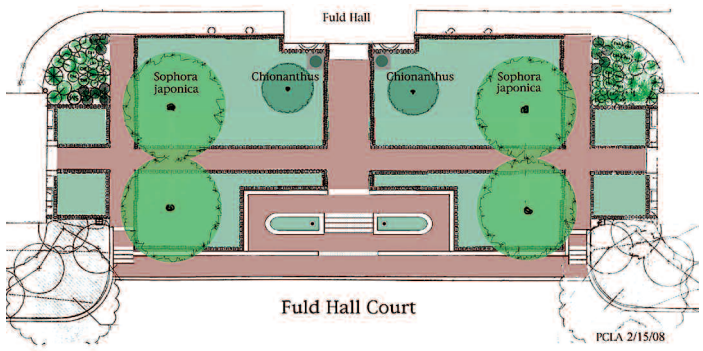
The Institute and Princeton University have a long tradition of sharing scholarly materials that dates back to at least 1945, when the Institute made a substantial financial contribution toward the creation of the Firestone Library. The Institute acquired the Gest Oriental Library in 1936 and deposited it at Princeton University in 1948. It served as the core collection around which the East Asian Library developed.

# NEW FULD HALL COURTYARD GROUNDED IN HISTORY

An initiative to provide new landscaping to the courtyard entrance of Fuld Hall has been generously supported by the Leon Levy Foundation and guided by Institute Trustee Shelby White. Noted landscape architect Patrick Chassé has reconfigured the Fuld courtyard to evoke a Georgian-style ornamental garden, adding symmetrical ramps that now frame the main steps in a welcoming and elegant design.

Work on the courtyard began last October and once complete, the new design will feature four Japanese ornamental trees, two white fringe trees, boxwood shrubs, and beds of ground covers and seasonal bulbs.

As it embarked on the project, the Institute simultaneously commissioned a historic landscape study, also funded by the Leon Levy Foundation. It was directed by Chassé and conducted by Thomas J. Elmore of Elmore Design Collaborative in Suffield, Connecticut. Archival documents at the Institute and elsewhere were reviewed to fully understand the development of the Institute's campus.




*The new landscaping will evoke a Georgian-style ornamental garden, as depicted above.*

As the first Institute building, constructed in 1939, Fuld Hall has served as the primary entrance over the years for Faculty, Members, and Visitors. The Georgian structure was conceived and executed by architect Jens Fredrick Larson, who was hired by Institute Director (1939–47) Frank Aydelotte, former president of Swarthmore College. Larson also designed buildings at Dartmouth College, Bucknell University, and Wake Forest University, among other distinguished campuses. Of Larson's development plan for the Institute campus, Faculty member (1933–60) Oswald Veblen noted, "Larson's plan is by far the best adapted to our needs, and also the best architecturally."

An early sketch of the Fuld Hall courtyard, conceived by Larson as a simplified Georgian-style ornamental garden, with paved paths and geometric panels of lawn, was discovered among Aydelotte's papers at the Friends Historical Library at Swarthmore. The current renovation includes ramps, as modern needs require, but Chassé's overall design is in the spirit of Larson's original idea. ■

# FOUNDERS' CIRCLE MEMBERSHIPS

Friends of the Institute for Advanced Study are partners in the advancement of research and scholarship at the highest level. Friends who join the Founders' Circle partake in a more tangible connection to the intellectual work of the Institute by sponsoring a Membership in a School of their choice for one year. Such Memberships enrich the Institute community and have enabled the participation of the following Members this year.

### *Helen and Martin Chooljian Member*

VIJAY BALASUBRAMANIAN

*Particle Physics, Biology* · School of Natural Sciences

Vijay Balasubramanian is a theoretical physicist, working in two areas—string theory and neuroscience. His current work in string theory focuses on the physics of black holes and the Big Bang, the "emergence" of space and time from a complex underlying configuration of space, and the quest to construct realistic, predictive models of particle physics and cosmology from string theory. His work in neuroscience attempts to give a theory of the structural and functional design of the visual pathway by considering how behaviorally relevant information in the natural environment can be processed and transmitted efficiently, subject to the limitations of biological computation, such as noise, energy, and spatial constraints.

