IAS

Institute for Advanced Study

Report for the Academic Year 2008–2009

It is fundamental in our purpose, and our express desire, that in the appointments to the staff and faculty as well as in the admission of workers and students, no account shall be taken, directly or indirectly, of race, religion, or sex. We feel strongly that the spirit characteristic of America at its noblest, above all the pursuit of higher learning, cannot admit of any conditions as to personnel other than those designed to promote the objects for which this institution is established, and particularly with no regard whatever to accidents of race, creed, or sex.

Extract from the letter addressed by the Institute's Founders, Louis Bamberger and Caroline Bamberger Fuld, to the first Board of Trustees, dated June 4, 1930

Newark, New Jersey

Cover: The Institute community gathers for After Hours Conversations, an evening of interdisciplinary discussion. Photo: Bentley Drezner

The Institute for Advanced Study exists to encourage and support fundamental research in the sciences and humanities—the original, often speculative, thinking that produces advances in knowledge that change the way we understand the world.

THE SCHOOL OF HISTORICAL STUDIES, established in 1949 with the merging of the School of Economics and Politics and the School of Humanistic Studies, is concerned principally with the history of Western European, Near Eastern, and East Asian civilizations. The School actively promotes interdisciplinary research and cross-fertilization of ideas.

THE SCHOOL OF MATHEMATICS, established in 1933, was the first School at the Institute for Advanced Study. Several central themes in mathematics of the twentieth and twenty-first centuries owe their major impetus to discoveries that have taken place in the School, which today is an international center for research on mathematics and computer science. The School sponsors, jointly with Princeton University, the Program for Women and Mathematics.

THE SCHOOL OF NATURAL SCIENCES, established in 1966, supports research in broad areas of theoretical physics, astronomy, and systems biology. Areas of current interest include elementary particle physics, string theory, quantum theory, and quantum gravity; investigating the origin and composition of the universe; and conducting research at the interface of molecular biology and the physical sciences. The School sponsors Prospects in Theoretical Physics, a program for graduate students and postdoctoral scholars.

THE SCHOOL OF SOCIAL SCIENCE, founded in 1973, takes as its mission the analysis of societies and social change and is devoted to a multidisciplinary, comparative, and international approach to social research and the examination of historical and contemporary problems.

SPECIAL PROGRAMS include the Program in Interdisciplinary Studies, which explores different ways of viewing the world; the Artist-in-Residence Program; Director's Visitors; the IAS/Park City Mathematics Institute, which aims to increase awareness of the roles of professionals in all mathematics-based occupations; and the Science Initiative Group, dedicated to building science capacity in the developing world.

IAS Institute for Advanced Study

Contents

ANDREA KANE

The Institute for Advanced Study is a community of scholars whose primary purpose is the pursuit of advanced learning and scholarly exploration. It is also a true academic village, where Members live together in housing adjacent to the campus and interact through meals, walks, concerts, lectures, forums, and activities.

Background and Purpose

The Institute for Advanced Study was founded in 1930 with a major gift from New Jersey businessman and philanthropist Louis Bamberger and his sister Caroline Bamberger Fuld, who wished to use their fortunes to make a significant and lasting contribution to society. They sought the advice of educator Abraham Flexner, who developed the concept of the Institute as a community of scholars whose primary purpose would be the pursuit of advanced learning and scholarly exploration. The Institute for Advanced Study has remained committed to its founding principles, and its record of definitive scholarship and scientific achievement is unsurpassed.

The Institute fills a unique role in postgraduate education and scientific and scholarly research. As "the university to universities," in the words of Trustee Vartan Gregorian, the Institute serves all colleges and universities by providing a place where scholars can hone their skills and do their best work, thereby adding substantially to their ability to contribute as both teachers and scholars to the academic institutions where they base their careers. For young scholars just entering the academic world, an opportunity to work at the Institute can set the direction for lifelong research interests and thereby determine professional careers. The Institute provides more mature scholars with the opportunity to take new directions in their research or to complete a major piece of work away from the many obligations of working life at a university. At a time when pure research and scholarly activities are undervalued, the opportunities that the Institute provides have never been more necessary. The Institute's foremost objective is the advancement of knowledge and the deepening of understanding across a broad range of the humanities, sciences, and social sciences.

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One of the Institute's unique strengths is its permanent Faculty of twenty-nine eminent scholars, whose broad interests and extensive ties to the larger academic world are reflected in their own work and also in the guidance and direction they provide to the Institute's visiting scholars.

The Faculty defines the major themes and questions that become the focus of each School's seminars and other activities, and selects and works closely with visiting Members. Small in number and organized into four Schools (Historical Studies, Mathematics, Natural Sciences, and Social Science), the Faculty and Members interact with one another without any departmental or disciplinary barriers.

Each year the Institute awards fellowships to some 190 visiting Members from about one hundred universities and research institutions throughout the world. The Institute's more than seven thousand former Members hold positions of intellectual and scientific leadership in the United States and abroad. Some twenty-two Nobel Laureates and thirty-four out of forty-eight Fields Medalists, as well as many winners of the Wolf and MacArthur prizes, have been affiliated with the Institute. The Institute does not receive income from tuition or fees; resources for operations come from endowment income, grants from private foundations and government agencies, and gifts from corporations and individuals.

Report of the Chairman

It is with a profound sense of responsibility that I have followed Martin L. Leibowitz in leading the Board of Trustees of the Institute for Advanced Study. I am immensely honored to serve alongside my colleagues on the Board, as well as Director Peter Goddard, the Faculty, and the staff, who on a daily basis enable the advancement of knowledge in the sciences and humanities. We are deeply grateful for the guidance and direction that Marty provided as Chairman in 2007–08 and are delighted that he continues to provide essential leadership as Vice Chairman of the Board and President of the Corporation.

The Institute's Trustees are dedicated to supporting and maintaining the Institute's unparalleled environment for world-class scholarship and research and the continuation of its traditions. In the past year, we welcomed Spiro J. Latsis, President of SETE SA, to the Board. We look forward to the addition of William H. Sewell Jr., the Frank P. Hixon Distinguished Service Professor Emeritus of Political Science and History at the University of Chicago, who will join the Board as Academic Trustee for the School of Social Science as of July. Bill succeeds Peter L. Galison, the Joseph Pellegrino University Professor at Harvard University, to whom the Board expresses its deep gratitude for his five years of admirable service.

For seventy-nine years, the Institute has existed for no other purpose than to encourage and support curiosity-driven research. This clarity of mission has been made possible only through the independence afforded by the strength of the Institute's endowment, which the Trustees have made a commitment to protect in these uncertain times by pledging contributions for operating costs that we anticipate will total $10 million for each of the next three years.

BRIAN SMALE

Additional Trustee support has included a $10 million gift from the Simons Foundation, founded by Trustee James H. Simons and his wife Marilyn, which has facilitated a new initiative between the Institute and the Rockefeller University. The gift, divided equally between the two institutions, is providing support for a joint professorship as well as biologists, mathematicians, physicists, and computer scientists who are exploring quantitative and theoretical approaches to biological problems. In addition, the Simons Foundation has given a second $10 million challenge grant to add to the permanent endowment of the Institute's Simons Center for Systems Biology.

A $3.5 million gift from the Leon Levy Foundation will allow the Institute to formally organize and preserve important historical materials, and serve as a repository for papers, oral histories, photographs, and other essential source materials moving forward. The gift supports the establishment of the Shelby White and Leon Levy Archives Center and reflects the continuing, dedicated support of Institute Trustee Shelby White and the foundation established in the name of her husband, the late Leon Levy, who was a longtime Trustee of the Institute.

Since its founding in 1930, the Institute has undertaken a review, approximately every ten years since the 1950s, that carefully considers its current course and recommends any future adjustments to maintain its influence and standing. The two-year process, which has been expertly overseen by Vice Chairman Richard B. Black, along with Trustees Victoria B. Bjorklund and Brian F. Wruble, is now coming to a close with a report of recommendations expected in October 2009.

The review has reminded us that we must be vigilant in caring for the Institute and its foremost aim, which the late J. Robert Oppenheimer (Director, 1947–66) once described as helping those "creative and deep and active and struggling scholars and scientists to get the job done that is their destiny to do." I look forward to working to ensure that the wide influence of the work of our Faculty and Members, and our role as a model for the many institutions around the world that have been inspired by our example, continue for generations to come.

Charles Simonyi
Chairman

Report of the Director

As one year ends and another begins, we are particularly conscious of the importance of the opportunities that the Institute provides: the end-of-year reports by Members and the comments of those arriving for the new year emphasize the immense value of having the time and complete freedom to follow one's research interests wherever developments lead rather than delivering on predetermined objectives.

While academic life here is as exciting as ever and the discussions at lunch and teatime remain as vibrant, the Institute is far from immune from the effects of the global financial situation. We depend on our endowment for eighty percent of our core operating expenses and, although our investments have not fared as badly as those of many comparable institutions, we have had to work hard to reduce expenditure while leaving the life and work of the Institute as little affected as possible. In this, the leadership and practical support provided by the Institute's Trustees has been of the first importance, and we owe them an enormous debt.

In October 2008, Charles Simonyi was elected Chairman of the Institute's Board of Trustees in succession to Martin Leibowitz, who had served for a year following James Wolfensohn's retirement in 2007. We are all very grateful to Marty for his invaluable leadership during a challenging time and are delighted that Charles, who has demonstrated outstanding commitment to the Institute and its mission since becoming a Trustee in 1997, will continue to guide us in the coming years. Both Jim and Marty remain actively involved in the Institute's work as members of the Board.


CLIFF MOORE

Didier Fassin, a social and medical anthropologist, will join us as the first James D. Wolfensohn Professor in the School of Social Science as of July. The Professorship has been endowed with funds subscribed to honor Jim's twenty-one years as Chairman. Didier's work combines intellectual analysis with a practical involvement in some of the most important global issues of our time. In April, Stanislas Leibler became the second Professor working in systems biology in the School of Natural Sciences. Originally a physicist, he holds this position jointly with his professorship at Rockefeller University, as part of a collaborative agreement generously supported by the Simons Foundation.

Matias Zaldarriaga, whose work interrelates closely with particle physics and concerns the recent remarkable discovery that the expansion of the universe is accelerating rather than decelerating as had been expected, also will join us in July as a Professor in the School of Natural Sciences, succeeding Peter Goldreich. Peter joins Phillip Griffiths, a Professor in the School of Mathematics since retiring as Director at the end of 2003, in becoming a Professor Emeritus. Helmut Hofer, a leader in the field of symplectic geometry, will join the School of Mathematics as a Professor in July.

The Institute community has benefited greatly from the musical presence of Paul Moravec, who served as the Institute's Artist-in-Residence in 2007–08 and Artistic Consultant in 2008–09. In 2009–10, Derek Bermel will serve as Artist-in-Residence, continuing a tradition that dates to the program's origins in 1994.

As we grapple with severe financial challenges, we are not neglecting the longer view. For two years now, the Institute has been conducting thorough reviews of all aspects of its academic work and administrative operations as the basis for a Decadal Review, whose purpose is to reassess how well the Institute is fulfilling its mission of fostering fundamental research and what should be done to ensure that it excels in its work through the next decade and beyond. As we reaffirm our mission, we are particularly mindful of all those to whom we are indebted—Trustees, Faculty, Members, Friends, staff, and other benefactors—for their support and all they contribute to the Institute through their work, through their donations, and in many other ways.

Peter Goddard
Director

CLIFF MOORE

Member Martin Powers (far left) spoke about "The *Chinese Philosopher* in Enlightenment England" at a workshop on modern history (pre-1900).

The School of Historical Studies

Faculty

Yve-Alain Bois

Caroline Walker Bynum

Patricia Crone, Andrew W. Mellon Professor

Nicola Di Cosmo, Luce Foundation Professor in East Asian Studies

Jonathan Israel

Avishai Margalit, George F. Kennan Professor

Heinrich von Staden

Professors Emeriti

Glen W. Bowersock

Giles Constable

Oleg Grabar

Christian Habicht

Irving Lavin

Peter Paret

Morton White

The School of Historical Studies is concerned principally with the history of Western European, Near Eastern, and East Asian civilizations. Both inside and outside these broad areas of study, Faculty and Members have pursued a wide range of topics. The emphasis has traditionally been on Greek and Roman civilization, medieval, early modern and modern European history, history of art, and the history of science, but over time the School's interests have been enlarged to include Islamic culture, the history of China and Japan, modern international relations, and more recently, music studies. Over two thousand scholars have come to the School since its founding, and their work in these and other areas of research has regularly been enriched by the fruitful interaction of disciplines in a small and collegial community.

The School's broad interpretation of the meaning of "Historical Studies" continued to be reflected in the research projects pursued by the forty Members and nine Visitors who joined the School for the academic year 2008–09. Their research spanned a diverse range of historical subjects including the history of art, philosophy, music, religion, international relations, literature, science, and medicine, as well as ancient history and Classics. The periods studied ranged from as far back as the Bronze Age to the late twentieth century. Research carried out in the School also extended over a wide geographic range, including Europe, the Middle East, and East Asia. Members received support both from the Institute's own funds and from a variety of external sources, including the National Endowment for the Humanities, the Andrew W. Mellon Foundation, the Fritz Thyssen Stiftung, the Gerda Henkel Stiftung, the American Council of Learned Societies, and the Robert Bosch Stiftung.

Beyond the individual research projects pursued, many events drew groups of scholars together for lectures and discussions that facilitated the exchange of ideas across fields and regions. These included a regular series

of presentations by individual Members to the School as a whole at the Monday Lunchtime Colloquia, as well as invited lectures, seminars, and a number of smaller groups that met on a regular basis to present and discuss topics of mutual interest. (See the list of events at the end of this section.)

ACADEMIC ACTIVITIES

In 2008–09, Professor **Yve-Alain Bois** curated the large exhibition "Picasso 1917–1937: l'arlecchino dell'arte" at the Complesso del Vittoriano in Rome and edited the multi-author catalogue (English and Italian editions), to which he contributed a long essay and more than half of the detailed notices devoted to the two hundred exhibited works. He published an essay on the work of the French artist Jean-Luc Moulène for the catalogue of his retrospective at the Musée d'Art Contemporain de Nîmes; an essay on Cézanne and Matisse for the catalogue of the exhibition "Cézanne and Beyond" at the Philadelphia Museum of Art; an essay on the German sculptor Isa Genzken for the catalogue of her retrospective in the Whitechapel Gallery in London and the Museum Ludwig in Cologne; and a discussion with Eric de Chassey in the catalogue of the exhibition "Ils ont regardé Matisse" at the Musée Départemental Matisse (Le Cateau Cambrésis, France). He also wrote an essay on Pierre Soulages for the catalogue of his retrospective at the Centre Georges Pompidou, as well as an essay on John Cage and painting for the catalogue of an exhibition on the musician at the Museu d'Art Contemporani of Barcelona, both forthcoming. He continued working on his long-term project of the catalogue raisonné of Ellsworth Kelly's painting and sculpture. At the Institute, he co-organized a series of lectures (the second of its kind) with the Department of Art and Archeology at Princeton University. In addition, he organized an informal art history seminar where Members as well as scholars from the area presented their work.

In September, he gave a seminar on representation at the School of Architecture at the University of Lausanne in Switzerland, and participated in a symposium on Ad Reinhardt's black painting at the Guggenheim Museum in New York as well as in another symposium on the "future of painting" at the Phillips Collection in Washington, D.C. In October, besides shepherding the opening of his Picasso exhibition in Rome, he presented his work on the issue of non-composition in the seminar of Professor Michael Meredith at the Graduate School of Design, Harvard University. In December, he participated in a scholarly dialogue concerning modern painting and conservation problems at the National Gallery of Art in Washington, and in February in a symposium on Cézanne of a similar

Professor Yve-Alain Bois (standing, in Wolfensohn Hall) curated the major exhibition "Picasso 1917–1937: l'arlecchino dell'arte" and published essays on Jean-Luc Moulène, Cézanne, and John Cage, among others.

CLIFF MOORE

format (not open to the public at large) at the Philadelphia Museum of Art. In April, he participated, both as speaker and respondent, in a two-day symposium devoted to Clement Greenberg at the Sackler Art Museum at Harvard University.

In 2008–09, Professor **Caroline Bynum** continued to work on late medieval devotional objects and miracles of material transformation with the larger purpose of characterizing religious life in the fifteenth century in its own terms rather than simply as a prelude to the reformations of the sixteenth century. She published an article in *Zmanim* (in Hebrew) on medieval miracles and an article in the winter issue of *Daedalus* on the current state of historical scholarship. She wrote six reviews, two of them lengthy. Her book *Wonderful Blood* (University of Pennsylvania Press, 2007) won the Otto Gründler Prize at the International Medieval Congress at Kalamazoo, Michigan, for the best book in any area of Medieval Studies published in 2007. In May, she received an honorary Doctor of Letters from Columbia University.

RANDALL HAGADORN

Member Edwin Curley's (standing at left) research on the rise of religious toleration (1500–1800) was the topic of conversation during a lunchtime colloquium.

