

THE INSTITUTE LETTER

INSTITUTE FOR ADVANCED STUDY

PRINCETON, NEW JERSEY · SPRING 2004

J. ROBERT OPPENHEIMER CENTENNIAL (1904–1967)

Much has been written about J. Robert Oppenheimer. The substance of his life, his intellect, his patrician manner, his leadership of the Los Alamos National Laboratory, his political affiliations and post-war military/security entanglements, and his early death from cancer, are all components of his compelling story.



J. Robert Oppenheimer in his office at the
Institute for Advanced Study

A number of plays have been written about him. American composer John Adams (*Nixon in China*) is currently at work on an opera. Commissioned by the San Francisco Opera, and tentatively titled "Doctor Atomic," it is scheduled to premier in September of 2005.

Much of the drama of Oppenheimer's life unfolded in the early years following World War II when he was Director of the Institute for Advanced Study, the position he held from 1947 until 1966. He was simultaneously Chairman of the General Advisory Committee of the Atomic Energy Commission (AEC), from 1947 through 1952.

Born Julius Robert Oppenheimer, on 22 April 1904 in New York City, Robert grew up in a Manhattan apartment decorated with paintings by Van Gogh, Cézanne, and Gauguin. His father, Julius Oppenheimer, was a German immigrant who worked in his family's textile importing business. His mother, Ella Friedman, was a painter whose family had been in New York for genera-

tions. His younger brother, Frank, would also become a physicist.

In 1921, Oppenheimer graduated from the Ethical Culture School of New York at the top of his class. At Harvard, Oppenheimer studied mathematics and science, philosophy and Eastern religion, French and English literature. He graduated *summa cum laude* in 1925 and afterwards went to Cambridge University's Cavendish Laboratory as research assistant to J. J. Thomson. Bored with routine laboratory work, he went to the University of Göttingen, in Germany.

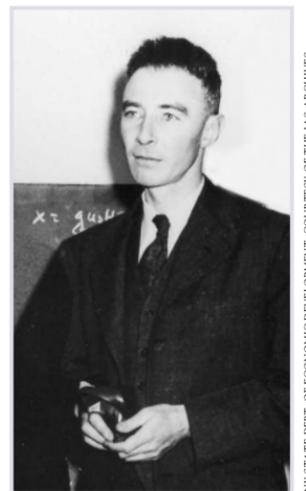
Göttingen was the place for quantum physics. Oppenheimer met and studied with some of the day's most prominent figures, Max Born and Niels Bohr among them. In 1927, Oppenheimer received his doctorate. In the same year, he worked with Born on the structure of molecules, producing the Born-Oppenheimer Approximation. Subsequently, he traveled from one prominent center of physics to another: Harvard, California Institute of Technology, Leyden, and Zurich. In 1929, he received offers to teach at Caltech and the University of California at Berkeley. Accepting both, he divided his time between Pasadena and Berkeley, attracting his own circle of brilliant young physics students.

"His lectures were a great experience, for experimental as well as theoretical physicists," commented

Hans Bethe, who would later work with Oppenheimer at Los Alamos: "In addition to a superb literary style, he brought to them a degree of sophistication in physics previously unknown in the United States. Here was a man who obviously understood all the deep secrets of quantum mechanics, and yet made it clear that the most important questions were unanswered. His earnestness and deep involvement gave his research students the same sense of challenge. He never gave his students the easy and superficial answers but trained them to appreciate and work on the deep problems."

When Julius Oppenheimer died in 1937, Oppenheimer became a wealthy man. In 1940 he married Katharine (Kitty) Puening Harrison, a biologist and divorcee whose second husband had been killed during

(Continued on page 4)



Oppenheimer in 1947

The School of Natural Sciences, Then and Now

J. Robert Oppenheimer's influence on 20th-century physics was further enhanced when he became Director of the Institute for Advanced Study in 1947. He attracted leading lights in the new area of particle physics to the Institute, where he presided over what has been described as a "Golden Age for Physics." The Institute became a world center for the development of high energy physics and field theory. Like Copenhagen in the twenties and thirties, the Institute became the new Mecca for theoretical physicists. Among those who flocked to the Institute were established figures such as Wolfgang Pauli, Paul Dirac, Sin-Itiro Tomonaga and

(Continued on page 4)



Oppenheimer with Paul Dirac and Abraham Pais at the Institute in 1947

NEWS OF THE INSTITUTE COMMUNITY

In May, *Quantum Theory as an Emergent Phenomenon: The Statistical Mechanics of Matrix Models as the Precursor of Quantum Field Theory* by STEPHEN L. ADLER, Professor in the School of Natural Sciences, was published by Cambridge University Press. The book represents the culmination of nearly twenty years of Professor Adler's work on embeddings of quantum mechanics in larger mathematical frameworks.

Medieval Islamic Political Thought by PATRICIA CRONE, Andrew W. Mellon Professor in the School of Historical Studies, was published in January by Edinburgh University Press, U.K., and in April by Columbia University Press, with the title *God's Rule: Government and Islam: Six Centuries of Medieval Islamic Political Thought*.

PIERRE DELIGNE, Professor in the School of Mathematics, has been elected a foreign member of the Accademia Nazionale dei Lincei, Rome.

In January, ERIC S. MASKIN, Albert O. Hirschman Professor in the School of Social Science, delivered a

set of four lectures on auction theory at the Institute for Advanced Study, Wuhan University, China.

In its issue of April 26, *TIME* Magazine named EDWARD WITTEN, Charles Simonyi Professor in the School of Natural Sciences, one of America's "100 Most Influential People." BERNARD LEWIS, frequent Member in the School of Historical Studies was also named.

In January, PETER PARET, Professor Emeritus in the School of Historical Studies, spoke at the plenary session of the annual meeting of the American Historical Association in Washington D.C. His speech focused on conflicting views of "the people in arms" at the end of the 18th century and is to be published in the *Journal of the History of Ideas*.

DAVID GABAI, Member in the School of Mathematics (1982–83, 1989–90), has received the 2004 Oswald Veblen Prize in Geometry. The prize, named in honor of former Faculty Member and Trustee Oswald Veblen, is awarded every three years by the American

Mathematical Society in recognition of notable published research in geometry or topology. Dr. Gabai is cited for his work in geometric topology and, in particular, the topology of 3-dimensional manifolds.

Of the 21 mathematicians who have received the prize since its inception, 16 have been associated with the Institute. They include: Christos D. Papakyriakopoulos (recipient of the first Veblen Prize, 1964), Raoul H. Bott (1964), Stephen Smale (1966), Morton Brown and Barry Mazur (1966), Robion C. Kirby (1971), Dennis P. Sullivan (1971), William P. Thurston (1976), James Simons (1976), Shing-Tung Yau (1981), Michael H. Freedman (1986), Richard Hamilton (1996), Gang Tian (1996), Jeff Cheeger (2001), and Yakov Eliashberg (2001).