"The IAS is a wonderful working environment. I especially appreciate the beauty and the calm of the surroundings, which are permitting uninterrupted focus on my research," says Balasubramanian. "What is more, there are so many talented people at the Institute that if I am puzzled about something, there is always someone around who can provide valuable insights. It is no wonder that such stellar work comes out of this institution."

### *Ginny and Robert Loughlin Member*

MARY L. DUDZIAK

*Law* · School of Social Science

Mary L. Dudziak is reexamining the history of twentieth-century America as a war story, in particular how war and preparation for war persistently shaped the nature of American democracy, the powers of government, the rights of citizens, and the nation's place in the world.

At the Institute, Dudziak is working on her revisionist account of law and war in twentieth-century U.S. history, and also putting the finishing touches on another book, *Exporting American Dreams: Thurgood Marshall's African Journey,* which will be published in 2008 by Oxford University Press. Says Dudziak, "The Institute is the perfect place to write, providing an unusual combination of serenity and lively conversation with great colleagues."

### *Rosanna and Charles Jaffin Member*

ELLEN KENNEDY

*Political Science* · School of Social Science

Ellen Kennedy is focusing on the economic sources of enlarged prerogative and sovereign discretion in twentieth-century Germany and on the development of international monetary constitutions after Bretton Woods. Each is an arena of debate and political theories increasingly relevant to the important question of whether, and how, the economy can be governed through the rule of law.

"The Institute provides a liberating and supportive atmosphere for its Members," says Kennedy. "I am deeply grateful for the generosity of the Jaffins because being at the Institute makes a big difference in the way I carry out my work, free of academic distractions and being part of a great tradition of the high quality of intellectual life."

### *Louise and John Steffens Member*

PATRICK MACKLEM

*Law* · School of Social Science

Patrick Macklem's research concerns how international law is reorienting itself to address the challenges posed by new forms of military and political emergency, requiring a more robust conception of the rule of law in relation to the exercise of sovereign power in the international legal order. In particular, he will focus on humanitarian intervention and how its legality and legitimacy are intertwined.

"The Institute has provided me with such a wonderful intellectual environment to pursue these projects," says Macklem. "My colleagues are brilliant and inspiring. The Institute's staff is generous and extremely helpful. I'm extremely grateful to the Steffens for their generosity and support. It has made a world of difference to my research."

### *Carl and Toby Feinberg Member*

YUJI TACHIKAWA

*Mathematical and Particle Physics* · School of Natural Sciences

As a postdoctoral fellow at the Institute, Yuji Tachikawa continues his research on superstring theory. He works mainly on the effective Lagrangian of supersymmetric compactifications, which will help uncover the quantum effect of gravity coupled with matter.

"IAS is the perfect place for me to pursue my study of string theory," says Tachikawa. "Princeton is home to one of the best string theory groups in the world, and it is my great delight to be able to discuss my work with them. Another important aspect of the Institute is the quiet and calm atmosphere, so different from crowded and noisy Tokyo where I spent ten years before coming here. It is just too beautiful when new leaves sprout in the spring and when they change colors in the autumn." ■

# CHARITABLE GIFT ANNUITIES

The Institute will soon be able to offer charitable gift annuities. In this popular charitable giving arrangement, a donor, making a gift of a minimum of $10,000 to the Institute, will receive guaranteed fixed payments for the lifetime of one or two individuals. Donors can establish annuities for themselves and/or a spouse, for elderly parents, or to support a relative or a close friend. Donors can elect to have payments start now, or at a later date. The annuitant must be at least sixty years old when the payments start.

Annuity rates range from 6.5 percent to 11.3 percent, depending on the annuitants' ages at the time the gift was made. A portion of each payment is tax-exempt. Rates will be even higher if the gift is made now and the payments are deferred. There is no limit as to the number of separate annuities that can be established by each donor. Other benefits include an immediate tax deduction for your gift and capital gains tax deferral if your gift is made with appreciated assets such as stock.