In the fall, Bynum gave two lectures at Oklahoma State University, lectured at the Ohio State University, and gave two seminars and a lecture at the University of Minnesota's Institute for Advanced Study. In the spring, she gave the West Memorial Lectures at Stanford University, the Rothschild Lecture in the History of Science at Harvard University, and served as a consultant on trends in humanities education at the Hebrew University in Jerusalem. She continued to work with Columbia University graduate students and served on the Board of the American Academy in Berlin. She co-chaired, with Yaakov Blidstein, the new Commission on the Humanities in Israel, funded jointly by the Israel Council on Higher Education and the Yad-Hanadiv Foundation. At the Institute, she again organized the Medieval Table, which met every Wednesday at lunchtime for the presentation of individual research and discussion of general methodological issues. She also organized After Hours Conversations, an early evening series designed to increase intellectual exchange across the Institute's four Schools, with Professor Piet Hut of the Program in Interdisciplinary Studies.

Patricia Crone, Andrew W. Mellon Professor, spent the year working on all her main fields of interest. In collaboration with Masoud Jafarijaze she prepared an edition and translation of a Persian account of the war against the Sogdian rebel al-Muqanna', with a detailed commentary and analysis. She also wrote a long entry on al-Muqanna' for the *Encyclopedia Iranica* and an even longer one on Khurramdiniyya, the strand of Iranian religion she is researching for her book. In a related vein, she drafted an article on the Muslim perception of Buddhism in eastern Iran as ancient Iranian paganism, and yet another on Jahm ibn Safwan, an early theologian who seems to come from a Buddhist background.

Crone also completed an article on the godless Dahris of the early Muslim world and another on the idea of the prophets as impostors, which was meant for a volume to be edited by her in collaboration with Jonathan Israel and Martin Mulsow, but this project has been abandoned. On the Qur'an front, she completed an article on what the so-called polytheists in the Qur'an took a messenger of God to be and organized a small gathering at the Institute in June on the identification of the religious traditions in the Near East in late antiquity to which the Qur'an is related. Finally, together with Adam Silverstein she completed an article on lot-casting for the division of estates and other purposes in the ancient Near East and Islam. This article, which was inspired by a talk given by Professor Emeritus Glen Bowersock about the Petra papyri some years ago, forms part of Crone's efforts to make it possible one day to write the history of the Near East from ancient times until today as a continuous narrative instead of, as now, the history of three seemingly unrelated segments, the ancient Near Eastern, the Greek and Roman, and the Islamic.

Of Crone's articles languishing in press, only one appeared, a short piece on the skimpy outfit of the bedouin in the Arab conquests, in a festschrift for Professor Emeritus Oleg Grabar. She did not attend a single conference this year apart from her own, and she only gave three public lectures, at the University of Toronto, Washington University in St. Louis, and Wake Forest University in Winston Salem, North Carolina. But she did teach a graduate seminar at Princeton University in the spring semester.

During the second term of the academic year 2008–09, **Nicola Di Cosmo**, Luce Foundation Professor in East Asian Studies, was on sabbatical as Visiting Professor at the Research Institute for Asian and African Cultures at the Tokyo University of Foreign Studies. During this time, he worked on primary and secondary materials related to the "pre-history" of the Manchu conquest of China, a period spanning from 1580 to 1636. This study is meant to reconsider changes in Manchu political culture and society in a broader framework that includes new trade patterns, technological innovations, and economic development. The purpose of this work is to explain how the Manchus conquered China, thus establishing the last and one of the most successful Chinese imperial dynasties (Ch'ing, 1644–1911): a question still unresolved.

Member Angelika Neuwirth (front, right) gave the lecture "The Late Antique Qur'an: Jewish-Christian Liturgy, Hellenic Rhetoric, and Arabic Language" as part of a colloquium on the Qur'an.

CLIFF MOORE

Institute activities were somewhat limited due to his sabbatical leave, but during the first term he convened nine events, including eight talks in the East Asian Studies Seminar series and a School lecture. As per publications, the most relevant event has been the appearance of the volume *Military Culture in Chinese Imperial History* (Harvard University Press, 2009), which Di Cosmo edited. He also completed a number of essays. Two long essays (fifty and one

hundred pages, respectively) were prepared for a multivolume Italian work on the "History of China" (Einaudi). He also submitted essays to the *Journal of the Economic and Social History of the Orient*, *Nuova Rivista Storica*, and the *Journal of the American Oriental Society*. He has continued to edit, together with Peter Golden and Allen Frank, the *Cambridge History of Inner Asia: The Chinggisid Age*, which has entered the very final stage of preparation, and publication is expected in August 2009.

He has also continued to be involved in pedagogical activities. He has tutored two dissertations, one at the Istituto Italiano di Scienze Umane in Florence on medieval perceptions of the Mongols, defended in December 2008; and one at the University of Pennsylvania on Mongol archeology (Xiongnu period), defended in June 2009. He also taught a weekly seminar on the Manchu language (for graduate students) at Princeton University in fall 2008, an experience he found especially rewarding.

As per public appearances, he lectured in the United States, Italy, and Japan at the following universities: Johns Hopkins, Columbia, Florence, Padova, Kyoto, Hitotsubashi, and Kansai. Additionally, he was invited to present a paper at the International Conference of Eastern Studies organized in Tokyo by the Tōhō Gakkai (Institute of Eastern Culture).

Professor Di Cosmo worked on primary and secondary materials related to the "pre-history" of the Manchu conquest of China as part of a study meant to reconsider changes in Manchu political culture and society in a broader framework that includes new trade patterns, technological innovations, and economic development.

During the academic year 2008–09, Professor **Jonathan Israel** advanced further toward completing the third volume of his series on the intellectual history of the Western Enlightenment covering the period 1750 to 1790. Most of this volume now exists in rough draft. His foreign research during this period brought him to libraries in Munich, Gotha, London, New York, Lima, Sucre in Bolivia, and Amsterdam, where in October 2008 he gave a brief address in connection with his being awarded the 2008 Heineken Prize for History. He also completed a short book on the Enlightenment due to be published by Princeton University Press in the autumn of 2009.

He gave visiting lectures during the academic year at Queen Mary College, London, and in Munich, Gotha, Haarlem, Utrecht, Groningen, and Seoul. At Gotha, where he spoke to an international gathering of Latin Americanists, he delivered his first lecture introducing the concept of Radical Enlightenment in the context of the New World as pre-echoing the later independence movement in the sphere of ideas.

Besides several book reviews, his publications during this session were: "Bayle's Double Image during the Enlightenment" in *Pierre Bayle (1747–1706) le Philosophe de Rotterdam*, edited by Wiep van Bunge and Hans Bots (Leiden, 2008); "Romeyn de Hooghe (ca. 1645–1708): Engraver, Inventor and Republican," in *Materialen van de Internazionale Wetenschappelijke Conferentie "Rusland-Nederland": Op het Kruispunt van Meningen*, edited by Natalia P. Kopaneva, et al., (St. Petersburg, 2008); "Radicalismo e conservazione" in *Illuminismo: Un Vademecum* edited by Gianni Paganini and Edoardo Tortarolo (Turin, 2008); "Philosophy, Deism, and the Early Jewish Enlightenment (1655–1740)" in *The Dutch Intersection. The Jews and the Netherlands in Modern History*, edited by Yosef Kaplan (Leiden, 2008); "The Democratic Republicanism of Frederik van Leenhof" in *Dall' Origine dei Lumi all Rivoluzione. Scritti in Onore di Luciano Guerci e Giuseppe Ricuperati*, edited by Donatella Balani, Dino Carpanetto, and Marina Roggero (Rome,

2008); "French Royal Censorship and the Battle to Suppress the *Encyclopédie* of Diderot and d'Alembert, 1751–1759" in *The Use of Censorship in the Enlightenment*, edited by Mogens Laerke (Leiden, 2009); "Jews and Crypto-Jews in the Atlantic World Systems, 1500–1800" in *Atlantic Diasporas. Jews, Conversos and Crypto-Jews in the Age of Mercantilism, 1500–1800*, edited by Richard L. Kagan and Philip D. Morgan (Baltimore, 2009); and "Les 'Antiphilosophes' et la Diffusion de la Philosophie Clandestine dans la Seconde Moitié du XVIII e Siècle" in *La Lettre Clandestine* XVII (2009).

RANDALL HAGADORN

Professor Avishai Margalit (with microphone, during a lunchtime colloquium) wrote an essay, "Israel: Civilians & Combatants," with Michael Walzer, Professor Emeritus in the School of Social Science, and contributed to the intense exchange that followed its publication in the *New York Review of Books*.

During the academic year 2008–09, **Avishai Margalit**, George F. Kennan Professor, gave the final touches to his book, *On Compromises and Rotten Compromises*, to be published by Princeton University Press in November 2009; he also delivered a Faculty lecture at the Institute on the topic of the book. Currently, he is at work on a book on betrayal, to be published by Harvard University Press.

Throughout the year, Margalit lectured extensively on a variety of topics. Among them: the Thomas More Lecture in Amsterdam on religious and political sectarianism; "Home and Homeland: Homage to Isaiah Berlin" in Riga; and a keynote address "On Nostalgia" at the conference of the International Association for Relational Psychoanalysis and Psychotherapy in Tel Aviv. Additionally, he was a commentator on the annual Tanner Lecture series at Harvard University.

Jointly with Michael Walzer, Professor Emeritus in the School of Social Science, Margalit wrote an essay, "Israel: Civilians & Combatants," for the *New York Review of Books*, and contributed to the intense exchange that followed the publication of the article.

In August 2008, Professor **Heinrich von Staden** gave the keynote lecture "The *Oath* and the Oaths: Is the Hippocratic Oath Hippocratic?" at an international symposium on Hippocratic medicine at the University of Texas at Austin. In October, he lectured at the University of Saint-Etienne, France, on "L'environnement vivant: l'animal et l'homme dans la *Medicina* de Celse," at a colloquium on the role of the environment in ancient and medieval medicine. In November, he gave the annual Gerald F. Else Lecture at the University of Michigan on "Experiments on Animals and Humans: Greek and Roman Perspectives." In April and May 2009, he spent several weeks at the California Institute of Technology at the invitation of the Division of the Humanities and the Social Sciences, in the context of an interdisciplinary exploration of the historical development of notions of "evidence" and "proof." He also gave a lecture, "Writing the Animal: Aristotle, Pliny the Elder, and Galen," at New York University in April at the symposium "Writing Science: Mathematical and Medical Authorship in Ancient Greece," organ-

ized by former Institute Member Markus Asper. In late May, he gave the lecture "Evidence and Proofs that Amount to Nothing?" at the Caltech symposium "The Temper of Evidence." In the early summer of 2009, he presented the talk "Hellenistic Medicine: Reception, Transmission, and Loss" at the University of Helsinki in conjunction with a conference on Constantine the African's *Liber Pantegni* and the transmission of Greek medical traditions to the Latin West via Byzantium and the Arabic world. The conference was prompted by the recent identification of a large part of the text of Constantine's famous work in a twelfth-century manuscript in Helsinki. He gave another talk, "*Ars longa, vita brevis*: Migrations of Greek Medicine from Antiquity to the Early Modern Period," on the topic at the National Library of Finland where the manuscript was on display.

Professor von Staden spoke at a conference held at the University of Helsinki on Constantine the African's Liber Pantegni *and the transmission of Greek medical traditions to the Latin West via Byzantium and the Arabic world.*

In addition to several book reviews, he published a number of articles, including "Animals, Women, and *Pharmaka* in the *Hippocratic Corpus*," in *Femmes en Médecine. Actes de la Journée Internationale d'Étude Organisée à l'Université René-Descartes-Paris V en l'Honneur de Danielle Gourevitch,* edited by Véronique Boudon-Millot, Véronique Dasen, and Brigitte Maire (Paris: Collection Médic, De Boccard, 2008); and "The Discourses of Practitioners on Medical Ethics in Ancient Europe" in *The Cambridge World History of Medical Ethics*, edited by Robert B. Baker and Laurence B. McCullough (Cambridge University Press, 2009). He also wrote several further chapters of his long-term project on the relation between scientific collectivities and individual scientists in antiquity.

Professor Emeritus **Glen W. Bowersock** traveled abroad several times to pay tribute to two scholars whom he had known well and deeply respected. One was Arnaldo Momigliano, whom he remembered in October at the Scuola Normale Superiore in Pisa on the centennial of his birth. The other was Louis Robert, whom he remembered in November on the tenth anniversary of Mme Robert's gift of her husband's archives to the Académie des Inscriptions et Belles-Lettres. Bowersock, who is in charge of those archives, joined in a day-long presentation of research based upon documents in the Fonds Louis Robert. The meeting was a joint session of the Collège de France and the Académie organized by Denis Knoepfler. Two weeks later Bowersock returned to Paris to deliver a formal address on Louis Robert at the *rentrée solennelle* of the Académie held under the coupola of the Institut de France.

In March, Bowersock delivered a paper in London on Strabo and Mithridates Eupator in a series of seminars on Strabo arranged by former Member Simon Hornblower, and later in that month he went to Berlin to deliver the keynote address at a symposium on Dionysus at the Pergamon Museum. He flew to Florence in early May to chair the Consiglio Scientifico of the Istituto di Studi Umanistici.

The volume *East and West* (Harvard University Press, 2008) brought together, with an introduction by Aldo Schiavone, the papers presented at a symposium at Princeton University on the occasion of Bowersock's retirement in 2006. Former Members Corey Brennan and Harriet Flower took the initiative in this entire project. Bowersock is profoundly grateful to them and to all the contributors. His own book *From Gibbon to Auden: Essays on the Classical Tradition* was published in March 2009 by Oxford University Press. In addition, Bowersock published a number of articles, some in scholarly

journals and others in the *New York Review of Books*. During the spring, he was elected a foreign member of the Royal Academy of Belgium.

During academic year 2008–09, Professor Emeritus **Giles Constable** published one book, three articles, one review, and (in collaboration with other colleagues) two memoirs. He gave lectures at the universities of Trier and Lyons, Loyola University in Chicago, and the Central European University in Budapest, and he spoke at meetings at St. Bonaventure University in New York, Princeton University, Harvard University, the Delaware Valley Medieval Association in Baltimore, and the medieval group at the Institute for Advanced Study. He attended conferences in New York and Eichstätt in addition to local meetings. He has one book in the press, two submitted to publishers, and a fourth nearing completion. He continued to serve on the editorial boards of several book series and scholarly journals and on the selection committee of the Delmas Foundation.

Professor Emeritus **Oleg Grabar** was celebrated in Philadelphia by the Historians of Islamic Art Association and presented with a second volume of articles, mostly by his students, in honor of his forthcoming eightieth birthday (the first one was on the occasion of his sixtieth birthday), published in *Muqarnas*, Volume 26. He participated with Glenn Lowry, Director of the Museum of Modern Art, in a panel at the Asia House in New York on the "art" of calligraphy in Islamic lands, gave papers or formal lectures at a conference on early Islamic Iran at the School of Oriental and African Studies at London University, and at another conference, organized by the Ismaili Institute dealing with shi'ism and art, at the British Museum in London. He gave a lecture on the historiography of the study of Islamic art at the new Museum of Islamic art in Doha, Qatar, and spent some time studying the extraordinary collection gathered there. He attended a meeting of the visiting committee of the Islamic Department at the Metropolitan Museum of Art in New York as well as the Hagip Sabanci Museum in Istanbul.

Professor Emeritus **Christian Habicht** worked mainly on his contribution to the new bilingual edition of Polybius's *Histories* for the Loeb series of the Harvard University Press. He finished composing historical notes to the entire text (six volumes) and submitted the manuscript in October. He also prepared a paper, "Eudoxos of Kyzikos and the Ptolemaic Exploration of the Sea Route to India," for an international conference on Ptolemaic Waterways and Sea Power to be held in Athens in September 2009.

His publications during the year were "Judicial Control of the Legislature in Greek States," *Studi Ellenistici* 20 (2008), and "A Decree for Koan Judges," *Hyperboreus* 13, 2007 (2008). Several other papers of his were accepted and are awaiting publication.

Professor Emeritus **Irving Lavin** gave an annual course of five lectures at the Istituto Italiano per gli Studi Filosofici in Naples and lectured in a summer course at the University of Cantabria

ANDREA KANE

Professor Emeritus Christian Habicht (right), seen below with Professor Heinrich von Staden, composed historical notes for a new six-volume bilingual edition of Polybius's *Histories* for the Loeb series of the Harvard University Press.

sponsored by the Fundación Marcelino Botín in Santander, Spain. He also gave lectures at the J. Paul Getty Museum in Los Angeles, the Bode Museum in Berlin, the Sorbonne, the College de France, the Grand Palais in Paris, and the University of Avignon. A volume of Italian translations of his collected works on modern art, *L'Arte della Storia dell'Arte*, was published in Milan in 2008. Other works published over the course of the past year included: "We Must Leave the City to Our Children Exactly as We Found It," in Italian in *Storie di Artisti. Storie di Libri. L'Editore che Inseguiva la Bellezza. Scritti in Onore di Franco Cosimo Panini* (Modena and Rome, 2008); "The 'Holy Face' of Claude Mellan: *Ostendatque etiam quae Occultet*" in French in *République des Lettres, République des Arts. Mélanges offerts à Marc Fumaroli, de l'Académie Française*, edited by Christian Mouchel and Colette Nativel (Geneva, 2008); "History of Art 'Italian Style'" in Italian in *Adolfo Venturi e la Storia dell'Arte Oggi*, edited by Mario D'Onofrio (Modena, 2008); and "WHIMSY: An Allegory of Urbane Urban Patronage" (a revised and expanded version of an essay first presented at a symposium in celebration of Phyllis Lambert's eightieth birthday, organized by Sylvia Lavin at the Institute of Fine Arts, New York University, in 2007) *Log*, 15 (2009).