Math and the Mona Lisa: The Art and Science of Leonardo da Vinci by BÜLENT ATALAY, Member in the School of Natural Sciences (1974–75, 1982–83), was published in April by Smithsonian Institution Press.

Making Ireland British 1580–1650 by NICHOLAS CANNY, Member in the School of Historical Studies (1979–80), was published in 2001 by Oxford University Press, New York.

JOHN CARDY, Member in the School of Natural Sciences (2003), has won the American Physical Society's Lars Onsager Prize for "profound and original applications of conformal invariance to the bulk and boundary properties of two-dimensional statistical systems."

CARLOS EIRE, Member in the School of Historical Studies (1986–87, 1992–93), won the 2003 National Book Award for *Waiting for Snow in Havana: Confessions of a Cuban Boy*.

LAWRENCE C. EVANS, Member in the School of Mathematics (1987–89), has received the American Mathematical Society's 2004 Leroy P. Steele Prize for Seminal Contribution to Research, jointly with Nicolai V. Krylov.

Ordinary Prussians: Brandenburg Junkers and Villagers, 1500–1840 by WILLIAM W. HAGEN, Member in the School of Historical Studies (1990–91), was published in 2002 by Cambridge University Press, London.

JOHN W. MILNOR, Professor in the School of Mathematics (1970–90), and Member in the School of Mathematics (1965–66), has received the American Mathematical Society's 2004 Leroy P. Steele Prize for Mathematical Exposition.

GABRIELE VENEZIANO, Member in the School of Natural Sciences (1970, 1998), has received the American Physical Society's Dannie Heineman Prize for Mathematical Physics for "pioneering discoveries in dual resonance models which, partly through his own efforts, have developed into string theory and a basis for the quantum theory of gravity."

GEORGE F. KENNAN AT THE INSTITUTE FOR ADVANCED STUDY

Symposium celebrates Professor Kennan's 100th Birthday

The Symposium in Honor of George F. Kennan at the Institute for Advanced Study in February drew members of Professor Kennan's family, friends and colleagues, as well as distinguished historians and diplomats. Speakers included Institute Director Peter Goddard, James D. Wolfensohn, José Cutileiro and Jack F. Matlock, Jr. Presentations were as follows: "Reflections on a Century" by Lawrence S. Eagleburger, "George Kennan and Russia" by Alexander A. Bessmertnykh, "George Kennan and the New Europe: A German Perspective" by Karl Kaiser, and "The Container Contained" by Strobe Talbott.

The symposium was organized by José Cutileiro and supported by contributions from Theodore L. Cross, Hamish Maxwell, and Stiftungsfonds Deutsche Bank.

Attending the symposium in Professor Kennan's honor, are from left to right: Strobe Talbott, President of The Brookings Institution, and former Deputy Secretary of State; Jack F. Matlock, Jr., the last U.S. Ambassador to the Former Soviet Union, and former George F. Kennan Professor in the School of Historical Studies; José Cutileiro, George F. Kennan Professor in the School of Historical Studies, and former Secretary General of the Western European Union; Lawrence S. Eagleburger, former Secretary of State; Karl Kaiser, Otto-Wolff-Director Emeritus of the German Council on Foreign Relations, and Visiting Scholar, Weatherhead Center for International Affairs, Harvard University; Alexander A. Bessmertnykh, last Foreign Minister of the Former Soviet Union; James D. Wolfensohn, President of the World Bank, and Chairman of the Board of Trustees of the Institute for Advanced Study; and Institute Director Peter Goddard.



Just two days after his 100th birthday on February 16, George F. Kennan made a surprise visit to the Institute. Professor in the School of Historical Studies since 1956 and Professor Emeritus since 1974, Professor Kennan (seated) and his personal assistant Tony Mano (in bow tie) were greeted by, from left to right: Trustee Emeritus Ladislaus von Hoffmann; George F. Kennan Professor José Cutileiro; Professor Kennan's grandson George Kennan Pfaeffli (partially hidden in back); Professor Kennan's son-in-law, Kevin Delaney; Institute Director Peter Goddard (in rear), Chairman of the Board of Trustees James D. Wolfensohn, and Elaine Wolfensohn.



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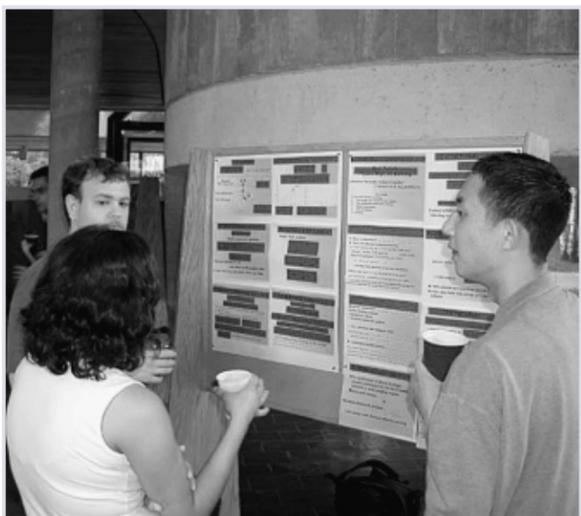
UPCOMING WORKSHOPS AND PROGRAMS

PROSPECTS IN THEORETICAL PHYSICS

July 19–30: String Theory

Prospects in Theoretical Physics (PiTP), sponsored by the Institute for Advanced Study's School of Natural Sciences, is an intensive two-week summer program designed for graduate students considering a career in theoretical physics. In addition to Institute Faculty, many faculty members from the physics and astrophysics departments at Princeton University are actively involved in the program together with scientists from neighboring institutions. The program builds on the strong relationship between the research groups at the Institute for Advanced Study and Princeton University.

First held in the summer of 2002, this year's program



ANNE BAXTER HUMES

Poster session at the 2003 Prospects in Theoretical Physics Program

is geared toward advanced (4th and 5th year) graduate students actively involved in research in string theory. Morning lectures will be followed by informal sessions in the afternoon in which all participants will have the opportunity for interactive discussions on the latest advances and open questions in string theory.

A partial list of organizers and lecturers includes: Juan Maldacena, Nathan Seiberg, and Edward Witten of the Institute for Advanced Study; Curtis Callan, Steven Gubser, Nissan Itzhaki, Igor Klebanov, Chiara Nappi, and Leonardo Rastelli of Princeton University; Louise Dolan of the University of North Carolina at Chapel Hill; Burt Ovrut of the University of Pennsylvania; Stephen Shenker of Stanford University; Kenneth Intriligator of the University of California at San Diego; and Charles Thorn of the University of Florida in Gainesville.