Those interested in gift annuities should contact the Institute or visit the new Planned Giving Gift Calculator under the Ways to Give section of the Institute's website (www.ias.edu/waystogive). All calculations are confidential unless you indicate that you wish to be contacted.

If you would like more information about receiving income for life, please contact Margaret A. Jackson, Planned Giving Officer, via email at pjackson@ias.edu or by telephone at (609) 951-4612.

## BLOOMBERG *(Continued from page 4)*

and two Visitors. This group has been trained largely in physics, mathematics, and computer science, and has moved into biology to study a wide variety of problems that did not exist before the technological breakthroughs that permitted the collection of large sets of information. Such information includes protein structures and functions, the nucleotide sequences of the DNAs of many different organisms (to study evolution), and the nucleotide sequences of many individuals of the same species (diversity).

This information has led to simultaneous studies of tens of thousands of genes (functional units) expressed at varying levels and different times in diverse locations of an organism. These studies have provided a deeper understanding of the networks, or pathways, in which many genes act in both normal and diseased tissues of the body. For example, it has been possible to correlate pathologies and stress responses to specific genes and networks which, in turn, allows the development of novel approaches to treat diseases.

"We now have the ability to follow the evolution of parasites or viruses during epidemics, and we are beginning the process of understanding the rules and predicting the consequences of such evolution," said Levine. "The challenge is to tease out the signal from the noise, and then to understand why a particular trait has been selected for in a population. Addressing this challenge creates a marriage between the theorists who recognize the problem and pose a hypothesis, and the experimentalists who generate the initial data and then test the ideas extracted from these data." ■

# CHARLES SIMONYI: SPACE TOURIST

RANDALL HAGADORN

*Members of the audience gather around Charles Simonyi at a reception following his lecture.*

Trustee Charles Simonyi had long aspired to travel into space. As a Hungarian teenager in 1963, he won a trip to Moscow where he met one of the first cosmonauts, Pavel Popovich. Last October, Simonyi spoke about his own spaceflight in "Space Tourist," a public lecture at the Institute for Advanced Study, in which he discussed his trip last April aboard a Russian-built Soyuz spacecraft as the fifth civilian and the 450th person in space.

In his talk, which was designed to appeal to aspiring astronauts of all ages, Simonyi spoke animatedly about his training at the Yuri Gagarin Cosmonaut Training Center in Star City, Russia; traveling to the International Space Station last April; and orbiting around the Earth sixteen times a day at 17,500 miles per hour.


RANDALL HAGADORN

*Items from Simonyi's spaceflight were on display in the lobby, including a can of space food and a glove from his Sokol space suit.*

On display in the lobby of Wolfensohn Hall were items from his spaceflight: a can of space food; a watch he wore on board the Soyuz spacecraft; his standard cosmonaut-issue jacket with the Institute for Advanced Study seal; a backpack handmade out of parachute material as part of his survival training; a dosimeter he used on board for measuring radiation; a harness equipped with ECG, temperature, and breathing-rate sensors that he wore during his launch into orbit and during his return to Earth; and a space glove belonging to his Sokol space suit.

Simonyi described the feeling of the spacecraft's launch as akin to taking off in a helicopter or in a very fast elevator. The sensation of reentering the Earth's atmosphere, he explained, was more like skiing. "The spacecraft body generates a slight lifting force and the sound it makes is very much like the whooshing sound of skiing," Simonyi told the audience. "The view through the window was amazing. Things start to turn pink, and then the pink disappears and you see fire. The window is a triple window and the outside pane is designed to burn away, so it turns black. You can see it, kind of like a curling piece of paper in a fireplace, the window turning black from the bottom up."


RANDALL HAGADORN

*Simonyi's public talk in Wolfensohn Hall was designed to appeal to aspiring astronauts of all ages.*

His favorite moment, Simonyi said, was when he arrived at the space station after traveling in space for two days. "We arrived at sunset and the colors at sunset are incredible. It was very theatrical. The colors are unusual and the structures are completely unusual. These are structures that couldn't support themselves on Earth. They seem a little bit flimsy, and the colors change tremendously. The shadows are very, very sharp, just like in a theater. It was like being in the middle of a fantastic opera."