In October and November 2008, Professor Emeritus **Peter Paret** gave the biannual Lees Knowles Lectures at the University of Cambridge. Under the title "The Cognitive Challenge of War," the expanded text of the lectures, which combine political and military history with the history of literature and art, will be published by Princeton University Press in September 2009. As guest curator of the Princeton University Art Museum, Paret and Calvin Brown, the museum's Associate Curator of Prints and Drawings, organized the exhibition "Myth and Modernity: Ernst Barlach's Images of the Nibelungen and Faust" (February 21 to June 7, 2009). Paret wrote the texts of the catalogue, published by the museum, and gave the opening talk and three further talks on the artist at the museum and the Institute. With Helga Thieme of the Barlach Foundation in Germany, he is now writing a book on Barlach's Nibelungen drawings as a case study of the interaction of ideology and modernism in the arts in twentieth-century Germany. He also published "The Annales School and the History of War" in the *Journal of Military History*, LXXV (October 2009), the first of several planned papers on the historiography of military history. An expanded text of his address "Kunst und Zeitgeschichte" at the Humboldt University in Berlin appeared as a brochure in the university's series of addresses by recipients of honorary degrees.

Professor Emeritus **Morton White** continued his research on a "prequel" to his book *A Philosophy of Culture*. But since the ultimate story he hopes to produce is long and life is short, he now plans to publish a shorter book—tentatively titled "The Roots of Rationalism"—in which he critically analyzes the views of necessary truth held by the philosophers Descartes, Hobbes, Leibniz, and Kant, as well as their efforts to apply those views in the philosophy of culture, notably in moral, legal, and political philosophy. This shorter work will be followed, he hopes, by one in which he brings the story of what John Dewey aptly called the quest for certainty to more recent times. In 2008, an article written by White in English and translated into French under the title "Le Pragmatisme, le Holisme Épistémologique et la Portée de la Science," was published in *Tracées: Revue de Sciences Humaines* Number 2.

BENTLEY DREZNER

Professor Emeritus Peter Paret gave a talk at the Institute relating to his exhibition "Myth and Modernity: Ernst Barlach's Images of the Nibelungen and Faust" at the Princeton University Art Museum.

MEMBERS, VISITORS, AND RESEARCH STAFF

f First Term ✦ *s* Second Term ✦ *v* Visitor ✦ *a* Research Assistant

Pamela Barmash
Biblical Studies, Ancient Law ✦ Washington University in St. Louis
Martin L. and Sarah F. Leibowitz Member

Elisheva Baumgarten
Medieval History ✦ Bar Ilan University
The Gladys Krieble Delmas Foundation Member

Susanne Bobzien
Ancient Philosophy, Philosophy of Logic and Language ✦ Yale University
Funding provided by the National Endowment for the Humanities and The Andrew W. Mellon Foundation

Corinne Bonnet
Ancient History ✦ Université de Toulouse II–Le Mirail ✦ *s*
Hetty Goldman Member

Patricia Clavin
Modern European and International History ✦ University of Oxford ✦ *v, s*

Edwin Munson Curley
Philosophy ✦ University of Michigan
Funding provided by The Andrew W. Mellon Foundation

Wiebke Denecke
East Asian Studies ✦ Barnard College
Funding provided by The Andrew W. Mellon Foundation Fellowships for Assistant Professors

Yaacov Deutsch
Early Modern History ✦ The Hebrew University of Jerusalem ✦ *v, f*

Damian Dombrowski
Art History ✦ Julius-Maximilians-Universität Würzburg ✦ *f*
Funding provided by The Herodotus Fund

Khaled El-Rouayheb
Islamic Intellectual History ✦ Harvard University
Funding provided by The Andrew W. Mellon Foundation Fellowships for Assistant Professors

Christopher Athanasious Faraone
Classics, Ancient Religion and Medicine ✦ The University of Chicago ✦ *f*
Hetty Goldman Member; additional funding provided by The Andrew W. Mellon Foundation

Klaus-Dietrich Fischer
Classics, History of Medicine ✦ Johannes Gutenberg-Universität Mainz ✦ *s*
Fritz Thyssen Stiftung Member

Norbert Frei
Modern History ✦ Friedrich-Schiller-Universität Jena
Fritz Thyssen Stiftung Member; additional funding provided by The Andrew W. Mellon Foundation

Jason Duane Geary
Musicology ✦ University of Michigan
Funding provided by The Herodotus Fund

Ralph Ghadban
Muslim Migration in the West ✦ Evangelische Fachhochschule Berlin
Robert Bosch Stiftung Member

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Russian and East European History and Politics ✦ University of Michigan ✦ *s*
Funding provided by the Fund for Historical Studies and The Andrew W. Mellon Foundation

Regina Grafe
Spanish Economic History ✦ Northwestern University
Funding provided by The Andrew W. Mellon Foundation Fellowships for Assistant Professors

Kathryn Gutzwiller
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Hetty Goldman Member

Peter Isaac Holquist
Russian History ✦ University of Pennsylvania
Edwin C. and Elizabeth A. Whitehead Fellow

Carl Augustus Huffman
Classics, Ancient Philosophy ✦ DePauw University ✦ *v, s*

Masoud Jafarijaze
Islamic History ✦ Institute for Advanced Study ✦ *a, f*

Peter Grant Jeffery
Musicology, Liturgiology • Princeton University ✦ *v*

Paul W. Kroll
Chinese Literature ✦ University of Colorado
Funding provided by the National Endowment for the Humanities and The Andrew W. Mellon Foundation

Ulrich Lehner
Enlightenment, History of Religious Thought, Monasticism ✦ Marquette University ✦ *s*
Funding provided by The Herodotus Fund

Miaw-fen Lu
Chinese Intellectual and Cultural History ✦ Institute of Modern History, Academia Sinica ✦ *v*

Melissa Macauley
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The Starr Foundation East Asian Studies Endowment Fund Member

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History and Philosophy of Logic and Mathematics ✦ University of California, Berkeley ✦ *s*
Funding provided by the Otto Neugebauer Fund

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Chinese History ✦ The George Washington University ✦ *f*
The Starr Foundation East Asian Studies Endowment Fund Member

Margaret Dorothea Mehl
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Edward T. Cone Member in Music Studies

Brigitte Leonie Isabelle Meijns
Medieval History ✦ Katholieke Universiteit Leuven and Fund for Scientific Research, Flanders ✦ *v, s*

Kristina Milnor
Classics ✦ Barnard College
Frederick Burkhardt Fellowship funded by The American Council of Learned Societies

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Felix Gilbert Member

Samuel Moyn
Modern European History ✦ Columbia University
Frederick Burkhardt Fellowship funded by The American Council of Learned Societies

Angelika Neuwirth
Near Eastern Studies ✦ Freie Universität Berlin ✦ *s*
Agnes Gund and Daniel Shapiro Member

Pantelis Nigdelis
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Funding provided by the Association of Members of the Institute for Advanced Study (AMIAS)

Martti Nissinen
Old Testament Studies, Assyriology ✦ University of Helsinki
William D. Loughlin Member

Emmanuel Papoutsakis
Syriac Christianity, Late Antiquity ✦ Princeton University
Ralph E. and Doris M. Hansmann Member

Daniel Thomas Potts
Comparative History, Archaeology, Anthropology ✦ The University of Sydney
Funding provided by the National Endowment for the Humanities and The Andrew W. Mellon Foundation

Martin J. Powers
History of Chinese Art ✦ University of Michigan
The Gladys Krieble Delmas Foundation Member; additional funding provided by The Andrew W. Mellon Foundation

François P. Rigolot
Renaissance Literature ✦ Princeton University ✦ *v*

Sabine Schmidtke
Islamic Studies ✦ Freie Universität Berlin
Gerda Henkel Stiftung Member

Hamish Marshall Scott
Early Modern History ✦ University of St Andrews
Funding provided by an endowment established with a gift from The Andrew W. Mellon Foundation

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Elizabeth and J. Richardson Dilworth Fellow in Historical Studies

Julia M. H. Smith
Medieval History ✦ University of Glasgow
George William Cottrell, Jr. Member

Lynn Staley
Medieval Studies ✦ Colgate University
Elizabeth and J. Richardson Dilworth Fellow in Historical Studies; additional funding provided by The Andrew W. Mellon Foundation

Zoltan Szombathy
Arabic Studies ✦ Eötvös Loránd University
Friends of the Institute for Advanced Study Member

Giovanni Tarantino
Early Modern European History ✦ Monash University
Hans Kohn Member

Gerhard Thür
Ancient Greek Law ✦ Karl-Franzens-Universität Graz ✦ *v, s*

Stephen V. Tracy
Greek History and Epigraphy ✦ The American School of Classical Studies at Athens ✦ *v*

Erling Johannes von Mende
East Asian History ✦ Technische Universität Berlin
Funding provided by an endowment established with a gift from The Andrew W. Mellon Foundation

RECORD OF EVENTS

September 29
Historical Studies Lunchtime Colloquium ✦ *First Term Introductions*

September 30
East Asian Studies Seminar ✦ *Two Court Scenes, with Poems, from the Early Reign of Tang Xuanzong* ✦ **Paul W. Kroll,** University of Colorado; Member, School of Historical Studies

October 6
Historical Studies Lunchtime Colloquium ✦ *A Civilized State? Imperial Russia's Role in Codifying the International Law of War 1868–1917* ✦ **Peter Isaac Holquist**, University of Pennsylvania; Member, School of Historical Studies

October 7
East Asian Studies Seminar ✦ *Local Bullies and Armed Force Entrepreneurs: Militia Leadership in Republican China* ✦ **Edward Allen McCord**, The George Washington University; Member, School of Historical Studies

October 8
Medieval Table Lunchtime Colloquium ✦ *A Medieval Jewish View of Catholic Liturgy* ✦ **Peter Grant Jeffery**, Princeton University; Visitor, School of Historical Studies

October 13
Historical Studies Lunchtime Colloquium ✦ *Music as Mediation in the German Revival of Greek Tragedy* ✦ **Jason Duane Geary**, University of Michigan; Member, School of Historical Studies

October 15
Medieval Table Lunchtime Colloquium ✦ *The Old English Exeter Relic List* ✦ **Julia M. H. Smith**, University of Glasgow; Member, School of Historical Studies

Modern History (Pre-1900) Historians Workshop ✦ *Radical Enlightenment, Moderate Enlightenment, Counter-Enlightenment* ✦ **Jonathan Israel**, Professor, School of Historical Studies

October 20
Historical Studies Lunchtime Colloquium ✦ *The Rise of Religious Toleration: 1500–1800* ✦ **Edwin Curley**, University of Michigan; Member, School of Historical Studies

October 22
Medieval Table Lunchtime Colloquium ✦ *Dancing Horses in Medieval China, at the Court of Tang Xuanzong (712–756)* ✦ **Paul W. Kroll**, University of Colorado; Member, School of Historical Studies

October 27
Historical Studies Lunchtime Colloquium ✦ *The Plow that Broke the Steppes: Agriculture and the Environment on the Russian Plains* ✦ **David Moon**, Durham University; Member, School of Historical Studies

October 28
East Asian Studies Seminar ✦ *The Rediscovery of Zhang Zai (1020–1077) in the Ming-Qing Transition* ✦ **Miaw-fen Lu**, Academia Sinica; Visitor, School of Historical Studies

October 29
Discussion and Reception at Princeton University's Index of Christian Art ✦ *An Introduction to the Index* ✦ **Colum Hourihane**, Princeton University

Ancient Studies Seminar ✦ *An Expulsion Rite and a Medical Map: Inscription and Miniaturization on the Damnameneus Gemstone from Anapa* ✦ **Christopher Athanasious Faraone**, The University of Chicago; Member, School of Historical Studies

November 3
Historical Studies Lunchtime Colloquium ✦ *The Return of Nobility in Early Modern Europe* ✦ **Hamish Marshall Scott**, University of St Andrews; Member, School of Historical Studies

November 4
East Asian Studies Seminar ✦ *Lantern Bearers—Yila/Yelü Lü and Some Other Qidan under Jurchen Rule* ✦ **Erling Johannes von Mende**, Technische Universität Berlin; Member, School of Historical Studies

November 6
Art History Seminar ✦ *Introductory Discussion*

November 10
Historical Studies Lunchtime Colloquium ✦ *Art and Expression in the China/Europe Culture Wars: A Circuitous Tale* ✦ **Martin J. Powers**, University of Michigan; Member, School of Historical Studies

November 12
Medieval Table Lunchtime Colloquium, Roundtable Discussion ✦ *Rankings of Academic Journals* ✦ Led by **Julia M. H. Smith**, University of Glasgow; Member, School of Historical Studies

Modern History (Pre-1900) Historians Workshop ✦ *Locke and Toleration* ✦ **Edwin Munson Curley**, University of Michigan; Member, School of Historical Studies

Ancient Studies Seminar ✦ *Recent Research at Qaleh Kali in Southwestern Iran: Tricky Toponyms, Achaemenid Administration, the Royal Road, and Alexander's Route from Susa to Persepolis* ✦ **Daniel Thomas Potts**, The University of Sydney; Member, School of Historical Studies

November 14

School of Historical Studies Lecture ✦ *Sense of the State and Critique of Political Power in Late Imperial China* ✦ **Pierre-Étienne Will**, Collège de France

November 17

Historical Studies Lunchtime Colloquium ✦ *Artistic Exchange in the Bronze-Age Mediterranean World* ✦ **Joanna S. Smith**, Columbia University; Member, School of Historical Studies

November 18

East Asian Studies Seminar ✦ *Reluctant Revelation through Disinterested Disclosure: Reading Xiao Tong's (501–531) Preface to* Tao Yuanming ji ✦ **Wang Ping**, Princeton University

November 19

Medieval Table Lunchtime Colloquium ✦ *The Memorbuch of Nuremberg* ✦ **Elisheva Baumgarten**, Bar Ilan University; Member, School of Historical Studies

November 24

Historical Studies Lunchtime Colloquium ✦ *Pompeian Graffiti, Literacy, and Authority* ✦ **Kristina Milnor**, Barnard College; Member, School of Historical Studies

November 25

East Asian Studies Seminar ✦ *Starting Late: Narratives of Simplicity, Artifice, and Decline in Early Japanese and Roman Literary Cultures* ✦ **Wiebke Denecke**, Barnard College; Member, School of Historical Studies

December 1

Historical Studies Lunchtime Colloquium ✦ *Ben Sira, Love Lyrics, and Prophecy* ✦ **Martti Nissinen**, University of Helsinki; Member, School of Historical Studies

December 3

Medieval Table Lunchtime Colloquium ✦ *Living the Psalms with the Nuns of Regina Laudis* ✦ **Margot Fassler**, Yale University and Center of Theological Inquiry

December 8

Historical Studies Lunchtime Colloquium ✦ *Thinking with Martyrs in the Early Middle Ages, ca. 500–1100* ✦ **Julia M. H. Smith**, University of Glasgow; Member, School of Historical Studies

December 10

Medieval Table Lunchtime Colloquium ✦ *Toldot Yeshu [The Life of Jesus]* ✦ **Yaacov Deutsch**, The Hebrew University of Jerusalem; Visitor, School of Historical Studies

Islamicist Seminar ✦ *Libertinism (Mujun) in Medieval Arabic Society and Literature* ✦ **Zoltan Szombathy**, Eötvös Loránd University; Member, School of Historical Studies

East Asian Studies Seminar ✦ *Do the Mongols Matter in Global History?* ✦ **Morris Rossabi**, Queens College and Columbia University

Art History Seminar ✦ *Apotheosis and Mediality in Bernini's Later Portrait Busts* ✦ **Damian Dombrowski**, Julius-Maximilians-Universität Würzburg; Member, School of Historical Studies

December 15

Historical Studies Lunchtime Colloquium ✦ *Gender and Piety: Religion and Practice in Medieval Jewish Society (c. 1050–1350)* ✦ **Elisheva Baumgarten**, Bar-Ilan University; Member, School of Historical Studies

December 16

East Asian Studies Seminar ✦ *Mendacity in the Archives: Migrants and the War on Drugs in China, 1819–1860* ✦ **Melissa Macauley**, Northwestern University; Member, School of Historical Studies

December 17

Modern History (Pre-1900) Historians Workshop ✦ *Reconstructing Past Environments: The Russian Steppes before the Plow* ✦ **David Moon**, Durham University; Member, School of Historical Studies

January 12

Historical Studies Lunchtime Colloquium ✦ *Second Term Introductions*

January 19

Historical Studies Lunchtime Colloquium ✦ *Legal Traditions in Mesopotamia and Ancient Israel* ✦ **Pamela Barmash**, Washington University in St. Louis; Member, School of Historical Studies

January 21

Medieval Table Lunchtime Colloquium ✦ *The Fragility of Religious Institutions* ✦ **Giles Constable**, Professor Emeritus, School of Historical Studies

Modern History (Pre-1900) Historians Workshop ✦ *The Consolidation of Aristocracy in Europe during the Long Seventeenth Century, ca. 1580–1720* ✦ **Hamish Marshall Scott**, University of St Andrews; Member, School of Historical Studies

Ancient Studies Seminar ✦ *No Place for a Woman: CIL 4. 5295 and Its Contexts* ✦ **Kristina Milnor**, Barnard College; Member, School of Historical Studies

January 26

Historical Studies Lunchtime Colloquium ✦ *About Flick: A German Tycoon During World War II and After* ✦ **Norbert Frei**, Friedrich-Schiller-Universität Jena; Member, School of Historical Studies