The PiTP program intends to help train the next generation of scholars in theoretical physics. An effort is made to reach out to women and minorities, as well as to graduate students in small universities who typically do not have the same opportunities and access to leaders in the field as graduate students in large research institutions. The program has received support from the Concordia Foundation, J. Seward Johnson, Sr. Charitable Trusts, and the National Science Foundation. For further information, see <http://www.admin.ias.edu/pitp>.

IAS CENTER FOR SYSTEMS BIOLOGY June 8–9: Genomic Instability and Cancer

Sponsored by the Institute for Advanced Study and the Center for Discrete Mathematics and Theoretical Computer Science (DIMACS), Rutgers University, a workshop on "Genomic Instability in Cancer: Biological and Mathematical Approaches" intends to initiate dialogue between experimental biologists and mathematical modelers on the subject of genomic instability, a characteristic of many cancers.

The role of genomic instability in cancer progression is an important and, as yet, unresolved question. The

workshop will bring together individuals who study genomic instability from different perspectives, and will offer opportunities for extended discussion and learning, and for identifying areas for cross-pollination between experimental scientists and mathematical modelers.

Genomic instability often involves gross chromosomal abnormalities such as deletion and duplication of chromosomes or chromosome parts, chromosomal rearrangements, and mitotic recombinations, generally termed "chromosomal instability." Other types of genomic instability are characterized by an increased rate of small-scale genetic changes (such as microsatellite instability). Mechanisms of genomic instability are intimately related to many aspects of cell biology, such as cell cycle regulation, DNA damage and repair, cell aging, and telomere function.

On the other hand, the role of genomic instability in cancer initiation and progression can be studied from the point of view of somatic evolution of cells, where mathematical modeling can play an important part. Quantitative methods can provide an important tool in deciphering the mystery of genomic instability, as has been seen with the study of infectious diseases, where mathematicians and biologists worked hand-in-hand to generate useful insights. It is expected that a similar phenomenon will happen in the area of cancer research. This workshop, the first attempt to create a forum for experimental biologists and modelers of genomic instability, is designed to encourage collaboration and improve the understanding of cancer.

Workshop organizers are Natalia L. Komarova, Rutgers, The State University of New Jersey and the Institute for Advanced Study, and Arnold J. Levine, Visiting Professor in the School of Natural Sciences and the Cancer Institute of New Jersey.

The Center for Systems Biology at the Institute for Advanced Study explores links between theoretical and experimental biology, especially the interface of molecular biology and the physical sciences. The Center for Systems Biology is receiving support from the Leon Levy and Shelby White Initiatives Fund, and other current grants. For further information, see <http://www.csb.ias.edu>.

PROGRAM FOR WOMEN IN MATHEMATICS May 17–28: Analysis and Nonlinear PDEs

The Program for Women in Mathematics provides an opportunity for women undergraduate and graduate students to work together with research mathematicians during an intensive 11-day workshop that includes lectures and seminars on a focused topic, mentoring, discussions on peer relations, and an introduction to career opportunities. This year's topic is analysis and nonlinear PDEs, and the program will include two lecture courses designed for beginning and advanced students in the field.

The beginning lecture course, "Harmonic Analysis: from Fourier to Haar," will introduce students to the basics of harmonic analysis, from Fourier's heat equation, and the decomposition of functions into sums of cosines and sines (frequency analysis) to dyadic harmonic analysis (or decomposition into Haar basis functions, involving time localization). Lesley Ward (Harvey Mudd College) will be the lecturer for the first week, and Cristina Pereyra (University of New Mexico) will lecture during the second week. Manuela Longoni de Castro (University of Mexico) and Stephanie Molnar (UCLA) will be the teaching assistants.

The topic of the advanced lecture course is "The Wave Equation: Classical and Modern Methods." Jill Pipher (Brown University) will be the lecturer for the first week, and current Member in the School of Mathematics



ANNE BAXTER HUMES

Participants in the Program for Women in Mathematics

Gigliola Staffilani (Massachusetts Institute of Technology), will lecture during the second week. Juhi Jang (Brown University) will be the teaching assistant.

This course will present some classical and more modern methods in the study of the linear and nonlinear wave equations when data are assigned at the initial time. Participants will see that abstract functional analysis, harmonic analysis, and Fourier analysis can be used to solve a very "physical" problem.

Cynthia Diane Rudin, a graduate student at Princeton University and former Program participant, will organize the Women in Science seminars. On Saturday, May 20, a reunion of past participants will feature lectures, panel discussions, and a research poster session.

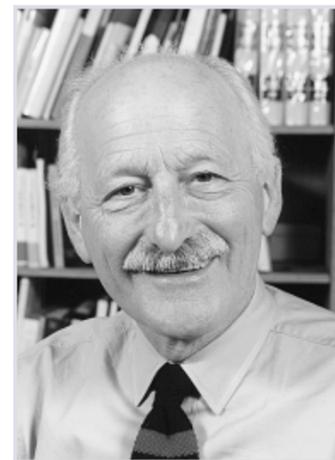
The Program's organizers are former Member and former Distinguished Visiting Professor in the School of Mathematics, Karen Uhlenbeck (University of Texas at Austin), current Member Sun-Yung Alice Chang (Princeton University), and former Member Chuu-Lian Terng (Northeastern University).

The Program for Women in Mathematics, a joint program of the Institute for Advanced Study and Princeton University, receives support from The Starr Foundation. For further information, see <http://www.math.ias.edu/womensprogram>.

THE 53RD A.W. MELLON LECTURES April 18–May 23: "More Than Meets the Eye"

Irving Lavin, Professor Emeritus in the School of Historical Studies, where he was Professor of Art History from 1973–2001, is this year's A. W. Mellon Lecturer in the Fine Arts. Professor Lavin will deliver a series of six lectures on successive Sundays between April 18 and May 23 at 2:00 p.m. at the National Gallery of Art in Washington D.C. The series, "More Than Meets the Eye," includes six lectures titled "The Story of O from Giotto to Einstein," on April 18; "Michelangelo, Moses, and the Warrior Pope," on April 25; "Caravaggio I: Divine Dissimulation," on May 2; "Caravaggio II: The View from Behind," on May 9; "The Infinite Spiral: Claude Mellan's Miraculous Image," on May 16; and "Going for Baroque: Observations on the Postmodern Fold," on May 23.