*Charles Simonyi, president and chief executive officer of Intentional Software Corporation, which he cofounded in 2002 after two decades at Microsoft, has been a Trustee of the Institute since 1997 and President of the Corporation since 2003. He will become Chairman of the Institute's Board of Trustees in October.*

DINAH KAZAKOFF

# MARQUAND HOUSE: A GUESTHOUSE FOR IAS VISITORS

More than forty years ago, Harold K. and Mary Marquand Hochschild provided the Institute with Marquand House, which is used today as a guesthouse and a site for important gatherings.

A Trustee of the Institute for Advanced Study from 1953 to 1969 and a Trustee Emeritus until 1974, Harold Hochschild had a lifelong interest in history and academic pursuits. He was born in 1892, and in 1941 he married Mary Marquand, daughter of Princeton University Professor Allan Marquand. The couple had homes in New York, Princeton, and the Adirondack Mountains.

In 1966, the Hochschilds drew up an agreement to give their house at 150 Stockton Street and the adjacent "Stone Cottage" to the Institute, with IAS providing the couple life tenancy. They also established a fund, the income of which is intended to defray the expenses of maintaining the house. The house was transferred to the Institute in 1979.

*Marquand House serves as a guesthouse for visitors from all over the world. Rugs, artwork, and books from the estate of former Member Willis Doney decorate its rooms. The piano in the sitting room once belonged to Albert Einstein.*

Harold was the head of the American Metal Company, and Mary had an abiding interest in horticulture. The home overlooks Marquand Park, seventeen acres of the Marquand family estate where Mary grew up, which was given to Princeton Borough in 1953 by her heirs.

Serving as a guesthouse for visitors from all over the world, the home, whose bedrooms were recently refurbished, was built in the mid-twentieth century and modeled after Guernsey Hall, the Marquand family mansion on Lovers Lane. Rugs, artwork, and books from the estate of Willis Doney, a former Member (1972–73) in the School of Historical Studies, adorn its rooms, and Einstein's piano, which the former Faculty member left to the Institute, occupies part of the sitting room.

Aside from functioning as a guesthouse, Marquand House is also the location for the Institute's playreading group. Each term, interested Faculty, Members, and staff gather in the living room on Tuesday evenings and read plays selected around a given theme. This year's theme is "And Justice for All …" For more information about the group, please visit www.admin.ias.edu/do/Playreadings_2007–2008.pdf, or contact Donne Petito at (609) 734-8250 or donne@ias.edu.

# THE INSTITUTE LETTER




Upon receiving the Nobel Prize in Economics on December 10, 2007, Eric S. Maskin, Albert O. Hirschman Professor in the School of Social Science, became the fifth Faculty member—following Albert Einstein, Tsung-Dao Lee, Chen Ning Yang, and Frank Wilczek—in the Institute for Advanced Study's history to become a Nobel Laureate. Many Members affiliated with the Institute have also been recognized with the Nobel Prize, among them John Nash, who was awarded the Prize in Economics in 1994.

The Royal Swedish Academy of Sciences lauded Maskin for having laid the foundations of mechanism design alongside Leonid Hurwicz of the University of Minnesota and Roger B. Myerson of the University of Chicago. At the Nobel ceremonies in December, King Carl XVI Gustaf of Sweden presented Maskin with the diploma depicted above along with the Nobel medal (see page 8).

In his presentation speech, Jörgen Weibull, chairman of the Economics Prize Committee, cited Hurwicz, Maskin, and Myerson for having "enabled economists not only to study the performance of existing economic institutions but also to suggest how these can be improved, and to identify the theoretical limits to what can be achieved when we take into account the constraints that emanate from individuals' incentives and private information."

In particular, Weibull congratulated Maskin for his "pioneering work on implementation theory, that part of the theory of mechanism design which deals with the problem of the potential coexistence of inferior equilibria along with the desired ones." Weibull likewise recognized Maskin's "numerous other important contributions, both to the pure theory of mechanism design and to its application to areas such as auctions, monopoly, and social choice."

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