January 28

Medieval Table Lunchtime Colloquium ✦ *Commercial Law in the Code of Moses Maimonides: The View from the Cairo Geniza* ✦ **Mark Cohen**, Princeton University

Ancient Studies Seminar ✦ *Moveable Palaces: Weaving Connections through Tapestries in the Ancient Mediterranean World* ✦ **Joanna S. Smith**, Columbia University; Member, School of Historical Studies

February 2

Historical Studies Lunchtime Colloquium ✦ *When Cultural Translation Works Both Ways: The Suzuki Method of Violin Instruction in Japan and Germany* ✦ **Margaret Dorothea Mehl**, University of Copenhagen; Member, School of Historical Studies

February 4

Medieval Table Lunchtime Colloquium ✦ *Heavenly Medicine vs. Earthly Medicine in the Preface to Germany's Oldest Medical Book (ca. 800)* ✦ **Klaus-Dietrich Fischer**, Johannes Gutenberg-Universität Mainz; Member, School of Historical Studies

February 9

Historical Studies Lunchtime Colloquium ✦ *"Style" in History and Philosophy of Mathematics* ✦ **Paolo Mancosu**, University of California, Berkeley; Member, School of Historical Studies

February 11

Medieval Table Lunchtime Colloquium ✦ *Recent Trends in History Writing: A Discussion of the* Daedalus *Article from December 2008* ✦ **Caroline Walker Bynum**, Professor, School of Historical Studies

Islamicist Seminar ✦ *Ibn Hazm on the Purity of Dogs* ✦ **Camilla Adang**, Tel Aviv University

February 18

Medieval Table Lunchtime Colloquium ✦ *The Transformation of the Institution of Lay Advocacy in the North of France and the Religious Policy of the Counts of Flanders (Ninth to Twelfth Century)* ✦ **Brigitte Leonie Isabelle Meijns**, Katholieke Universiteit Leuven and Fund for Scientific Research, Flanders; Visitor, School of Historical Studies

February 23
Historical Studies Lunchtime Colloquium ✦ *Enlightenment Behind Monastery Walls* ✦ **Ulrich Lehner**, Marquette University; Member, School of Historical Studies

February 25
Modern History (Pre-1900) Historians Workshop ✦ *The* Chinese Philosopher *in Enlightenment England* ✦ **Martin J. Powers**, University of Michigan; Member, School of Historical Studies

Art History Seminar ✦ *How to Survive Civilization, or What I Learned from Dada* ✦ **Hal Foster**, Princeton University

February 27
Ancient Studies Seminar ✦ *Aristoxenus's "Pythagorean Precepts": Forgery or Genuine Account of Pythagorean Ethics in the Fourth Century BCE?* ✦ **Carl Augustus Huffman**, DePauw University; Visitor, School of Historical Studies

March 4
Medieval Table Lunchtime Colloquium ✦ *Aristotle's "Poetics" in the Arabic Medieval Tradition* ✦ **Luis Xavier López-Farjeat**, Universidad Panamericana, Mexico, and Center of Theological Inquiry

March 6
Ancient Studies Seminar ✦ *Athenian Law of Guardianship in the New Hyperides Fragment/ Against Timandros* ✦ **Gerhard Thür**, Karl-Franzens-Universität Graz; Visitor, School of Historical Studies

March 9
Historical Studies Lunchtime Colloquium ✦ *Crofts and Lofts—Images of Nation in the Fourteenth Century* ✦ **Lynn Staley**, Colgate University; Member, School of Historical Studies

March 11
Medieval Table Lunchtime Colloquium ✦ *More Crofts and Lofts—Images of Nation in the Fourteenth Century* ✦ **Lynn Staley**, Colgate University; Member, School of Historical Studies

March 18
Medieval Table Lunchtime Colloquium ✦ *Sedulius Scottus's Poetic Description (Carm. 31) of a Mid-Ninth-Century Pharmacy in Liège* ✦ **Klaus-Dietrich Fischer**, Johannes Gutenberg-Universität Mainz; Member, School of Historical Studies

Islamicist Seminar ✦ *An Anonymous Jewish Refutation of Samaw'al al-Maghribi's Ifham al-yahud'* ✦ **Sabine Schmidtke**, Freie Universität Berlin; Member, School of Historical Studies

Modern History (Pre-1900) Historians Workshop ✦ *What Is Catholic Enlightenment* ✦ **Ulrich Lehner**, Marquette University; Member, School of Historical Studies

March 23
Historical Studies Lunchtime Colloquium ✦ *How Human Can God Be? Islamic Law in the West* ✦ **Ralph Ghadban**, Evangelische Fachhochschule Berlin; Member, School of Historical Studies

March 25
Medieval Table Lunchtime Colloquium ✦ *Moments of Frankishness in the Carolingian Period: Identity Politics and Identity Crisis in the Royal Frankish Annals* ✦ **Helmut Reimitz**, Princeton University

Islamicist Seminar ✦ *Relational Inferences and the Question of Decline in Arabic Logic* ✦ **Khaled El-Rouayheb**, Harvard University; Member, School of Historical Studies

March 27
Ancient Studies Seminar ✦ *The "Gens Varinia" in Eastern Macedonia. Observations on the Serres Decree SEG LIV, 617* ✦ **Pantelis Nigdelis**, Aristotle University of Thessaloniki; Member, School of Historical Studies

March 30
Historical Studies Lunchtime Colloquium ✦ *From Sedentism to Nomadism: Transformations in Iranian History and Prehistory* ✦ **Daniel Thomas Potts**, The University of Sydney; Member, School of Historical Studies

April 1
Medieval Table Lunchtime Colloquium, Roundtable Discussion ✦ *The Year at IAS* ✦ Led by **Caroline Walker Bynum**, Professor, School of Historical Studies

April 3
Ancient Studies Seminar ✦ *Ex occidente lux—Greek Medical Works as Represented in Pre-Salernitan (i.e. pre-1100) Latin Translations* ✦ **Klaus-Dietrich Fischer**, Johannes Gutenberg-Universität Mainz; Member, School of Historical Studies

April 15
Modern History (Pre-1900) Historians Workshop ✦ *Gordon and Republicanism* ✦ **Giovanni Tarantino**, Monash University; Member, School of Historical Studies

Art History Seminar ✦ *On Rilke's Cézanne* ✦ **Brigid Doherty**, Princeton University

May 11
Modern History (Pre-1900) Historians Workshop ✦ *Distant Tyranny: Trade, Power, and Backwardness in Spain, 1650–1820* ✦ **Regina Grafe**, Northwestern University; Member, School of Historical Studies

June 1
Qur'an Colloquium ✦ *World of the Bible—Arabian Context: Competing References for "Amthal" in the Qur'an* ✦ **Michael Marx**, Berlin-Brandenburgische Akademie der Wissenschaften ✦ *Some Passages in the Qur'an with Parallels in the Bible* ✦ **François de Blois**, School of Oriental and African Studies, University of London ✦ *Q 12 in Light of Syriac Homilies on Joseph* ✦ **Joseph Witztum**, Princeton University ✦ *A Close Reading of Surah 53* ✦ **Nicolai Sinai**, Berlin-Brandenburgische Akademie der Wissenschaften

June 2
Qur'an Colloquium ✦ *Mani and Muhammad: Reviewing Some Textual Echoes* ✦ **John Reeves**, University of North Carolina at Charlotte ✦ *The Qur'anic Satan and the Book of Job* ✦ **Adam Silverstein**, University of Oxford ✦ *Qur'anic Cosmology and the Serpent's Curse* ✦ **Gabriel Reynolds**, University of Notre Dame ✦ *Paradise, Ephraem the Syrian and the Arabic Qur'an* ✦ **Sidney Griffith**, The Catholic University of America

June 3
Lecture ✦ *The Late Antique Qur'an: Jewish-Christian Liturgy, Hellenic Rhetoric, and Arabic Language* ✦ **Angelika Neuwirth**, Freie Universität Berlin; Member, School of Historical Studies

ANDREA KANE

Professor Jean Bourgain (left) with Visiting Professor Russell Impagliazzo during a mini-workshop on pseudorandomness in mathematics and computer science

The School of Mathematics

Faculty

Enrico Bombieri, IBM von Neumann Professor

Jean Bourgain

Phillip A. Griffiths

Robert MacPherson, Hermann Weyl Professor

Peter Sarnak

Thomas Spencer

Vladimir Voevodsky

Avi Wigderson, Herbert H. Maass Professor

Professors Emeriti

Pierre Deligne

Robert P. Langlands

During the 2008–09 academic year, the School of Mathematics held a special program on "Geometric Partial Differential Equations."

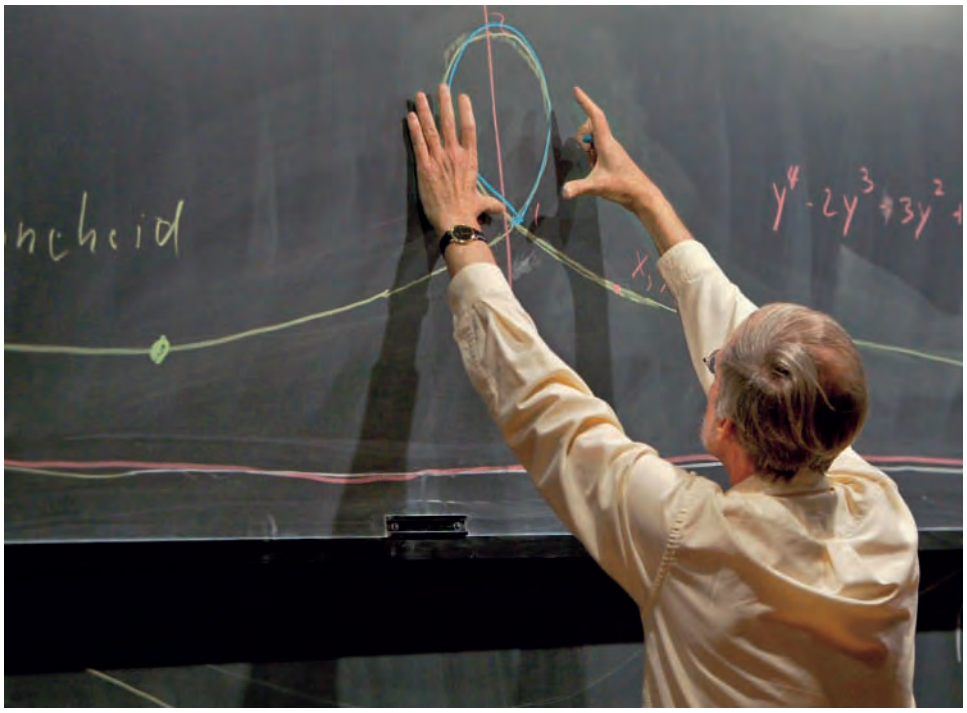
GEOMETRIC PARTIAL DIFFERENTIAL EQUATIONS

Professor Alice Chang of Princeton University organized the special program for the year and was the School's Distinguished Visiting Professor for 2008–09.

The main theme of the program was to combine the latest developments in geometry and fully nonlinear partial differential equations (PDE). The topics were: study of the eigenvalues of Ricci curvatures using methods in fully nonlinear PDE, mass transport problems, free boundary value problems, the role played by the fractional Laplacian operators, and connecting developments in these problems in the geometric setting. The major activities of the special year consisted of six mini-courses, three in each term, during which leading experts in the field each gave four lectures on a specific topic. Each course consisted of four one-hour lectures. During the first term, Member Matthew Gursky gave a course on "Fully Nonlinear Equations in Conformal Geometry"; Member Andrea Malchiodi on "Q-curvature, Analytic and Geometric Structures"; and Member Neil Trudinger on "Mass Transport Problem."

Courses during the second term were given by Member Luis Caffarelli on "Issues in Homogenization for Problems with Nondivergence Structure"; Member Cédric Villani on "Curvature and Regularity of Optimal Transport"; and Blaine Lawson on "Dirichlet Duality and the Nonlinear Dirichlet Problem Part I: For Domains in R^n" and "Part II: On Riemannian Manifolds."

Year-long weekly seminars were held, usually about two talks per week, during which either Institute Members presented their own research work or an invited visitor gave a guest lecture. The von Neumann Lecture was given in the first term by leading geometer Rich Schoen from Stanford University. Gerhard Huisken of the Max-Planck Institute for Gravitational Physics in Germany gave the Marston Morse Lecture in the second term.



ANDREA KANE

Professor Robert MacPherson spoke about "Geometry in Bures and Princeton" during a fiftieth anniversary celebration of the founding of the Institut des Hautes Études Scientifiques in France, held at the Institute in November.

A five-day workshop was held during February 23–28 with twenty-one lectures and a large number of people from Princeton University and neighboring institutions in attendance.

Member Paul Yang of Princeton University organized lengthy graduate-student learning seminars that met once or twice a week. These seminars were well attended by Institute Members and students from Princeton and nearby universities.

During the second term, Members Irene Gamba (The University of Texas at Austin), Michael Sigal (University of Toronto), and Cédric Villani (École Normale Supérieure de Lyon) with Professor **Thomas Spencer** organized mathematical physics seminars that usually met once or twice per week. Among the featured topics were nonequilibrium statistical mechanics, optimal transport, rigorous renormalization methods, soliton dynamics, and critical temperatures for Bose-Einstein condensation. Both classical and quantum aspects of statistical mechanics were well represented. Toward the end of the term, Professor Peter Goldreich and Richard Black Professor Scott Tremaine of the School of Natural Sciences presented the inspiring and interactive lectures "Conversations in Astrophysics" and "Stability of the Solar System."

There was a "Workshop on Topology: Identifying Order in Complex Systems" organized by **Robert MacPherson**, Hermann Weyl Professor, and Konstantin Mischaikow of Rutgers, the State University of New Jersey. The seminars met on the first Wednesday of each month during the second term and alternated between the campuses of the Institute and Rutgers. There was a mix of lectures by topologists, by scientists in fields with topological applications, and by individuals doing topological computations. The lectures were aimed at a broad interdisciplinary audience and were intended to provide a forum for discussing current and future applications of topological techniques, both theoretical and computational. Lecturers were Shmuel Weinberger of the University of Chicago; Konstantin Mischaikow of Rutgers; Marian Mrozek of Jagiellonian University, Krakow; Thomas Wanner of George Mason University; Carina Curto of the Courant Institute of Mathematical Sciences, New York University; Robert Ghrist and Randal Kamien of the University of Pennsylvania; Michael Schatz of the Georgia Institute of Technology; Stephen Smale of the Toyota Technological Institute at Chicago; and John Harer and Herbert Edelsbrunner of Duke University.

During the course of the year, there were seminars on other subjects as well. The computer science and discrete mathematics seminar of **Avi Wigderson**, Herbert H. Maass Professor, and Visiting Professors Noga Alon and Russell Impagliazzo met twice a week. The number theory seminar, which is organized jointly with Princeton University, met weekly.

In October 2008, there was a two-day conference on "Algebraic and Differential Geometry: A Conference in Celebration of the Seventieth Birthday of Phillip Griffiths." In November, **Enrico Bombieri**, IBM von Neumann Professor, received an honorary doctorate degree from the Eidgenössische Technische Hochschule Zürich. Also in November, the Institute hosted a fiftieth anniversary celebration of the founding of the Institut des Hautes Études Scientifiques in France for which MacPherson gave the talk "Geometry in Bures and Princeton."

In March 2009, Professor **Jean Bourgain** gave the public lecture "Search for Randomness." In May, Professor **Phillip Griffiths**, Chair of the Science Initiative Group, gave the public lecture "Science and Technology in the Developing World: The Institute's Role."

Professor Emeritus **Pierre Deligne** was elected to the American Philosophical Society. MacPherson was awarded the Eidgenössische Technische Hochschule Zürich's inaugural Heinz-Hopf Prize for his "fundamental and outstanding contributions in topology and geometry." In October 2009, he will deliver two lectures in Zurich at the award ceremony.

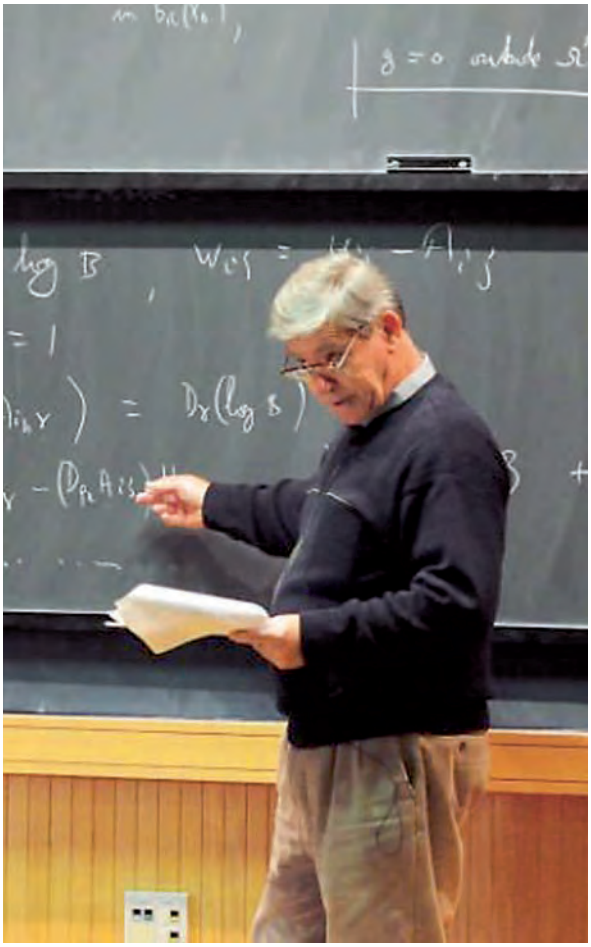
Wigderson, together with former Members Omer Reingold and Salil Vadhan, received the 2009 Gödel Prize presented by the Special Interest Group for Algorithms and Computation Theory and the European Association for Theoretical Computer Science. They were cited for "outstanding papers in theoretical computer science" at the Association for Computing Machinery Symposium on the Theory of Computing in June.