Professor Lavin's numerous books on Florentine and Roman sculpture and architecture include: *Santa Maria del Fiore: The Cathedral of Florence and the Pregnant Madonna* (1999); *Bernini, the Savior, and the "Good"* (Continued on page 6)



RANDALL HAGADORN

Irving Lavin, Professor Emeritus in the School of Historical Studies

OPPENHEIMER (Continued from page 1)

the Spanish Civil War. The couple had two children.

World War II interrupted the work and lives of most American physicists. In 1942, Oppenheimer was appointed to the Manhattan Project, code-name for the project to develop an atomic bomb. The project involved several laboratories in secret locations across the country, including the University of Chicago; Oak Ridge, Tennessee; and Los Alamos, New Mexico. Oppenheimer oversaw the construction of the Los Alamos laboratory, where he gathered the best minds in physics to work on the problem of creating an atomic bomb. Because of his leadership in this project, he is often referred to as the “father” of the atomic bomb.

When the war ended, the government set up the Atomic Energy Commission to replace the Manhattan Project. The AEC was charged with overseeing all atomic research and development in the United States. As Chairman of the General Advisory Committee, Oppenheimer opposed the development of the hydrogen bomb. Known as the “Super Bomb,” the hydrogen bomb was a thousand times more powerful than the atomic bomb. In the context of the Cold War, when the United States and the Soviet Union jockeyed for power, Oppenheimer’s stance was controversial.

In the 1950s, while Oppenheimer was Director of the Institute, anti-Communist hysteria was sweeping through Washington, D.C., spearheaded by the conservative Senator Joseph McCarthy of Wisconsin. McCarthy and anti-Communist zealots devoted themselves to rooting out Communist spies from every walk of American life. Oppenheimer was subjected to a security investigation that became a *cause célèbre* and divided the intellectual and scientific community. In 1953, he was denied security clearance and lost his position



Oppenheimer in 1947 at the Shelter Island conference where theoretical physicists gathered to discuss the state of their field in the aftermath of World War II. From left to right, standing, are: W. Lamb, K.K. Darrow, Victor Weisskopf, George E. Uhlenbeck, Robert E. Marshak, Julian Schwinger, and David Bohm. From left to right, seated are: J. Robert Oppenheimer (holding pipe), Abraham Pais, Richard P. Feynman (seated, with pen in hand), and Herman Feshbach.

with the AEC. Doors that had formerly been open to him were closed. “Oppenheimer took the outcome of the security hearing very quietly but he was a changed person; much of his previous spirit and liveliness had left him,” recalled Hans Bethe.

Oppenheimer’s concern for the general public’s lack of scientific understanding, and the difficulty of conveying the content of scientific discoveries as well as the exhilaration of the creative act of discovery to even educated lay people, led to several popular essays on science. He

delivered the Reith lectures on the BBC in 1953. These were published under the title “Science and the Common Understanding.”

In April 1962, the U.S. Government made amends for the treatment J. Robert Oppenheimer suffered during the McCarthy years, when President Kennedy invited Oppenheimer to a White House dinner of Nobel Prize winners. In 1963, President Johnson awarded Oppenheimer the highest honor given by the AEC, the Fermi Award.

Oppenheimer continued to stimulate research in theoretical physics as Director of the Institute for Advanced Study until 1966. He died of throat cancer on February 18, 1967.

In 1967, George F. Kennan, Professor Emeritus in the School of Historical Studies, wrote of his Institute colleague and contemporary (both men were born in 1904):

“In preserving and developing the Institute for Advanced Study as a seat of the purest and highest sort of scientific and intellectual effort; in giving hospitality, encouragement and inspiration to a host of talented scholars—in many instances great scholars—from all parts of the world; in setting for these visitors and for thousands of others outside of Princeton an example of the scientific mind at its best, rigorous but humane, fastidious but generous and powerful, uncompromisingly responsible in its relationship to ascertainable truth but never neglectful of the need for elegance and beauty in the statement of it;—in doing all these things, he was rendering a service of great importance to the progress of science and humane letters in this country and the world over; and he was conscious of doing so. This was, I am sure, a comfort and a solace to him in the face of the disappointments and frustrations with which these years were otherwise replete.” ■

SCHOOL OF NATURAL SCIENCES (Continued from page 1)



COURTESY OF THE IAS ARCHIVES

Abraham Pais, Sumiko Yakawa, and Hideki Yakawa, circa 1950

Hideki Yukawa, and younger scholars such as Murray Gell-Mann, Freeman Dyson, Geoffrey Chew, Francis Low, Yoichiro Nambu, Ros Jost, and Cécile DeWitt-Morette.

By all accounts, Oppenheimer’s lecture style benefited from an erudite command of the English language and a dry wit. He conveyed a sense of excitement about the scientific endeavor. Hans A. Bethe has written: “J. Robert Oppenheimer did more than any other man to make American theoretical physics great. His taste and his knowledge guided and stimulated young American physicists for two generations ... Oppenheimer’s mind was all the time concerned with the most fundamental questions in physics. This attitude of concentrating on the fundamental difficulties and ignoring the easy problems, he communicated to his students. ‘What we don’t understand we explain to each other,’ he once said in describing the activities of the physics group at the Insti-

tute for Advanced Study. There was always a burning question which had to be discussed from all aspects, a solution to be found, to be rejected, and another solution attempted. Wherever he was, there was always life and excitement, and the expectation of excitement in physics for generations to come.”

During Oppenheimer’s tenure as Director of the Institute, outstanding physicists were appointed to the permanent Faculty: Abraham Pais in 1950, Freeman Dyson in 1953, T. D. Lee and C. N. Yang in 1955, and Bengt Ström-gren in 1957. Yang and Lee did their 1957 Nobel Prize-winning work on parity violation while they were Faculty at the Institute. In the 1960s, there were six physics professors—Abraham Pais, C. N. Yang, T. D. Lee, Freeman Dyson, Tullio Regge, and Bengt Ström-gren—in the School of Mathematics. Nominally part of the School of Mathematics, physicists formed a working group within it until an independent School of Natural Sciences was established in 1966.

The presence of physics, however, goes back to the Institute’s first Faculty appointments of Einstein, Weyl, and von Neumann, in 1933. Einstein was a physicist. Weyl and von Neumann were mathematicians who had made major contributions to physics. In 1933, the Institute had no permanent building. Its School of Mathematics was housed in borrowed quarters in the mathematics department at Princeton University. The University’s generous act of offering office space to the newly formed Institute’s Faculty initiated some confusion. The Institute has often been incorrectly perceived as part of Princeton University.

Today, the areas of interest of the School of Natural

Sciences are elementary particle theory, astrophysics, and mathematical physics. String theory, in particular, is currently the most exciting and actively pursued branch of physics. Strong claims have been made for this theory, which, in the view of many, is the best hope for providing a unified theory of the fundamental forces of nature, sometimes called the “Theory of Everything.”

Current Faculty of the School of Natural Sciences are Stephen Adler, John Bahcall, Peter Goldreich,

Juan Maldacena, Nathan Seiberg, and Edward Witten. Professor Emeritus Freeman Dyson is an active member of the School.



COURTESY OF THE IAS ARCHIVES

Professor Emeritus in the School of Natural Sciences Freeman Dyson, in the late 1940s

Each year the School has some 50 Members working full time in particle physics and astrophysics. Short-term visitors, some 150 annually, include invited scholars from around the world for periods of a few days to a few months. To encourage graduate students in the field, the School has created a two-week summer program, Prospects in Theoretical Physics (see page 3). ■

REMEMBERING ALBERT EINSTEIN

In the Spirit of Einstein's Legendary Generosity, the Institute Donates Einstein Furniture to the Historical Society of Princeton



ALAN RICHARDS

Albert Einstein in front of the Institute for Advanced Study

This year marks the 125th anniversary of the birth of Albert Einstein (1879–1955) in Ulm, Germany, where, auspiciously, the city's motto is *Ulmensis sunt mathematici*. At the Institute for Advanced Study, where he was a member of the Faculty from 1933 until his death 22 years later, Professor Einstein is still very much a part of living memory. While there is no overt memorial to the great scientist, who was appointed one of the Institute's first Faculty members—his home at 112 Mercer Street continues to be a private home, his office continues as the office of a working mathematician—nevertheless, Einstein's legacy of excellence is still present.

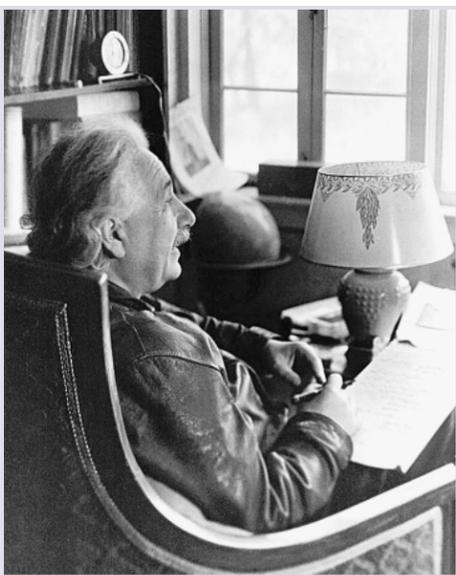
During his lifetime, Einstein's personal generosity was such that when his friends and colleagues wanted to celebrate his 70th birthday, they devised a plan to surprise him with a gift he could not give away. At age 88, Jack Rosenberg, then a young engineer just out of the armed services and working on John von Neumann's Electronic Computer Project at the Institute, remembers the occasion in his unpublished memoir. As he records, Mr. Rosenberg had not expected to meet the famous scientist, with whom he shared a passionate love of classical music, let alone receive his attention and friendship.

In the late 1940s, Mr. Rosenberg's expertise in designing and constructing his own high fidelity recording system, at a time when no such equipment was commercially available, brought him to the attention of Einstein's close friend and fellow Institute professor, art historian Erwin Panofsky. Built for his own pleasure, Rosenberg's audio equipment filled an entire room of his small Princeton apart-



PETER C. COOK, COURTESY OF THE HISTORICAL SOCIETY OF PRINCETON

Einstein was photographed on numerous occasions seated in this favorite upholstered tub armchair, now part of the Albert Einstein furniture collection at the Historical Society of Princeton.



ALAN RICHARDS

Albert Einstein in his study at 112 Mercer Street, Princeton, New Jersey

ment. Word of its quality soon spread among local music lovers.

As recalled in Rosenberg's memoir, Erwin Panofsky approached him in the laboratory of the Electronic Computer Project building to request a "favor." The favor was to build an audio system consisting of an FM tuner, amplifier, and loudspeaker, each housed in a separate wood cabinet. Signals would be received from classical music broadcasting stations located in New York City; the entire project was to be kept secret from Einstein until a working system could be unveiled. Rosenberg says, "Einstein's friends wanted to give him something that would please him. Not only did they want to select something Einstein would enjoy frequently, but they also wanted something he could not easily bestow on someone else. Since he was overly generous, he



PETER C. COOK, COURTESY OF THE HISTORICAL SOCIETY OF PRINCETON

Einstein's 19th-century grandfather clock is now part of the Albert Einstein furniture collection at the Historical Society of Princeton.

sight I will never forget ... I have never witnessed a more authentic surprise."

To express his gratitude, Professor Einstein invited Jack Rosenberg and his wife, Frances, to his home for the first of a series of conversations that the Rosenbergs enjoyed until they left Princeton in October, 1951.

When Einstein died in 1955, he bequeathed his home to the Institute. The Einstein home was one of the first planned gifts to the Institute for Advanced Study and it prompted the creation, in 1996, of the Einstein Legacy Society to honor those who name the Institute in their will and those who make a planned gift. Einstein's stepdaughter, Margot, lived in the home, which contained the family's furniture brought from Germany



PETER C. COOK, COURTESY OF THE HISTORICAL SOCIETY OF PRINCETON

Albert Einstein loved classical music and was a keen violinist. His maple music stand is among the items given to the Historical Society of Princeton by the Institute.

usually gave away presents he received to anyone with a pitiful story."

So it was that Rosenberg found himself surreptitiously installing an FM radio antenna on the roof of 112 Mercer Street while Einstein's secretary, Helen Dukas, made sure that Einstein would remain absent from his home. The antenna lead was dropped from the chimney above Einstein's study, through the bottom windowsill, and concealed under the rug where it lay hidden until March 14, 1949, when Institute Director J. Robert Oppenheimer transported Jack Rosenberg and the equipment to Einstein's home for the gift's installation and presentation.

Rosenberg writes: "When all three cabinets were installed, I began hooking up the interconnecting cables and told Einstein it was an FM radio music system. He said 'But does it not need an aerial?' I reached under the rug, picked up the lead, and connected it to the tuner. Suddenly it all registered. 'You have been here before. How did you get in?' People unknown to him were never permitted to enter the house. By this time the radio was playing a classical composition. The look of pleasure in his face was a



PETER C. COOK, COURTESY OF THE HISTORICAL SOCIETY OF PRINCETON

This late 19th-century German oak cabinet that stood in Albert Einstein's Princeton home at 112 Mercer Street is among the 65 items of furniture donated by the Institute for Advanced Study to the Historical Society of Princeton.

shortly after Einstein came to America, until her death in 1986.