A mix of lectures by topologists, by scientists in fields with topological applications, and by individuals doing topological computations were aimed at a broad interdisciplinary audience and were intended to provide a forum for discussing current and future applications of topological techniques, both theoretical and computational.

Attendees (left) at a conference on algebraic and differential geometry held in honor of the seventieth birthday of Professor Phillip Griffiths (right)

ALL PHOTOS CLIFF MOORE

KATE ABLUTZ



BENTLEY DREZNER

CLIFF MOORE

Clockwise from top left: Member Luis Caffarelli (with chalk), Member Neil Trudinger, and Professor Avi Wigderson (on stage)

MEMBERS AND VISITORS

f First Term ✦ *s* Second Term ✦ *v* Visitor ✦ *dvp* Distinguished Visiting Professor ✦ *vp* Visiting Professor ✦ *vri* Veblen Research Instructorship ✦ *vnf* von Neumann Fellowship

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Funding provided by The Ambrose Monell Foundation and the National Science Foundation

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Funding provided by the National Science Foundation

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Funding provided by the National Science Foundation

Michael Zieve
Number Theory and Theoretical Computer Science ✦ Institute for Advanced Study

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October 13

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Algebraic and Differential Geometry: A Conference in Celebration of the Seventieth Birthday of Phillip Griffiths (http://math.ias.edu/pg70)

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Algebraic and Differential Geometry: A Conference in Celebration of the Seventieth Birthday of Phillip Griffiths (http://math.ias.edu/pg70)

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Members Seminar ✦ *The Topography of Random Waves* ✦ **Zeev Rudnick**, Tel Aviv University; Member, School of Mathematics

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Joint IAS/PU Number Theory Seminar ✦ *Weight Cycling and Serre-Type Conjectures* ✦ **Florian Herzig**, Northwestern University

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Ruth and Irving Adler Lecture ✦ *Lorenz Knots and Links* ✦ **Joan Birman**, Columbia University

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IHÉS Fiftieth Anniversary Celebration ✦ *The Constants of Nature* ✦ **Thibault Damour**, Institut des Hautes Études Scientifiques ✦ *Geometry in Bures and Princeton* ✦ **Robert MacPherson**, Hermann Weyl Professor, School of Mathematics

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Computer Science/Discrete Math I ✦ *Almost-Natural Proofs* ✦ **Timothy Chow**, Institute for Defense Analyses, Princeton

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Hermann Weyl Lecture ✦ *Riemannian Manifolds of Positive Curvature I* ✦ **Richard Schoen**, Stanford University

November 13

Hermann Weyl Lecture ✦ *Riemannian Manifolds of Positive Curvature II* ✦ **Richard Schoen**, Stanford University

Joint IAS/PU Number Theory Seminar ✦ *Faltings' Height of CM Cycles and Derivative of L-Functions* ✦ **Tong Hai Yang**, University of Wisconsin–Madison

November 14

Shimura Varieties and Trace Formula Seminars ✦ *A Global Analogue of Springer Representations* ✦ **Zhiwei Yun**, Princeton University ✦ *Twisted Relative Trace Formulae with a View Toward Unitary Groups I and II* ✦ **Jayce Getz**, Princeton University; Veblen Research Instructorship, School of Mathematics

November 17

Computer Science/Discrete Math I ✦ *Scalably Scheduling Processes with Arbitrary Speedup Curves* ✦ **Jeff Edmonds**, York University, Toronto

Members Seminar ✦ *Spherical Cubes and Rounding in High Dimensions* ✦ **Anup Rao**, Member, School of Mathematics

November 18

Computer Science/Discrete Math II ✦ *Complexity of Equational Proof Systems* ✦ **Pavel Hrubes**, Member, School of Mathematics

Mini-Course in Geometric PDE ✦ *Optimal Transportation and Nonlinear Elliptic PDE* ✦ **Neil Trudinger**, The Australian National University; Member, School of Mathematics

November 20

Geometric PDE Seminar ✦ *Special Lagrangian Equations* ✦ **Micah Warren**, Princeton University

Joint IAS/PU Number Theory Seminar ✦ *Comparison Isomorphisms for p-adic Formal Schemes and Applications* ✦ **Adrian Iovita**, McGill University

November 21

Shimura Varieties and Trace Formula Seminars ✦ *Twisted Relative Trace Formulae with a View Toward Unitary Groups* ✦ **Jayce Getz**, Princeton University; Veblen Research Instructorship, School of Mathematics ✦ *Reduction Theory for p-adic Moduli Spaces of Abelian Varieties and p-Divisible Groups* ✦ **Laurent Fargues**, CNRS and Université Paris-Sud 11; von Neumann Fellowship, School of Mathematics

November 24

Computer Science/Discrete Math I ✦ *Large Induced Trees in K_r-Free Graphs* ✦ **Jacob Fox**, Princeton University

Members Seminar ✦ *Mathematical Questions Arising from Bose-Einstein Condensation* ✦ **Israel Michael Sigal**, University of Toronto; Member, School of Mathematics

Special Computer Science/Discrete Math Seminar ✦ *Quantum Algorithms Using the Curvelet Transform* ✦ **Yi-Kai Liu**, California Institute of Technology

November 25

Computer Science/Discrete Math II ✦ *Complexity of Equational Proof Systems* ✦ **Pavel Hrubes**, Member, School of Mathematics

Geometric PDE Seminar ✦ *Convexity and Partial Convexity of the Solution of Elliptic Partial Equation* ✦ **Xinan Ma**, University of Science and Technology of China; Member, School of Mathematics

November 26

Guest Lecture in Geometric PDE ✦ *Second Order Parabolic and Elliptic Equations with Very Rough Coefficients* ✦ **Hongjie Dong**, Brown University; Member, School of Mathematics

December 1

Computer Science/Discrete Math I ✦ *Derandomizing Algorithms on Product Distributions* ✦ **Avinatan Hassidim**, Massachusetts Institute of Technology

Members Seminar ✦ *Trace Formulae and Locally Symmetric Spaces* ✦ **Jayce Getz**, Princeton University; Veblen Research Instructorship, School of Mathematics

Special Joint IAS/PU Number Theory Seminar ✦ *Multiplicity One Theorems—A Uniform Proof* ✦ **Avraham Aizenbud**, Weizmann Institute of Science

December 2

Computer Science/Discrete Math II ✦ *Combinatorial Reasoning in Information Theory* ✦ **Noga Alon**, Tel Aviv University; Visiting Professor, School of Mathematics

Geometric PDE Seminar ✦ *The Global Smooth Effects and Well Posedness for the Derivative Nonlinear Schrödinger Equation with Small Rough Data* ✦ **Baoxiang Wang**, Beijing University

December 3

Pseudorandomness in Mathematics and Computer Science Mini-Workshops ✦ *Exponential Sums, Equidistribution and Pseudorandomness* ✦ **Jean Bourgain**, Professor, School of Mathematics ✦ *When Do Sparse Sets Have Dense Models?* ✦ **Russell Impagliazzo**, University of California, San

Diego; Visiting Professor, School of Mathematics ✦ *Substitution Sequences at Primes* ✦ **Peter Sarnak**, Professor, School of Mathematics ✦ *Randomness Extractors* ✦ **Avi Wigderson**, Herbert H. Maass Professor, School of Mathematics

December 4

Geometric PDE Seminar ✦ *The Composite Membrane Problem* ✦ **Sagun Chanillo**, Rutgers, The State University of New Jersey; Member, School of Mathematics

Joint IAS/PU Number Theory Seminar ✦ *Mock Modular Forms* ✦ **Sander Zwegers**, University College Dublin

December 5

Shimura Varieties and Trace Formula Seminars ✦ *Formal Degrees and Adjoint Gamma Factors* ✦ **Atsushi Ichino**, Osaka City University; Member, School of Mathematics ✦ *On the Cohomology of Some Non-Compact Shimura Varieties III: Applications* ✦ **Sophie Morel**, Member, School of Mathematics

December 8

Computer Science/Discrete Math I ✦ *Convergent Sequences of Sparse Graphs* ✦ **Bela Bollobas**, University of Cambridge and University of Memphis

Members Seminar ✦ *The Sum of Squares of the Wavelengths of a Surface* ✦ **Kate Okikiolu**, University of California, San Diego; Member, School of Mathematics

Special Computer Science/Discrete Math Seminar ✦ *Cutoff Phenomena for Random Walks on Random Regular Graphs* ✦ **Eyal Lubetzky**, Microsoft Research

December 9

Computer Science/Discrete Math II ✦ *Extractors for Varieties* ✦ **Zeev Dvir**, Member, School of Mathematics

Geometric PDE Seminar ✦ *Dual Legendrian Variations in Contact Form Geometry* ✦ **Abbas Bahri**, Rutgers, The State University of New Jersey

December 11

Joint IAS/PU Number Theory Seminar ✦ *Langlands Functoriality and the Inverse Problem in Galois Theory* ✦ **Gordan Savin**, University of Utah

December 15

Computer Science/Discrete Math I ✦ *Direct-Product Testing and a New 2-Query PCPs* ✦ **Valentine Kabanets**, Simon Fraser University

December 16

Computer Science/Discrete Math II ✦ *Extractors for Varieties* ✦ **Zeev Dvir**, Member, School of Mathematics

Geometric PDE Seminars ✦ *Differential Complexes in Conformal Geometry* ✦ **Ashwin Rod Gover**, The University of Auckland; Member, School of Mathematics ✦ *Existence and Uniqueness of Meissner State Solutions to Nonselfdual Chern-Simons-Higgs Equation* ✦ **Xiaodong Yan**, University of Connecticut; Member, School of Mathematics

December 18

Geometric PDE Seminars ✦ *On Neck Pinching under Mean Curveature Flow* ✦ **Israel Michael Sigal**, University of Toronto; Member, School of Mathematics ✦ *Conformal Geometry of Differential Equations* ✦ **Pawel Nurowski**, Stony Brook University, The State University of New York

January 12

Members Seminar ✦ *Expansion in Linear Groups and Applications* ✦ **Jean Bourgain**, Professor, School of Mathematics

January 13

Geometric PDE Seminars ✦ *Blow-up Profile for Q-Curvature Equations* ✦ **Yongzhong Xu**, Member, School of Mathematics ✦ *Minimally Invasive Surgery for Ricci Flow Singularities* ✦ **Don Knopf**, The University of Texas at Austin

January 15

Mini-Course in Geometric PDE ✦ *Issues in Homogenization for Problems with Nondivergence Structure* ✦ **Luis Caffarelli**, The University of Texas at Austin; Member, School of Mathematics

January 19

Computer Science/Discrete Math I ✦ *Noise-Resilient Group Testing: Limitations and Constructions* ✦ **Mahdi Cheraghchi**, École Polytechnique Fédérale de Lausanne

Members Seminar ✦ *Nonlinear Problems for Nonlocal Diffusions* ✦ **Luis Caffarelli**, The University of Texas at Austin; Member, School of Mathematics

January 20

Computer Science/Discrete Math II ✦ *Resilient and Equilibrium-Less Mechanism Design* ✦ **Silvio Micali** and **Paul Valiant**, Massachusetts Institute of Technology

Geometric PDE Seminars ✦ *Fractional Diffusion Limit for Kinetic Equations* ✦ **Antoine Mellet**, University of Maryland ✦ *Non-Local Minimal Surfaces* ✦ **Jean-Michel Roquejoffre**, Institut de Mathématiques, Université Paul Sabatier

January 22

Mini-Course in Geometric PDE ✦ *Issues in Homogenization for Problems with Nondivergence Structure* ✦ **Luis Caffarelli**, The University of Texas at Austin; Member, School of Mathematics

January 23

Special Geometric PDE Seminar ✦ *Local Polyhomogeneity and Unique Continuation for Einstein Metrics* ✦ **Olivier Biquard**, Université Pierre et Marie Curie

January 26

Computer Science/Discrete Math I ✦ *The Limits of Advice* ✦ **Scott Aaronson**, Massachusetts Institute of Technology

Members Seminar ✦ *Hidden Structures in the Family of Convex Functions in R^n and the New Duality Transform* ✦ **Vitali Milman**, Tel Aviv University

January 27

Computer Science/Discrete Math II ✦ *The XOR Lemma—A Quarter Century of Proofs* ✦ **Avi Wigderson**, Herbert H. Maass Professor, School of Mathematics

January 28

Mathematical Physics Seminar ✦ *Large Deviations of the Current in Nonequilibrium Systems* ✦ **Thierry Jacques Bodineau**, École Normale Supérieure; Member, School of Mathematics

January 29

Joint IAS/PU Number Theory Seminar ✦ *The Subconvexity Problem for GL_2* ✦ **Philippe Michel**, École Polytechnique Fédérale de Lausanne

February 2

Computer Science/Discrete Math I ✦ *Toward a Calculus for Nonlinear Spectral Gaps* ✦ **Assaf Naor**, Courant Institute of Mathematical Sciences, New York University

Members Seminar ✦ *Pseudo-Hermitian Geometry in 3-D* ✦ **Paul Yang**, Princeton University; Member, School of Mathematics

February 3

Computer Science/Discrete Math II ✦ *Poly-Logarithmic Independence Fools ACO Circuits* ✦ **Mark Braverman**, Microsoft Research New England

Geometric PDE Seminars ✦ *Scalar Invariants for Even Dimensional Conformal Structures* ✦ **Kengo Hirachi**, The University of Tokyo; Member, School of Mathematics ✦ *Dispersion and Strichartz Type Estimates with No Loss for Schrödinger Equation in Trapping Geometries* ✦ **Colin Guillarmou**, CNRS and Université de Nice Sophia Antipolis; Member, School of Mathematics

February 4

Mathematical Physics Seminar ✦ *A Statistical Mechanics Model of Random Matrices* ✦ **Thomas Spencer**, Professor, School of Mathematics

Workshop on Topology: Identifying Order in Complex Systems ✦ *Homology and Data Samples* ✦ **Shmuel Weinberger**, The University of Chicago ✦ *Databases for Multiparameter Nonlinear Systems* ✦ **Konstantin Mischaikow**, Rutgers, The State University of New Jersey

February 5

Joint IAS/PU Number Theory Seminar ✦ *On the Andre-Oort Conjecture* ✦ **Bruno Klingler**, Institut de Mathématiques de Jussieu, Université Paris Diderot; von Neumann Fellowship, School of Mathematics

February 6

Mathematical Physics Seminar ✦ *Rigidity of Solutions for the Focusing Mass-Critical Nonlinear Schrödinger Equations* ✦ **Dong Li**, Member, School of Mathematics

February 9

Computer Science/Discrete Math I ✦ *On P vs. NP, Geometric Complexity Theory, and the Riemann Hypothesis* ✦ **Ketan Mulmuley**, The University of Chicago

Members Seminar ✦ *Isoperimetric and Concentration Inequalities and Their Applications* ✦ **Emanuel Milman**, Member, School of Mathematics

February 10

Computer Science/Discrete Math II ✦ *On P vs. NP, Geometric Complexity Theory, and the Riemann Hypothesis* ✦ **Ketan Mulmuley**, The University of Chicago

Geometric PDE Seminars ✦ *Asymptotic Curvature Decay of Bach-Flat Metrics* ✦ **Jeff Streets**, Princeton University ✦ *C^0 Estimates for Conformally Invariant Equations on Locally Conformally Flat Manifolds With Umbilic Boundary* ✦ **Hoai-Minh Nguyen**, Member, School of Mathematics

Special Analysis/Probability Seminar ✦ *Random Walk on a Surface Group* ✦ **Steve Lalley**, The University of Chicago

February 11

Computer Science/Discrete Math III ✦ *On P vs. NP, Geometric Complexity Theory, and the Riemann Hypothesis* ✦ **Ketan Mulmuley**, The University of Chicago

February 12

Mini-Course in Geometric PDE ✦ *Curvature and Regularity of Optimal Transport* ✦ **Cédric Villani**, École Normale Supérieure de Lyon; Member, School of Mathematics

February 13

Mathematical Physics Seminars ✦ *New Rigorous Results about the Classical Microcanonical Ensemble* ✦ **Michael Kiessling**, Rutgers, The State University of New Jersey ✦ *Classical Inequalities for the Boltzmann Collision Operator with Applications to the Inhomogeneous Cauchy Boltzmann Problem* ✦ **Ricardo Alonso**, The University of Texas at Austin

February 16

Computer Science/Discrete Math I ✦ *Interesting Families of Permutations, an Algebraic Approach* ✦ **Ehud Friedgut**, The Hebrew University of Jerusalem; University of Toronto ✦ *Approximating Submodular Functions Everywhere* ✦ **Nick Harvey**, Microsoft Research, Massachusetts Institute of Technology