In the spirit of Einstein's generosity, the Institute for Advanced Study has donated 65 pieces of his possessions to the Historical Society of Princeton. The 65 pieces include Einstein's treasured Biedermeier-style grandfather clock, his favorite armchair, his wooden music stand, and his pipe.

The Historical Society plans to devote a room in Bainbridge House, at 158 Nassau Street, to the collection as part of an educational and interpretative appreciation of Einstein's life and work. ■

FRIENDS OF THE INSTITUTE FOR ADVANCED STUDY

The Friends of the Institute have enjoyed a full schedule of activities this year, including four Friends Forums.

The first, titled "Fighting AIDS in Developing Countries: Brazil's Model of Success," was presented in October by Director's Visitor José Serra. As Brazilian Minister of Health from 1998 to 2002, José Serra was involved with intellectual property and strategic drug issues particularly as they pertain to the treatment of AIDS. Brazil's anti-AIDS campaign and AIDS policy is considered the best among developing countries, and Dr. Serra discussed the evolution of Brazil's AIDS strategies in this talk.

In November, Caroline Walker Bynum, Professor of European Medieval History in the Institute's School of Historical Studies, presented "The Presence of Objects: Medieval Anti-Judaism in Modern Germany." Dr. Bynum described her talk as follows: "In the later Middle Ages in Germany, there were a number of sites where pilgrimages and pogroms developed around objects supposedly abused by Jews. In some of these places, the objects survive until today and raise questions about how contemporary Germans and non-Germans should treat such shameful objects from the past." Dr. Bynum spoke about "the medieval context for such objects and modern attempts to memorialize and expiate the events."

In March, Dr. Henry Louis Gates, Jr., Joint Visitor in the Schools of Historical Studies and Social Science, presented "W.E.B. Du Bois and the Encyclopaedia Africana." W.E.B. Du Bois, the leading African-



Dr. Henry Louis Gates, Jr. in conversation with Elaine Wolfensohn at the Institute for Advanced Study

American intellectual of the 20th century, dreamed of editing an "Encyclopaedia Africana," which he envisioned as a comprehensive compendium of knowledge about the history, cultures, and social institutions of people of African descent. Du Bois was able to secure only half the funds needed to complete his project. Inspired by Du Bois' dream, Harvard professor Henry Louis Gates, Jr., and his colleague Kwame Anthony Appiah, created what was left unfinished by Du Bois: the first scholarly encyclopedia whose scope is the entire

history of Africa and the African Diaspora.

Ronald A. Carson, Special Visitor in the School of Social Science, spoke on "Metaphorical Concentration in Medicine," in April. A bioethicist and "medical humanist," Dr. Carson's work is devoted to making healthcare more humane. He is the author of numerous articles and three books. Dr. Carson is the Harris L. Kempner Distinguished Professor and Director, Institute for the Medical Humanities, University of Texas Medical Branch.

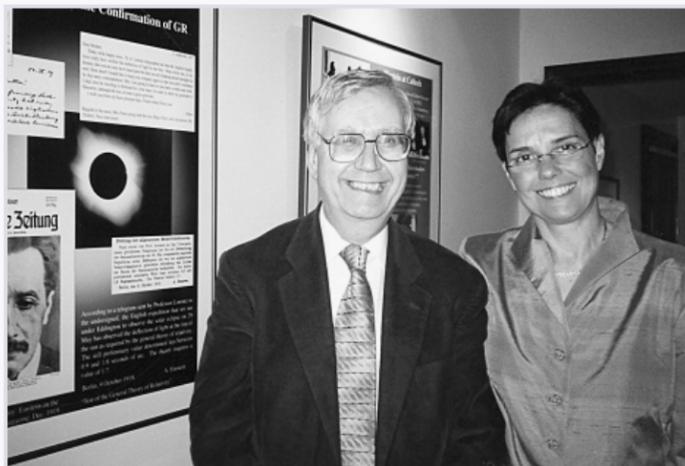
The fall Fireside Chat was given in October by author Michael Curtis, who presented findings from his book, *Verdict on Vichy: Power and Prejudice in the Vichy France Regime*, which explores the attitudes and actions of French officials and citizens towards Jews in France during World War II. In the book, Dr. Curtis examines the degree to which French citizens, including ministers and officials of the Vichy regime, the legal and administrative system, the Church, and lay people, collectively participated in the discrimination and persecution of Jews. Michael Curtis is Distinguished Professor Emeritus of Political Science at Rutgers University.

The Friends Executive Committee hosted a holiday reception for Friends and Faculty in December at which the guests of honor were Phillip and Taffy Griffiths. In January, Friends held a welcome reception for Peter and Helen Goddard.

Upcoming Friends events include the Friends annual meeting and picnic on June 2. For information on these events, or if you are interested in becoming a Friend, please call Pamela Hughes at (609) 734-8204. ■

AMIAS

In March, Dr. Goddard traveled to California and Washington to host receptions for former Members and Friends of the Institute. At the California Institute of Technology in Pasadena, former Member Diana Kormos-Buchwald spoke on "The History and Work of the Einstein Papers Project." Visiting Intel in Berkeley, Avi Wigderson, Herbert H. Maass Professor in the School of Mathematics, presented "The Digital Envelope—A Crash Course in Modern Cryptography," and, in Medina, Washington, Arnold Levine, Visiting Professor in the School of Natural Sciences, introduced guests to the IAS Center for Systems Biology and spoke on the "Human Genome Project."



Dr. Peter Goddard with Diana Kormos-Buchwald, Director of the Einstein Papers Project at Caltech, and AMIAS Board member



From left: Visiting Professor Arnold Levine, Institute Trustee Charles Simonyi, former Members in the School of Mathematics Christian Borgs and Jennifer Chayes, and Dr. Peter Goddard, on a visit to Medina, Washington

UPCOMING WORKSHOPS AND PROGRAMS

(Continued from page 3)

Death in Seventeenth-Century Rome (1998), *Bernini and the Unity of the Visual Arts* (1980), and *Bernini and the Crossing of Saint Peter's* (1967). Studies published in *Past-Present: Essays on Historicism in Art from Donatello to Picasso* (1993) range from the early Renaissance through the twentieth century.

For further information see <http://www.nga.gov/programs>.

IAS/PARK CITY MATHEMATICS INSTITUTE July 11–31: Geometric Combinatorics

The 2004 PCMI Summer Session will take place July 11–31 in Park City, Utah. Each year, the IAS/Park City Mathematics Institute (PCMI), a program of the Institute for Advanced Study, draws mathematics researchers, educators, and post-secondary students for a three-week summer program of professional development and study.

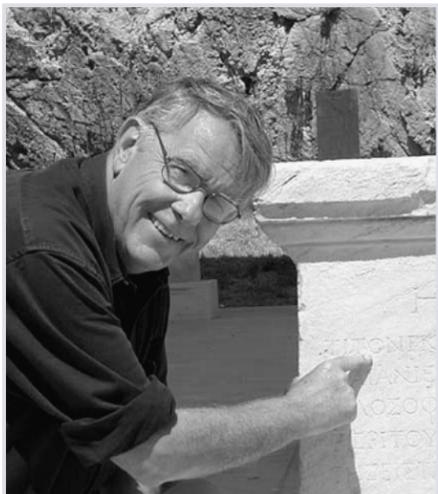
This year's research topic is "Geometric Combinatorics;" the education theme is "From Policy to Practice: Partnerships with School Districts." Research organizers are Ezra Miller and Victor Reiner of the University of Minnesota, and Bernd Sturmfels of the University of California at Berkeley. Education coordinators are Gail Burrill and Joan Ferrini-Mundy of Michigan State University, and Daniel Goroff of Harvard University.

PCMI receives major funding from the National Science Foundation and additional funding from the following foundations and individuals: the Starr Foundation, State of New Jersey, National Security Agency, Bristol-Myers Squibb Foundation, George S. and Delores Doré Eccles Foundation, Mr. and Mrs. Charles Jaffin, Wolfensohn Family Foundation, and support from the University of Utah Department of Mathematics.

For further information see: <http://www.admin.ias.edu/ma/>. ■

PIECING THE PAST

Former Member in the School of Historical Studies, Stephen V. Tracy is a Specialist in Greek Epigraphy



Stephen V. Tracy on the south slope of the Acropolis

Epigraphist Stephen V. Tracy, who first came to the Institute for Advanced Study as a Member in the School of Historical Studies in 1987–88, has made the study of Athenian letter cutters his special field of research. Through repeated and painstaking examination involving thousands of inscriptions and meticulous measurement, he has developed the ability to distinguish the individual hands of some 100 stonecutters from the fifth to the first century B.C.E. These highly skilled artisans worked with hammer and chisel on marble and stone. They inscribed matters of state, copying laws and decrees of the Athenian Council and Assembly for public display. They cut texts at high speed in very small capital letters, with no spaces between words or

sentences. They were extremely efficient and, it is thought, may have accompanied dignitaries on their travels throughout the Mediterranean. Dr. Tracy's systematic examination of their stylistic traits allows him to attribute even small fragments of an inscription to a particular "writer," just as one might recognize the lettering style in a handwritten note from a relative.

Since whole or nearly whole inscriptions are rare, it is important to piece fragments together whenever possible. Being able to identify the unique "hand" of a mason allows dispersed pieces to be reunited, and helps date inscriptions to within the lifespan of an individual stonecutter. In the course of his career, Tracy has studied thousands of laws and decrees found in Attica as well as on the Athenian island of Delos or on the walls of the Athenian treasury in the sanctuary of Apollo at Delphi. He is able to ascribe to each cutter a portfolio of inscriptions, some comprising a few pieces, others amounting to some sixty or more pieces.

As a Member and subsequent frequent visitor to the Institute, Dr. Tracy has made use of the extensive collection of "squeezes" in the School of Historical Studies' Epigraphical Library. "It was and is the best place—and at some periods the only place—for me to work. I can go through thousands of squeezes in a day there, whereas to see that many stones in the museums here in Athens, to physically move them about so as to view the lettering in the best lighting conditions, would require months of work,"

he says. In expressing his gratitude to the Institute, and the particular support of Professors Christian Habicht and Glen Bowersock in the School of Historical Studies, Dr. Tracy recalls "very happy times there pursuing my work on hands and basking in the academic ambience of the Institute. The squeeze collection at IAS is very complete for Attica." In the preface to his most recent book, *Athens and Macedon: Attic Letter-Cutters of 300 to 229 B.C.* (Berkeley 2003), Dr. Tracy states, "Indeed, without the generous support of the School of Historical Studies at the Institute for Advanced Study in Princeton and the magnificent squeeze collection housed there, little could have been accomplished."

His studies have allowed Dr. Tracy to follow some of the unnamed stonecutters from Athens to Delphi or to Athenian Delos and back to Attica. He has been able to reconstruct the careers, some as long as

forty years or more, of individual masons and to date numerous documents with greater accuracy than before.

Until Dr. Tracy's first formal paper on the subject in 1970, "Identifying Epigraphical Hands" in *Greek, Roman and Byzantine Studies*, "the study of lettering had been done haphazardly, in a casual and amateurish way," says Professor Habicht. "Today, the skill of recognizing hands of individual cutters is still Tracy's exclusive possession. It has made him the undisputed and unrivaled expert in this field, to the same degree that Sir John Beazley was the expert for Athenian vase painters."

While Dr. Tracy's "new method" has met with some skepticism—even he admits to wondering sometimes whether he might be "dreaming it all"—it has proved effective. Often, after Dr. Tracy has identified two fragments of an inscription to the same hand, the fragments have been shown to fit together as parts of the same inscription. Likening this aspect of his work to piecing together a jigsaw puzzle, Tracy says "The study of individual hands thus provides a very powerful tool for dating fragments, and even in some cases for putting them back together. This is the primary reason for doing it. It also aids us greatly in dealing with the small fragments that so often face us, which are so very difficult to study, for, once one has learned a hand, it is possible to recognize

accurately even very small samples of a cutter's writing."

"The reliability of Tracy's method has been proven by its results," comments Professor Habicht, who notes that Tracy "has demonstrated hundreds of material joints between pieces that had previously not been identified as belonging to one and the same document...Each join is fresh proof of the validity of the method, and these results have therefore convinced experts in the field all over the world."

Stephen Tracy's work has resulted in advances in determining the chronology of ancient events, the precise dating of military campaigns, and even in distinguishing ancient historical figures of the same name. He was, for example, able to distinguish the scholarly Demetrios of Phaleron, a leading political figure of late fourth century B.C.E. Athens, from Demetrios the military general and grandson of the former.

For historians, inscriptions provide an invaluable resource. Information thus gleaned helps define personalities in the ancient world. We learn, for example, that the Athenian dramatist Sophocles was also treasurer of the Athenian empire, as recorded in treasury accounts inscribed on the Acropolis, dating to the second half of the fifth century B.C.E. As Dr. Tracy puts it, "the study of hands provides a new means to date more precisely-inscribed texts from antiquity and thus to achieve a better understanding of the precious evidence they furnish us."