February 17

Computer Science/Discrete Math II ✦ *Algorithmic Versions of Dense Model Theorems* ✦ **Russell Impagliazzo**, University of California, San Diego; Visiting Professor, School of Mathematics

Geometric PDE Seminars ✦ *On a Conjecture of J. Serrin* ✦ **Haim Brezis**, Rutgers, The State University of New Jersey ✦ *Characterizations of Sobolev Spaces and Related Inequalities* ✦ **Hoai-Minh Nguyen**, Member, School of Mathematics

February 18

Combined Members Seminar and Mathematical Physics Seminar ✦ *Generalizations to Boltzmann-Maxwell Interaction Dynamics* ✦ **Irene Gamba**, The University of Texas at Austin; Member, School of Mathematics

February 19

Mini-Course in Geometric PDE ✦ *Curvature and Regularity of Optimal Transport* ✦ **Cédric Villani**, École Normale Supérieure de Lyon; Member, School of Mathematics

Joint IAS/PU Number Theory Seminar ✦ *Potential Automorphy for Certain Galois Representations to GL(n)* ✦ **Thomas Barnet-Lamb**, Harvard University

February 20

Mathematical Physics Seminar ✦ *Non-Spectral Poles in Asymptotically Hyperbolic Scattering* ✦ **C. Robin Graham**, University of Washington; Member, School of Mathematics

February 23

Computer Science/Discrete Math I ✦ *The Convergence of Bird Flocking* ✦ **Bernard Chazelle**, Princeton University

February 24

Computer Science/Discrete Math II ✦ *Algorithmic Versions of Dense Model Theorems* ✦ **Russell Impagliazzo**, University of California, San Diego; Visiting Professor, School of Mathematics

February 26

Joint IAS/PU Number Theory Seminar ✦ *Bounding Sup-Norms of Cusp Forms* ✦ **Valentin Blomer**, University of Toronto

February 27

Mathematical Physics Seminar ✦ *On Lyapunov Exponents of Green's Function for Diffusions and Random Walks in a Random Potential* ✦ **Elena Kosygina**, Baruch College and The Graduate Center, The City University of New York; Member, School of Mathematics

March 2

Computer Science/Discrete Math I ✦ *Finding Sparse Cuts Locally Using Evolving Sets* ✦ **Yuval Peres**, Microsoft Research, Redmond

Members Seminar ✦ *Categorical Probability Theory* ✦ **Vladimir Voevodsky**, Professor, School of Mathematics

March 3

Computer Science/Discrete Math II ✦ *Graph Homomorphisms with Complex Values: A Dichotomy Theorem* ✦ **Xi Chen**, Visitor, School of Mathematics

Geometric PDE Seminars ✦ *The Minimal-Mass Blow-up Solutions Of the Mass-Critical GKdV* ✦ **Shuanglin Shao**, Member, School of Mathematics ✦ *Asymptotics for Solutions to the σ_k-Yamabe Equation Near Isolated Singularity* ✦ **Zheng-Chao Han**, Rutgers, The State University of New Jersey

March 4

Mathematical Physics Seminar ✦ *Controlled Concentration and Long Time Behavior of the Critical Mass Keller-Segel Equation* ✦ **Eric Carlen**, Rutgers, The State University of New Jersey

Workshop on Topology: Identifying Order in Complex Systems ✦ **Rob Ghrist**, University of Pennsylvania ✦ *Using Homology to Characterize Laboratory Fluid Flows* ✦ **Mike Schatz**, Georgia Institute of Technology ✦ *Persistent Local Homology, Looking for Stratifications in Data* ✦ **John Harer**, University of Pennsylvania

March 5

Joint IAS/PU Number Theory Seminar ✦ *A "Relative" Langlands Program and Periods of Automorphic Forms* ✦ **Yiannis Sakellaridis**, University of Toronto

March 9

Computer Science/Discrete Math I ✦ *NP and MA Do Not Contain coNP in Multiparty Communication Complexity* ✦ **Dmitry Gavinsky**, NEC Laboratories America, Inc.

Members Seminar ✦ *The Noether Lefschetz Locus* ✦ **Ania Otwinowska**, Université Paris-Sud 11; Member, School of Mathematics

Special Mini-Course in Geometric PDE ✦ *Dirichlet Duality and the Nonlinear Dirichlet Problem Part I: For Domains in R^n; Part II: On Riemannian Manifolds* ✦ **H. Blaine Lawson, Jr.**, Stony Brook University, The State University of New York

March 10

Computer Science/Discrete Math II ✦ *Affine Extractors over Prime Fields* ✦ **Amir Yehudayoff**, Member, School of Mathematics

Geometric PDE Seminars ✦ *Einstein Metrics, Complex Surfaces, and Symplectic 4-Manifolds* ✦ **Claude LeBrun**, Stony Brook University, The State University of New York ✦ *Quadruple Junction Solutions in the Entire Three Dimensional Space* ✦ **Changfeng Gui**, University of Connecticut

March 11

Mathematical Physics Seminar ✦ *Smoothing Effects for the Full Landau Equation* ✦ **Robert Strain**, Harvard University

March 12

Joint IAS/PU Number Theory Seminar ✦ *The Rudnick-Sarnak Conjectures* ✦ **Roman Holowinsky**, University of Toronto

March 16

Computer Science/Discrete Math I ✦ *Simple Algorithms for Sequential K-Independent Graphs* ✦ **Allan Borodin**, University of Toronto, Canada

Members Seminar ✦ *Integral Conformal Invariants* ✦ **Alice Chang**, Princeton University; Distinguished Visiting Professor, School of Mathematics

March 17

Geometric PDE Seminar ✦ *Renormalized Volume Coefficients and Fully Nonlinear Equations* ✦ **C. Robin Graham**, University of Washington; Member, School of Mathematics

March 18

Marston Morse Lecture ✦ *Mean Curvature Flow with Surgeries* ✦ **Gerhard Huisken**, Max-Planck-Institut für Gravitationphysik

March 19

Joint IAS/PU Number Theory Seminar ✦ *p-adically Completed Cohomology and the p-adic Langlands Program* ✦ **Matthew Emerton**, Northwestern University

March 20

Marston Morse Lectures ✦ *Inverse Mean Curvature Flow and Isoperimetric Inequalities* and *An Isoperimetric Concept for the Mass in General Relativity* ✦ **Gerhard Huisken**, Max-Planck-Institut für Gravitationphysik

March 23

Computer Science/Discrete Math I ✦ *Symmetry and Approximability of Submodular Maximization Problems* ✦ **Jan Vondrak**, Princeton University

Members Seminar ✦ *Finite Approximation of Group Actions and Graph Metrics* ✦ **Gabor Kun**; Member, School of Mathematics

Special Geometric PDE Seminar ✦ *Three Dimensional Cauchy Riemann Manifolds* ✦ **John Bland**, University of Toronto

March 24

Computer Science/Discrete Math II ✦ *Direct Sums in Randomized Communication Complexity* ✦ **Anup Rao**, Member, School of Mathematics

Geometric PDE Seminars ✦ *Green Functions and Mean Field Equation at Critical Parameters on Torus* ✦ **Chang-Shou Lin**, National Taiwan University ✦ *Homogenization of Nonlinear Stochastic Evolution Problems in Non Periodically Perforated Domains* ✦ **Mamadou Sango**, University of Pretoria; Member, School of Mathematics

March 25

Mathematical Physics Seminars ✦ *Infinite/Finite Time Blow-up for Aggregation Equations in Mathematical Biology* ✦ **Jose Carrillo**, Universitat Autonoma de Barcelona ✦ *Stability Problems for Crystals, I* ✦ **Alessio Figalli**, École Polytechnique, Palaiseau, France

March 26

Mathematical Physics Seminar ✦ *Stability Problems for Crystals, II* ✦ **Alessio Figalli**, École Polytechnique, Palaiseau, France

Joint IAS/PU Number Theory Seminar ✦ *CM Liftings of Abelian Varieties* ✦ **Ching-Li Chai**, University of Pennsylvania

March 30

Members Seminar ✦ *The Regularized Determinant of a Four-Manifold* ✦ **Matthew Gursky**, University of Notre Dame; Member, School of Mathematics

March 31

Geometric PDE Seminars ✦ *On a Class of Fully Nonlinear Flow in Kähler Geometry* ✦ **Hao Fang**, The University of Iowa; Member, School of Mathematics ✦ *A Free Boundary Model for Price Formation* ✦ **Maria Pia Gualdani**, The University of Texas at Austin

April 1

Mathematical Physics Seminar ✦ *Mass Renormalization in Non-Relativistic Quantum Electrodynamics* ✦ **Volker Bach**, University of Mainz, Germany

Workshop on Topology: Identifying Order in Complex Systems ✦ *Homology Algorithms for Subsets of R^d* ✦ **Marian Mrozek**, Jagiellonian University in Krakow, Poland ✦ *Topology-Guided Sampling of Gaussian Random Fields* ✦ **Tom Wanner**, George Mason University ✦ *Stimulus Space Topology and Geometry from Neural Activity* ✦ **Carina Curto**, Courant Institute of Mathematical Sciences, New York University

April 2

Joint IAS/PU Number Theory Seminar ✦ *A Rigid Irregular Connection on the Projective Line* ✦ **Edward Frenkel**, University of California, Berkeley

April 6

Computer Science/Discrete Math I ✦ *Public Key Cryptography from Different Assumptions* ✦ **Benny Applebaum**, Princeton University

Members Seminar ✦ *Local Entropy and Projections of Dynamically Defined Fractals* ✦ **Michael Hochman**, Princeton University; Veblen Research Instructorship, School of Mathematics

April 7

Computer Science/Discrete Math II ✦ *On the Parallel Repetition Theorem* ✦ **Thomas Holenstein**, Princeton University

Geometric PDE Seminars ✦ *Half-Laplacian Problems Related to Crystal Dislocations* **Maria del Mar Gonzalez**, Universitat Politècnica de Catalunya; Member, School of Mathematics ✦ *A Gluing Construction for Solutions to Fully Nonlinear Equations in Conformal Geometry* ✦ **Giovanni Catino**, Università di Pisa

April 8

Mathematical Physics Seminar ✦ *Low-Degree Landau-Lifshitz and Schrödinger Maps* ✦ **Stephen Gustafson**, The University of British Columbia

April 9

Joint IAS/PU Number Theory Seminar ✦ *Eigenvarieties and p-adic Families of Finite Slope Automorphic Representations* ✦ **Eric Urban**, Columbia University

April 10
Mathematical Physics Seminar ✦ *Renormalization Group Methods* ✦ **Jon Dimock**, University at Buffalo, The State University of New York

April 13
Computer Science/Discrete Math I ✦ *Bounded Independence Fools Halfspaces* ✦ **Emanuele Viola**, Northeastern University

Members Seminar ✦ *Intersections of Polynomial Orbits, and a Dynamical Mordell-Lang Conjecture* ✦ **Michael Zieve**, Member, School of Mathematics

April 15
Mathematical Physics Seminars ✦ *Rigidity and Flexibility of $C^{1,\alpha}$ Isometric Embeddings* ✦ **Camillo De Lellis**, Institut für Mathematik, Universität Zürich ✦ *Spectral Dynamics and Critical Thresholds in Nonlinear Convective Equations* ✦ **Eitan Tadmor**, University of Maryland

April 16
Joint IAS/PU Number Theory Seminar ✦ *Stable Topology of Hurwitz Spaces and Arithmetic Counting Problems* ✦ **Jordan Ellenberg**, University of Wisconsin–Madison

April 20
Computer Science/Discrete Math I ✦ *The Constant-Depth Complexity of K-Clique* ✦ **Ben Rossman**, Massachusetts Institute of Technology

April 21
Computer Science/Discrete Math II ✦ *Beyond Planarity* ✦ **Jacob Fox**, Princeton University

Geometric PDE Seminar ✦ *The Decay of Fourier Modes for 2D Navier-Stokes Systems with Special Boundary Conditions* ✦ **Dong Li**, Member, School of Mathematics

April 22
Automorphic Forms and Galois Representations Seminar ✦ *Phi-Modules and Coefficient Spaces for Galois Representations* ✦ **George Pappas**, Michigan State University

Mathematical Physics Seminar ✦ *Soliton Dynamics and Energy Equipartition in Inhomogeneous Media* ✦ **Michael I. Weinstein**, Columbia University

April 23
Joint IAS/PU Number Theory Semina ✦ *Toroidal Compactifications of Certain Kuga Families* ✦ **Kai-Wen Lan**, Princeton University; Veblen Research Instructorship, School of Mathematics

April 24
Mathematical Physics Seminar ✦ *Decoherence and Disentanglement* ✦ **Marco Merkli**, Memorial University of Newfoundland

April 27
Computer Science/Discrete Math I ✦ *Values and Patterns* ✦ **Alon Orlitsky**, University of California, San Diego

April 28
Computer Science/Discrete Math II ✦ *Values and Patterns* ✦ **Alon Orlitsky**, University of California, San Diego

Geometric PDE Seminar ✦ *Transverse Knots via Braids* ✦ **Keiko Kawamuro**, Rice University; Member, School of Mathematics

April 29
Mathematical Physics Seminar ✦ *Scaling Relations for Ising-Like Models of Statistical Mechanics* ✦ **Pierluigi Falco**, The University of British Columbia

April 30
Mathematical Physics Seminar ✦ *Scaling Relations for Ising-Like Models of Statistical Mechanics* ✦ **Pierluigi Falco**, The University of British Columbia

May 4
Computer Science/Discrete Math I ✦ *Lower Bounds for Randomized Communication Complexity* ✦ **Mike Saks**, Rutgers, The State University of New Jersey

May 5
Computer Science/Discrete Math II ✦ *List Decoding Product and Interleaved Codes* ✦ **Venkatesan Guruswami**, University of Washington and Carnegie Mellon University

May 6
Workshop on Topology: Identifying Order in Complex Systems ✦ *Smetic Topology, Topography, and Tomography* ✦ **Randall Kamien**, University of Pennsylvania ✦ *Geometry of Data* ✦ **Steve Smale**, Toyota Technological Institute at Chicago ✦ *The Stability of the Fold* ✦ **Herbert Edelsbrunner**, Duke University

May 11
Computer Science/Discrete Math I ✦ *SDP Integrality Gaps With Local L1-Embeddability* ✦ **Subhash Khot**, Courant Institute of Mathematical Sciences, New York University

May 12
Computer Science/Discrete Math II ✦ *The Circle Method* ✦ **Craig Valere Spencer**, Member, School of Mathematics

May 13
Mathematical Physics Seminar ✦ *A Theory of Hypoellipticity in Infinite Dimensions* ✦ **Martin Hairer**, Courant Institute of Mathematical Sciences, New York University

May 14
Joint IAS/PU Number Theory Seminar ✦ *The Circle Method in Function Fields* ✦ **Craig Valere Spencer**, Member, School of Mathematics

May 18
Computer Science/Discrete Math I ✦ *The Density Hales-Jewett Theorem and Open-Source Mathematics* ✦ **Ryan O'Donnell**, Carnegie Mellon University

May 19
Computer Science/Discrete Math II ✦ *To Check Is to Know Is to Prove* ✦ **Doron Zeilberger**, Rutgers, The State University of New Jersey

May 20
Mathematical Physics Seminar ✦ *Conversations in Astrophysics* ✦ **Peter Goldreich**, Professor, School of Natural Sciences

May 22
Mathematical Physics Seminar ✦ *Stability of the Solar System* ✦ **Scott Tremaine**, Richard Black Professor, School of Natural Sciences

May 26
Computer Science/Discrete Math II ✦ *Constraints, Logic, and Derandomization* ✦ **Gabor Kun**, Member, School of Mathematics

Computer Science/Discrete Math I ✦ *On the Complexity of Boolean Functions in Different Characteristics* ✦ **Amir Shpilka**, Technion–Israel Institute of Technology

May 27
Mathematical Physics Seminar ✦ *The Critical Temperature of Dilute Bose Gases* ✦ **Robert Seiringer**, Princeton University

June 8
Computer Science/Discrete Math I ✦ *Quasi-One-Way Functions* ✦ **Andrej Bogdanov**, The Chinese University of Hong Kong

June 9
Computer Science/Discrete Math II ✦ *Linear Systems over Composite Moduli* ✦ **Arkadev Chattopadhyay**, Member, School of Mathematics

June 16
Computer Science/Discrete Math II ✦ *Extensions to the Method of Multiplicities with Applications to Kakeya Sets and Mergers* ✦ **Zeev Dvir**, Member, School of Mathematics

June 23
Computer Science/Discrete Math II ✦ *Matrix Products and Subgraph Problems* ✦ **Virginia Vassilevska**, Member, School of Mathematics

Program for Women and Mathematics

CLIFF MOORE

Participants in the Program for Women and Mathematics conferred about geometric partial differential equations.

The sixteenth annual Program for Women and Mathematics was held at the Institute for Advanced Study from June 8–19, 2009. The program, whose research topic was "Geometric Partial Differential Equations," was sponsored by the Institute and Princeton University and generously supported by the National Science Foundation.

The goal of the program is to encourage undergraduate and graduate students to continue their mathematics education. Research mathematicians offer lectures and seminars on a focused topic, as well as mentoring, discussions on peer relations, and an introduction to career opportunities.

Including teaching assistants and lecturers, there were twenty-one undergraduate students, twenty-one graduate students, and eight postdoctoral mathematicians who participated in the program. Mentors and students were accommodated in the Institute's housing complex, which gave them an opportunity to meet Institute Members and mathematicians from other parts of the country and the world.

Alice Chang of Princeton University served as the organizer of the program this year and gave the second half of the course, "PDE in Conformal Geometry." The first half of the advanced course, "Nonlinear Diffusion," was given by Panagiota Daskalopoulos of Columbia University.

Yi Wang of Princeton University and Maria Cristina Caputo of the University of Texas at Austin served as teacher assistants. Irina Mitrea of the University of Virginia gave the beginning course on "PDEs on Surfaces." Katharine Ott of the University of Kentucky was the teacher assistant.

Tanya Khovanova of the Massachusetts Institute of Technology organized the research seminars as follows: Katharine Ott, University of Kentucky, "The Mixed Boundary Value Problem in Lipschitz Domains"; Maria Cristina Caputo, the University of Texas at Austin, "Degenerate Nonlinear Curvature Flows"; Tanya Khovanova, "Game Set Theory"; Janna Lierl, Cornell University, " Heat Kernel Estimates on Uniform Domains"; Lina Wu, The University of Toledo, "P-Harmonic Theory and Its Geometric Applications"; Zichen Qiu,

Lawrence University, and Ziyi Qiu, The University of British Columbia, "Mathematics, Another Form of Fine Art—Along with a Brief History of Mathematics"; Maria del Mar Gonzalez, Universitat Politècnica de Catalunya, "Fractional Order Operators in Conformal Geometry"; Julie Miker, University of Kentucky, "The Payne-Pólya-Weinberger Conjecture for a Family of Spherically Symmetric Riemannian Manifolds"; and Eugenia Saorin Gomez, Universidad de Murcia, Spain, "Brunn-Minkowski Inequalities: A Geometric Way of Deriving Poincare-type Inequalities."

Two colloquia were given during the program. Fan Chung Graham of the University of California, San Diego, gave a talk on "The Combinatorics of PageRank," and Institute Member Cédric Villani gave a talk on "Optimal Transport and Curvature—From Monge to Riemann."

The Women-in-Science seminars were organized by Khovanova and Ingrid Daubechies of Princeton University. Deborah Lockhart of the National Science Foundation gave the talk "An Introduction to the National Science Foundation and Funding Opportunities"; there was "A Chat with Alice Chang and Fan Chung Graham," which included a panel discussion on a day in the life of a mathematician with Khovanova; Linda Ness of Telcordia Technologies, Inc.; Cynthia Rudin of Columbia University; Anna Wienhard of Princeton University; Nancy Hingston of the College of New Jersey; and Barbara Flynn of the National Security Agency. Ann Hibner Koblitz of Arizona State University gave the talk "Women in Mathematics—Paradoxes and Ironies," and there was a general discussion on the topic of "The Next Step—Applying and Surviving Graduate School and a Postdoc Position."

On Monday, June 15, the participants visited Princeton University for Princeton Day, heard talks by Princeton University Professors John Conway and Charles Fefferman, took a brief tour of the campus, and enjoyed lunch and dinner at the University.

The Institute for Advanced Study and the School of Mathematics appreciate the dedication of the senior women who have graciously given their time and talents since the inception of the program in 1994. Organizers, program committee members, and lecturers have all contributed to the growth and success of the women's program. In the past sixteen years, many women in the field of mathematics or contemplating entering the field have been encouraged and supported by Karen Uhlenbeck, the program founder, and her collaborator and co-organizer Chuu-Lian Terng. Their commitment to the goals of the program has been unparalleled.

At the conclusion of each year's program, questionnaires are distributed to the participants to obtain feedback about the organization, structure, and quality of the program. Both undergraduates and graduate students expressed their sincere appreciation about being selected to participate in the program. Many commented that as a result of the program they felt a sense of excitement about their math studies and fortunate to have had the opportunity to work with so many women with common interests.

ANDREA KANE

Distinguished Visiting Professor Alice Chang (at microphone, to right) gave the second half of the course, "PDE in Conformal Geometry."

BENTLEY DREZNER

Professor Juan Maldacena (left) in discussion with visiting lecturer Herbert Neuberger during a high energy theory seminar

The School of Natural Sciences

Faculty

Stephen L. Adler

Nima Arkani-Hamed

Peter Goldreich

Stanislas Leibler *(from 4/1/09)*

Arnold J. Levine

Juan Maldacena

Nathan Seiberg

Scott Tremaine, Richard Black Professor

Edward Witten, Charles Simonyi Professor

Professor Emeritus

Freeman J. Dyson

ACADEMIC ACTIVITIES

In 2008–09, Professor **Stephen L. Adler** continued his work on the phenomenology of modified forms of quantum theory, while devoting most of his effort to a new project dealing with constraints on and implications of planet-bound dark matter. In work relating to modified forms of quantum theory, Adler wrote a paper in collaboration with Angelo Bassi that continued their analysis of models of spontaneous wave function collapse with stochastic dynamics driven by non-white Gaussian noise. Their work focused on a model in which a classical "noise" field, with specified autocorrelator, is coupled to a local nonrelativistic particle density. They derived general results in this model for the rates of density matrix diagonalization and state vector reduction, and showed that both processes are governed by essentially the same rate parameters. As an alternative route to the reduction results, they also derived the Fokker-Planck equations that correspond to the initial stochastic Schrödinger equation. For specific models of the noise autocorrelator, including ones motivated by the structure of thermal Green's functions, they discussed the dependence of the reduction rate on model parameters. As another aspect of his continuing involvement in fundamentals of quantum theory, Adler accepted a three-year term, starting January 1, 2009, as Divisional Associate Editor for "Foundations of Quantum Mechanics" for *Physical Review Letters*.

Adler wrote three papers dealing with aspects of possible planet-bound dark matter. In the first, he showed that by comparing the total mass (in gravitational units) of the earth-moon system, as determined by lunar laser ranging, with the sum of the lunar mass as determined by its gravitational action on satellites or asteroids, and the earth mass as determined by the LAGEOS geodetic survey satellite, one can get a direct measure of the mass of earth-bound dark matter lying between the radius of the moon's orbit and the geodetic satellite orbit. Current data show that the mass of such earth-bound dark matter must be less than 4×10^{-9} of the earth's mass.

Two other papers studied implications of possible planet-bound dark matter. Adler suggested that accretion of planet-bound dark matter by the Jovian planets could be a significant source of their internal heat. The anomalously low internal heat of Uranus would then be explained if the collision believed to have

ANDREA KANE

Professor Stephen Adler (right) collaborated with Angelo Bassi (left) in work relating to modified forms of quantum theory.

tilted the axis of Uranus also knocked it free of most of its associated dark matter cloud. Adler also gave a detailed analysis of whether the recently reported spacecraft flyby velocity anomalies can be attributed to dark matter interactions. He considered both elastic scattering (which leads to spacecraft velocity decreases) and exothermic inelastic scattering (which can lead to spacecraft velocity increases, as observed in some cases). Constraints on the dark matter scenario require dark matter to be non-self-annihilating, and to have much larger scattering cross sections on nucleons, and much lighter masses, than usually assumed. Adler is continuing modeling relating to the flyby anomaly, as well as studies of other aspects of possible planet-bound dark matter.

In 2008–09, Professor **Nima Arkani-Hamed** was involved in two orthogonal lines of research. One line has been stimulated by a growing number of intriguing experimental anomalies in astrophysics that may be pointing to new theories of dark matter. Another line is motivated by trying to understand the amazing properties of scattering amplitudes in gauge theories and gravity, which point toward a dual holographic formulation of the theories very nearly describing our world.

Together with Douglas Finkbeiner, Tracy Slatyer, and Neal Weiner, Arkani-Hamed proposed a comprehensive theory of dark matter that explains the recent proliferation of unexpected observations in high-energy astrophysics. New cosmic ray data from the PAMELA satellite suggest an intriguing excess of positrons that can be interpreted as arising from the annihilation of dark matter particles. The needed annihilation rate is, however, roughly a hundred times larger than expected in ordinary models of dark matter, and the annihilation products must be mostly electrons or muons, again unusual from the standard point of view. Arkani-Hamed and his collaborators argued that these peculiarities point to the presence of a new force in the dark sector, with force carriers having a mass in the neighborhood of a GeV, giving rise to a relatively long-range force between dark matter particles. The long range allows a "Sommerfeld enhancement" to boost the annihilation cross section as required, and, if the dark matter annihilates into the new force carrier, ϕ, its low mass can force it to decay dominantly into leptons. If the force carrier is a non-Abelian gauge boson, the dark matter is part of a multiplet of states, with small splittings between their masses induced by the dark radiative corrections, naturally of order the MeV scale, which allows an explanation for an entirely different anomaly—positron annihilation in the galactic center observed by the INTEGRAL satellite. Somewhat smaller splittings would also be expected, providing a natural source for the parameters of the inelastic dark matter (iDM) explanation for the claimed direct detection of dark matter by the DAMA collaboration.

With Weiner, Arkani–Hamed pointed out that this theory predicts major additions to SUSY signals at the Large Hadron Collider (LHC). A completely generic prediction is that the force carriers in the dark sector particles can be produced in cascade decays of the usual superpartners. A large fraction of all SUSY events will contain at least two "lepton jets": collections of leptons, with small angular separations and GeV scale invariant masses, which would serve as smoking gun evidence for this theory.

These models have sparked a flurry of activity in the field, and will be further confronted by many new experimental results through the end of 2009 and 2010, ranging from further results from PAMELA, HESS, and FERMI as well as the next generation of direct detection experiments. These theories also suggest a new frontier for particle physics exploiting very high energy electron beams to directly produce the new dark sector particles in low-energy fixed target experiments, a subject that Arkani-Hamed is currently actively discussing with a variety of theorists and experimentalists.

Arkani-Hamed also has studied the physics of scattering amplitudes, research he has undertaken in collaboration with Freddy Cachazo, as well as his students Clifford Cheung and Jared Kaplan. Conventional wisdom says that the simpler the Lagrangian of a theory the simpler its perturbation theory, but an increased understanding of the structure of the S-matrix in gauge theories and gravity has been pointing to the opposite conclusion. Arkani-Hamed and his collaborators suggest that N=8 supergravity has the simplest interacting S-matrix in four dimensions. The full power of supersymmetry exposes the amplitudes as beautifully "smooth" objects, and allows us to control and understand them very effectively. Arkani-Hamed, et al., showed that all the leading "tree" amplitudes in N=4 super–Yang Mills theory and N=8 supergravity vanish at (supersymmetric) infinite complex momentum, and can thus be determined by recursion relations. They also identified the action of the nonlinearly realized $E_{7(7)}$ symmetry of N=8 SUGRA on scattering amplitudes. They gave a simple discussion of the structure of 1-loop amplitudes in any QFT, in close parallel to recent work of Forde, showing that the coefficients of scalar "triangle" and "bubble" integrals are determined by the "pole at infinite momentum" of tree amplitude products appearing in cuts. Combining all these ideas led to a proof of a recent conjecture that 1-loop amplitudes in N=8 SUGRA have only scalar box integrals, just as N=4 SYM. It is natural to conjecture that with maximal SUSY, amplitudes are completely determined by their leading singularities even beyond tree- and 1-loop level; this would directly imply the perturbative finiteness of N=8 SUGRA.

All of these remarkable properties of scattering amplitudes call for an explanation in terms of a "weak-weak" dual formulation of QFT, a holographic dual of flat space. Arkani-Hamed and his collaborators made progress toward finding this theory, suggesting that this dual description lives in a space with (2,2) signature, with two space and two time dimensions, and is naturally formulated in twistor space. They recast the BCFW recursion

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CLIFF MOORE

Professor Nima Arkani-Hamed (right), seen here in discussion with Trustee Martin Rees, is pursuing research concerning experimental anomalies in astrophysics that may point to new theories of dark matter, and properties of scattering amplitudes in gauge theory and gravity that point toward a dual holographic formulation of theories very nearly describing our world.

relations in an on-shell form that begs to be transformed into twistor space. The twistor transformation proposed by Arkani-Hamed and his collaborators is inspired by Witten's, but differs in treating twistor and dual twistor variables more equally. In these variables the three- and four-point amplitudes are amazingly simple; the BCFW relations are represented by diagrammatic rules that finally realize Roger Penrose's dream, dating from 1970, to relate scattering amplitudes to "twistor diagrams." Indeed, Arkani-Hamed, et al., precisely defined a version of "twistor diagrams" vigorously developed in recent years by Andrew Hodges. The "Hodges diagrams" for Yang-Mills theory are disks and not trees; they reveal striking connections between amplitudes and suggest a new form for them in momentum space. Arkani-Hamed and his collaborators also obtained a twistorial formulation of gravity. All tree amplitudes can be combined into an "S-Matrix" functional, which is the natural holographic observable in asymptotically flat space; the BCFW formula turns into a quadratic equation for this "S-Matrix," providing a holographic description of N=4 SYM and N=8 supergravity at tree level. They explored loop amplitudes in (2,2) signature and twistor space, beginning with a discussion of IR behavior. They found that the natural pole prescription renders the amplitudes well-defined and free of IR divergences. Loop amplitudes vanish for generic momenta, and in twistor space are even simpler than their tree-level counterparts. This further supports the idea that there exists a sharply defined object corresponding to the S-Matrix in (2,2) signature, computed by a dual theory naturally living in twistor space.

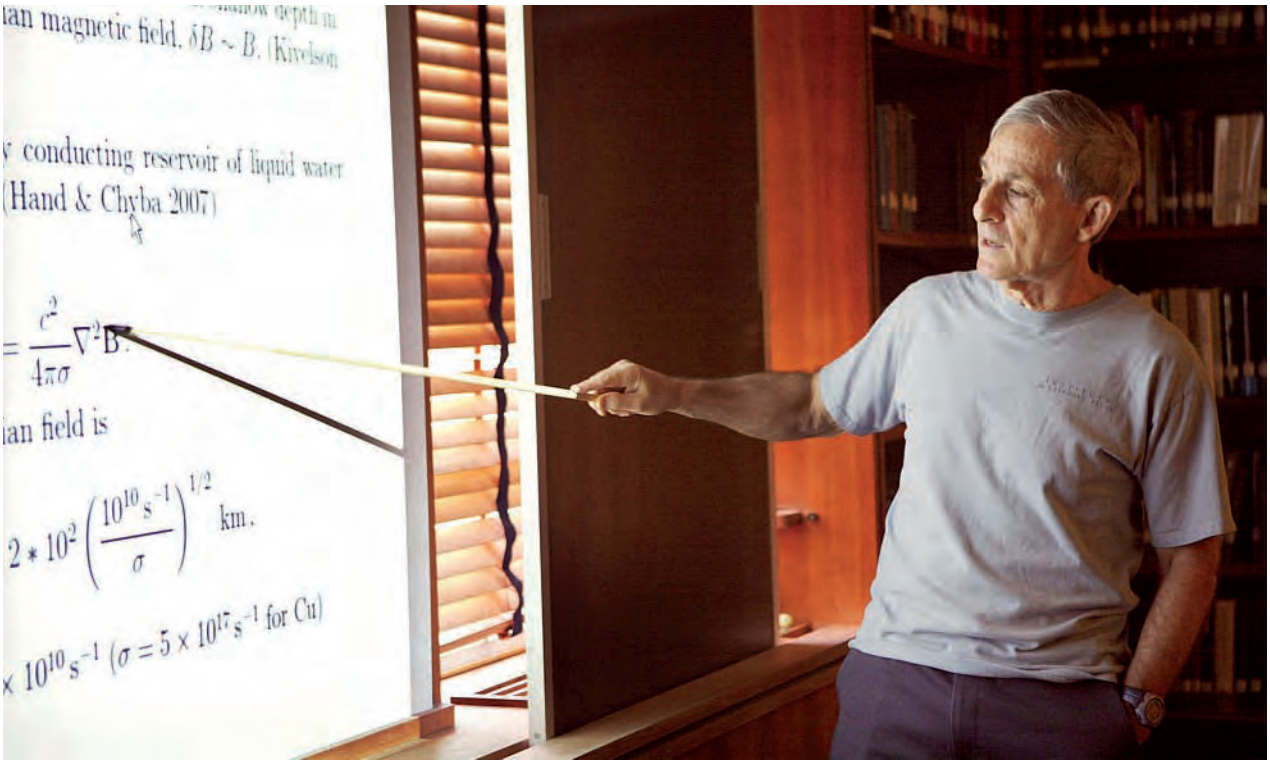
The twistor transformation proposed by Professor Arkani-Hamed and his collaborators is inspired by Professor Witten's, but differs in treating twistor and dual twistor variables more equally. In these variables the three- and four-point amplitudes are amazingly simple; the BCFW relations are represented by diagrammatic rules that finally realize Roger Penrose's dream, dating from 1970, to relate scattering amplitudes to "twistor diagrams."

During the 2008–09 academic year, Professor **Peter Goldreich** investigated synchronous, or near synchronous, spinning satellites with ice shells and subsurface oceans, which are an intriguing class of solar system bodies. Part of their appeal is the possibility that the oceans could support life. Currently, Jupiter's satellite Europa and Saturn's satellite Titan are the prime candidates for membership in this class.

The induced magnetic field of Europa as measured by the magnetometer on the Galileo spacecraft essentially proves the presence of a current-carrying, near-surface liquid layer, i.e., a salty subsurface ocean. All mechanisms proposed for creating the observed morphologies of cracks on Europa's surface require the presence of a near-surface fluid layer. Most also invoke an immeasurably slow, super-synchronous spin of the ice shell due to tidal torques associated with the satellite's orbital eccentricity.