Stephen Tracy received his A.B. from Brown University in 1963, and his M.A. and Ph.D. from Harvard University in 1965 and 1968, respectively. At Harvard, he was a student of Greek scholar and epigraphist Sterling Dow, himself a student of Harvard classical historian William Scott Ferguson. Professor Habicht, recognized as the leading authority on the history of Athens from the time of Alexander the Great to the establishment of the Roman Empire, has described Dr. Tracy as "the legitimate heir of this great tradition and these two eminent figures."

In 1986, Tracy founded the Center for Epigraphical and Paleographical Studies at Ohio State University and is now Director of the American School of Classical Studies at Athens. He is a member of the Rough Cilicia Survey Project and serves on the Advisory Board overseeing publication of a third edition of Volume II of *Inscriptiones Graecae*. His books include: *Athens and Macedon: Attic Letter-Cutters of 300 to 229 B.C.* (Berkeley, 2003); *Athenian Democracy in Transition: Attic Letter-Cutters of 340 to 290 BC* (Berkeley, 1995); *Attic Letter-Cutters of 229 to 86 B.C.* (Berkeley, 1990); *The Story of the Odyssey* (Princeton, 1990); *I.G. II2 2336: Contributors of First Fruits for the Pythais* (Meisenheim, 1982); *The Lettering of an Athenian Mason* (Princeton, 1975); and, with John Bodel, *Greek and Latin Inscriptions in the USA: A Checklist* (Rome, 1997).

For further information on Stephen Tracy's work, see his article, "Dating Athenian Inscriptions: A New Approach," in the *Proceedings of the American Philosophical Society*, Vol. 144, No. 1, March 2000, which can be found online at <http://www.aps-pub.com/proceedings/mar00/Tracy.pdf>. ■



This fragment of an inscription (IG II 2 59) is part of a decree from Athens of the very early fourth century B.C.E.

What is a Squeeze?

A "squeeze" is a copy of an inscription made by pressing damp paper over the lettering. The technique is used by scholars studying inscriptions written in ancient times on stone tablets. Prepared in the field or in museums, squeezes provide a physical rendering of an inscription that can be removed and examined elsewhere. According to Professor Christian Habicht, the technique was much used in the 19th century and can already be found in the 16th century. A committee working for the French Secretary of Education published recommendations for their use in 1843, and they were used extensively by the French Academician Philippe Le Bas (1794–1860) in Asia Minor (1843), and by the German scholar Karl Richard Lepsius (1810–1884) in Egypt (1842–1845).

The Institute for Advanced Study is home to some 25,000 such squeezes. A complete inventory of the Institute's collection, prepared under the direction of Professor Habicht, is now on CD-ROM. Squeezes originally from the IAS collection, such as those shown here, can be viewed online with others in the Ohio State University collection on the website of the Center for Epigraphical and Paleographical Studies: <http://omega.cohums.ohio-state.edu/epigraphy/>. ■

This inscription (IG II 2 101) honors King of the Molossi, Alketas the Syracusan, so called because he was exiled to Sicily and adopted into a Syracusan aristocratic family. Later restored to his throne, he assisted an Athenian force sent to Corfu and was honored in Athens during the winter of 373/2 B.C.E. It is thought that the horse relief refers to a victory he won in an equestrian competition while in Athens.



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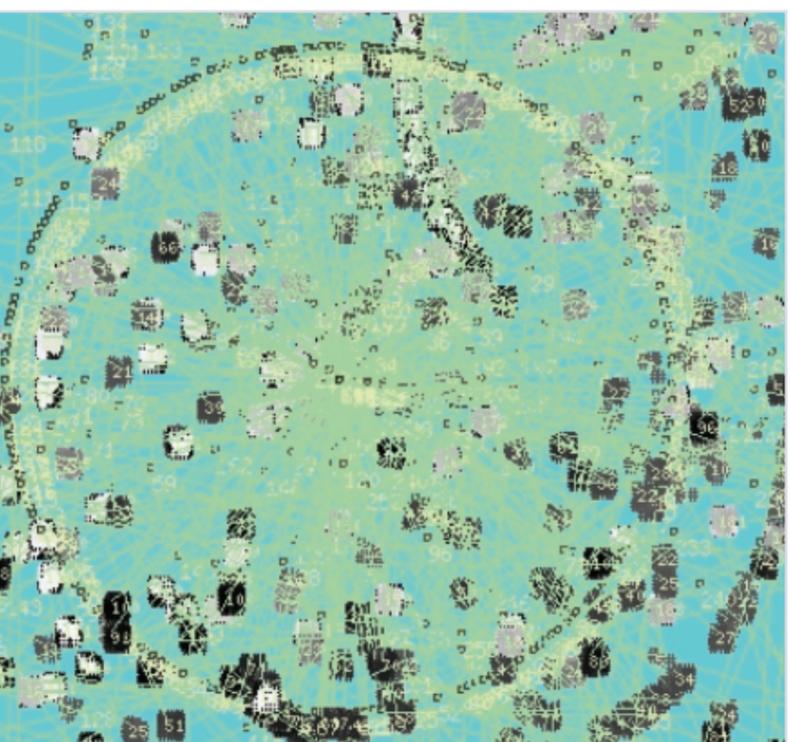
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THE INSTITUTE LETTER



Academy of the Internet

This computer-generated image by artist Kazumori Takahashi was created for the experimental internet art project *Mapping the Web Infome*. It appears on the cover of *Academy of the Internet*, published in 2004 by Peter Lang Publishing Inc., New York. *Academy of the Internet* is a collection of essays edited by Helen Nissenbaum of New York University and Monroe E. Price of Yeshiva University. Both editors were Members in the School of Social Science at the Institute for Advanced Study in 2000–01. The collection was developed as a work in progress during the summer workshop held by the School of Social Science in 2001 as part of its program in Information Technology and Society.

The essays explore the impact of the Internet on scholarly research in the social sciences and other fields of inquiry, and address topics in history, computer ethics, cyberlaw, aesthetics, politics, economics and public policy. Contributing authors offer critical perspectives on the effects of the Internet on their particular fields of inquiry.

The editors cite the contributions of workshop participants and School of Social Science Members Joan Fujimura, Manuel Delanda, James Der Derian, Margaret Morse, Tom Streeter, and Michele White, among others; as well as School of Social Science Faculty: Professor Emeritus Clifford Geertz, UPS Foundation Professor Michael Walzer, and Harold F. Linder. Professor Joan Wallach Scott, for their support of the program. The Information Technology and Society program was directed by Adam Ashforth, Visiting Associate Professor in the School of Social Science, and was funded in part by The Rockefeller Foundation, The John D. and Catherine T. MacArthur Foundation, The Ford Foundation, and the Gladys Krieble Delmas Foundation.

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