Models of Titan's thermal evolution are consistent with the presence of a subsurface ocean. Moreover, motions of its surface features as tracked by the Cassini spacecraft's radar have been interpreted as implying a slow, nonsynchronous rotation. This is explained as driven by a seasonally changing atmospheric torque acting on an ice shell decoupled from the interior by a subsurface ocean.

As a result of centrifugal and tidal forces, the interiors of Europa and Titan have ellipsoidal figures whose longest axes point toward the parent planet. Thus a nonsynchronously spinning shell must suffer time-dependent elastic strains. These give rise to an elastic torque that opposes those driving the nonsynchronous spin. In the investigation reported on here, the elastic torque is compared with the tidal torque acting on Europa and the atmospheric torque acting on Titan. Regarding Europa, it concluded that the



ANDREA KANE

Professor Peter Goldreich has investigated spinning satellites with ice shells and subsurface oceans. These are an intriguing class of solar system bodies, partly because the oceans could support life.

tidal torque is too weak to produce stresses that could fracture the ice shell. It is proposed instead that the cracks are associated with time-dependent stresses resulting from convection in the satellite's interior. The situation for Titan is less clear cut. Most likely there is a problem with the interpretation of the radar observations.

During the 2008–09 academic year, Professor **Arnold J. Levine**'s research has focused on genetic variations affecting cancer risks and responses to therapies; infectious diseases and the innate immune system; and identifying genetic causes of autism.

Together with Member Alexei Vazquez and former Member Gareth Bond, who is now at the University of Oxford, Levine worked on a project to uncover genetic variations affecting cancer risks and responses to cancer treatment by using statistical methods and data from large-scale anti-tumor cancer drug screens to identify associations between single nucleotide polymorphisms that result in a variable response of cancer patients to treatment. (*Nature Reviews Drug Discovery* 7, 2008).

With Member Benjamin Greenbaum and former Member Raúl Rabadán, now at Columbia University, Levine worked on showing how both single stranded RNA viruses and the mRNA involved in the innate immune response have evolved to avoid the mechanisms that trigger innate immunity, which encompasses both the initial recognition of the virus by a cell and the early defense response. The goal of this research is to better understand how different viruses are recognized by the immune system, and how that initial defense shapes the evolutionary history of a virus. Based on work begun last year (*PLoS Pathogens* 4(6):1–9, 2008), they showed that H1N1 influenza has been evolving to lower its CpG content since the 1918 pandemic. These CpGs are avoided in a particular context that is highly underrepresented in both ssRNA viruses and innate mRNA produced from cell

CLIFF MOORE

With Member Benjamin Greenbaum (standing) and former Member Raúl Rabadán (sitting at right), Professor Arnold Levine (far left) worked to understand how different viruses are recognized by the immune system, and how that initial defense response affects viral evolution. Also pictured is Nina Bhardwaj, a visiting lecturer.

types involved in the innate response. The conclusion drawn from this is that both are avoiding the same recognition mechanism. The CpGs eliminated from influenza are eliminated only if they contain this underrepresented motif class.

In another project (with Members Chang Chan, Shoichi Metsugi, and others) studying the genetics of autism, the genomes of families with multiple autistic children are being analyzed to identify mutations that are more prevalent in these multiplex families than in the general population. These mutations are rare deletions that are generally inherited. However, they have incomplete penetrance, as the parent and some of the nonautistic siblings of these multiplex families also harbor the same mutations. Among the top six regions harboring such deletions, two involve genes that have independently been found to be associated with autism and have roles in the synaptic function of neurons. These mutations are now being verified experimentally.

During this academic year, Professor **Juan Maldacena**'s main research effort has been on the gauge/string duality.

Member Luis Fernando Alday and Maldacena have been exploring string scattering amplitudes at strong coupling in N=4 super Yang Mills theory. They have mapped this problem to a problem involving minimal surfaces in negatively curved space. These minimal surfaces end on the boundary on a polygon that lives in Minkowski space. The sides of the polygon are null. The amplitude depends on the area of the polygon, which in turn depends on the position of the vertices. This problem has a mathematical structure that is the same as that of a problem that had been considered by Davide Gaiotto, a long-term Member, and other collaborators. Using Gaiotto's results, they determined the answer for the simplest case. In principle there is an

iterative procedure that would allow one to determine the answer in all cases.

Gaiotto and Maldacena have considered the gravity duals of N=2 superconformal field theories. They constructed gravity solutions for a large class of N=2 theories that were recently constructed by Gaiotto.

Dario Martelli and Maldacena have studied a gravity solution corresponding to a conifold with flux. This is a solution that has played an important role in recent developments. They have given a simple picture in terms of branes for some extreme regions of the parameter space of the solution.

Member Dario Martelli and Professor Maldacena have studied a gravity solution corresponding to a conifold with flux. This is a solution that has played an important role in recent developments. They have given a simple picture in terms of branes for some extreme regions of the parameter space of the solution.

During this year, Professor **Nathan Seiberg** continued his work on various aspects of supersymmetry breaking and its phenomenology.

With Matthew Buican and Members Patrick Meade and David Shih, he continued to explore the framework they had suggested earlier of general gauge mediation. They presented a reformulation of the correlation functions used in the theory, and further elucidated their infrared and ultraviolet properties. Additionally they clarified the issue of ultraviolet sensitivity in the calculation of the soft masses in the Minimal Supersymmetric Standard Model (MSSM), highlighting the role of the supertrace over the messenger spectrum. Finally, they presented weakly coupled messenger models that fully cover the parameter space of general gauge mediation. These examples demonstrate that the full parameter space of these theories is physical and realizable. Thus, it should be considered a valid basis for future phenomenological explorations of gauge mediation.

With Member Zohar Komargodski, Seiberg addressed the mu-problem in the context of general gauge mediation. They classified possible models depending on the way the Higgs fields couple to the supersymmetry breaking hidden sector. The different types of models have distinct signatures in the MSSM parameters. They exhibited concrete and surprisingly simple examples based on messengers in each class.

With Members Tomer Volansky and Brian Wecht, Seiberg described a framework for gauge mediation of supersymmetry breaking in which the messengers are charged under the hidden sector gauge group, but do not play a role in breaking supersymmetry. From this point of view, this framework is between ordinary gauge mediation and direct mediation. As an example, they considered the 3-2 model of dynamical supersymmetry breaking, and added to it massive messengers which are SU(2) doublets. They briefly discussed the phenomenology of this scenario.

With Komargodski, Seiberg conducted a careful analysis of the Fayet-Iliopoulos model that showed that its energy momentum tensor and supersymmetry current are not gauge invariant. Since the corresponding charges are gauge invariant, the model is consistent. However, these observations about the currents give a new perspective on its restrictive renormalization group flow and explain why Fayet-Iliopoulos terms never appear in dynamical supersymmetry breaking. This lack of gauge invariance is at the root of the complications of coupling the model to supergravity. They showed that this is possible only if the full supergravity theory (including all higher derivative corrections) has an additional exact continuous global symmetry. A consistent quantum gravity theory cannot have such symmetries, and hence Fayet-Iliopoulos terms cannot appear. These results have

ANDREA KANE

Professor Scott Tremaine presented a public lecture, "The Fifth Element: Astronomical Evidence for Black Holes, Dark Matter, and Dark Energy," at the Institute in October. Much of his research has focused on the behavior of stars orbiting close to black holes, which offers one of the most reliable probes of the mass and other properties of the central black hole.

consequences for various models of particle physics and cosmology.

The massive black holes found at the centers of most galaxies, including our own Milky Way, are surrounded by millions of stars that orbit under the gravitational influence of the black hole. Much of the research of **Scott Tremaine**, Richard Black Professor, has focused on the behavior of stars orbiting close to these black holes. This subject is of interest because encounters of stars with the black hole may fuel the activity of quasars and other active galactic nuclei and generate gravitational waves that could be detectable by spacecraft in the near future, and because the dynamics of these stars offer one of the most reliable probes of the mass and other properties of the central black hole. With Visitor Jihad Touma of the American University of Beirut, he has devised efficient numerical procedures for following the evolution of these stars over millions of orbits, and with Member Bence Kocsis he is investigating whether the tools of classical statistical mechanics can be used to describe the steady-state equilibrium of these star clusters.

Reliable estimates of black hole masses from stellar dynamics are now available for some thirty nearby galaxies. As part of a collaboration led by Kayhan Gultekin, Tremaine has assembled and analyzed this sample to determine the most accurate relations between black hole mass and other galaxy properties such as luminosity and velocity dispersion. In one or two cases, more reliable masses are available from the kinematics of maser sources in gas disks surrounding the black hole. For the best of these, the galaxy catalogued as NGC 4258, Tremaine participated in a collaboration lead by Christos Siopis that compared the maser and stellar mass estimates. They found that the two estimates agree within 15 percent or better, thereby providing an end-to-end test of the machinery used in stellar dynamical mass estimates.

With Member Kevin Heng, Tremaine has examined the survival of protoplanetary disks—disks of orbiting solid bodies—over timescales comparable to the age of the galaxy, using a unified approach that is applicable to bodies of any size, from dust grains to asteroids to planets. They have identified what types of planetesimal disk can survive on billion-year timescales, and through what observational signatures these disks could be detected. Possible detection techniques include radial-velocity variations in the host star, gravitational lensing, and infrared emission from small particles created in collisions.

With Yan-Fei Jiang, a graduate student, Tremaine has investigated the disruption of wide binary stars due to encounters with passing stars. Their

results provide predictions for the distribution of wide binary stars that can be tested with the next generation of large-scale surveys of the solar neighborhood, and can be used to constrain the nature of the dark matter or other mass concentrations near the sun.

In the summer of 2008, **Edward Witten**, Charles Simonyi Professor, completed two projects that had been in progress for a while. One, with long-term Member Davide Gaiotto, was a study of how supersymmetric boundary conditions in four-dimensional supersymmetric Yang-Mills theory transform under electric-magnetic duality. The two-dimensional analog of this question has been important in string theory, but the four-dimensional case had not been investigated.

The second project, with Sergei Gukov, concerned the problem of quantization. The general notion of quantization of classical phase spaces is surprisingly unclear, despite its seemingly central place in physics. Gukov and Witten proposed a new perspective on this problem using branes and two-dimensional field theory.

In the winter of 2008–09, Witten carried out a study of Taub-NUT spaces, which are some of the simplest non-flat solutions of general relativity, showing how their construction can be understood using D-branes. He also used D-branes to investigate instantons on these spaces, and applied the results to describe a new duality involving M-theory.

In the spring of 2009, Witten continued his work on the relation between gauge theory and the geometric Langlands correspondence. He wrote up lectures he gave at the Institute in 2008 on the use of six-dimensional superconformal field theory (discovered in the 1990s from string theory) to relate instantons on Taub-NUT spaces to Kac-Moody algebras. This gives a gauge theory approach to a higher-dimensional analog of geometric Langlands duality. Witten also used gauge theory, and his results with Gaiotto mentioned above, to construct a new approach to some slightly mysterious group theory results that have been discovered by mathematicians exploring geometric Langlands.

During 2008–09, Professor Emeritus **Freeman J. Dyson** has kept busy traveling, giving public lectures on a variety of subjects, and writing book reviews. He has not done any significant scientific research.

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Professor Emeritus Freeman Dyson spoke at the Institute in November following a screening of a documentary about the making of *Doctor Atomic*, an opera about J. Robert Oppenheimer, former Institute Director (1947–66).

MEMBERS AND VISITORS

f First Term ✦ *s* Second Term ✦
m Long-term Member ✦ *v* Visitor

Prashanth AK
Biology ✦ Institute for Advanced Study
Lynn and Robert Johnston Founders' Circle Member

Luis Fernando Alday
Particle Physics ✦ Utrecht University
Funding provided by the United States Department of Energy

Vladimir Belyi
Biology ✦ Institute for Advanced Study

Robert A. Beckman
Biology ✦ Merck & Co., Inc. ✦ *v*

Gyan Bhanot
Biology ✦ Rutgers, The State University of New Jersey, and The Cancer Institute of New Jersey ✦ *v*

N. Emil J. Bjerrum-Bohr
Mathematical and Particle Physics ✦ Institute for Advanced Study ✦ *f*
Funding provided by the United States Department of Energy

Chang Chan
Biology ✦ Institute for Advanced Study
Charles L. Brown Member

Shane Davis
Astrophysics ✦ Institute for Advanced Study
Chandra Postdoctoral Fellow

Henriette Elvang
Theoretical Physics ✦ Massachusetts Institute of Technology
Funding provided by the National Science Foundation

Davide Gaiotto
Particle Physics ✦ Institute for Advanced Study ✦ *m*
Funding provided by the United States Department of Energy; Roger Dashen Member

Peter Graham
Particle Physics ✦ Stanford University ✦ *v, f*
Funding provided by the National Science Foundation

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Biology ✦ Institute for Advanced Study
Eric and Wendy Schmidt Member in Biology

Kevin Heng
Astrophysics ✦ Institute for Advanced Study

Mario Juric
Astrophysics ✦ Institute for Advanced Study
Funding provided by the National Aeronautics and Space Administration, National Science Foundation

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Hyung Do Kim
Particle Physics ✦ Seoul National University ✦ *s*

Bence Kocsis
Astrophysics ✦ Harvard University

Zohar Komargodski
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Funding provided by the National Science Foundation

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Astrophysics ✦ Institute for Advanced Study
William D. Loughlin Member

Paul Langacker
Particle Physics ✦ Institute for Advanced Study
Funding provided by the National Science Foundation; IBM Einstein Fellow

Ari Laor
Astrophysics ✦ Technion–Israel Institute of Technology ✦ *f*
Funding provided by The Ambrose Monell Foundation

Rachel Mandelbaum
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Hubble Space Telescope Fellow

Elke Katrin Markert
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Dario Martelli
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Funding provided by the National Science Foundation

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Jonathan Mitchell
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Funding provided by the W. M. Keck Foundation Fund

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Gil Paz
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Funding provided by the United States Department of Energy and the United States–Israel Binational Science Foundation

Martin Pessah
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Friends of the Institute for Advanced Study Member

Jun Song
Biology ✦ Institute for Advanced Study
Martin A. and Helen Chooljian Member in Biology

Gustavo A. Stolovitzky
Biology ✦ IBM Thomas J. Watson Research Center, Yorktown Heights, New York ✦ *f*

Yuji Tachikawa
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Funding provided by the National Science Foundation; Marvin L. Goldberger Member

Charles B. Thorn
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Funding provided by The Ambrose Monell Foundation

Salvatore Torquato
Particle Physics ✦ Princeton University ✦ *v*

Tanmay Vachaspati
Particle Physics ✦ Case Western Reserve University ✦ *v*

Glenn van de Ven
Astrophysics ✦ Institute for Advanced Study
Hubble Space Telescope Fellow

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Zheng Zheng
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RECORD OF EVENTS

Astrophysics Activities

September 18
Astrophysics Informal Seminar ✦ *Observations Through a Lumpy Universe* ✦ **Marilena LoVerde**, Columbia University

September 25
Astrophysics Informal Seminar ✦ *On the Origin of Planetary Spins and the Formation of Kuiper Belt Binaries* ✦ **Hilke Schlichting**, California Institute of Technology

September 30
Astrophysics Seminar ✦ *New Methods for Modeling Type Ia Supernovae* ✦ **Mike Zingale**, Stony Brook University, The State University of New York

October 2
Astrophysics Informal Seminar ✦ *HeII Reionization and Its Effect on the IGM* ✦ **Matt McQuinn**, Harvard-Smithsonian Center for Astrophysics

October 6
Astrophysics Informal Seminar ✦ *Cygnus A Revisited: A Precessing Jet and Emission from Multiple Jet Activity Periods* ✦ **Katrien Steenbrugge**, University of Oxford

October 7
Astrophysics Seminar ✦ *Exploring the ISM with Pulsar-Based Holography* ✦ **Daniel Stinebring**, Oberlin College

October 14
Astrophysics Seminar ✦ *Cosmology with the Sunyaev-Zel'dovich Effect: New Results and Future Plans* ✦ **John Carlstrom**, The University of Chicago

October 16
Astrophysics Informal Seminar ✦ *Chasing High-Magnification Microlensing Events to Hunt for Extrasolar Planets: Discoveries, Surprises, and Challenges* ✦ **Subo Dong**, The Ohio State University

October 21
Astrophysics Seminar ✦ *The Nature of Cosmic Explosions* ✦ **Avishay Gal-Yam**, Weizmann Institute of Science

October 23
Astrophysics Informal Seminar ✦ *Stellar Dynamics Near Massive Black Holes: Young Stars, Hypervelocity Stars, and Gravitational Wave Sources* ✦ **Hagai Perets**, Weizmann Institute of Science

October 28
Astrophysics Seminar ✦ *Planetary Radio Emissions* ✦ **Don Gurnett**, The University of Iowa

October 30
Astrophysics Informal Seminar ✦ *On the Origin of Radio Emission in RQQ: A New Work Hypothesis* ✦ **Ari Laor**, Technion–Israel Institute of Technology; Member, School of Natural Sciences

November 4
Astrophysics Seminar ✦ *Galaxy Evolution over the Last Two-Thirds of Cosmic Time* ✦ **Sandra Faber**, University of California, Santa Cruz

November 5
Astrophysics Informal Seminar ✦ *Motion and Radiation of Binary Black Holes: The Effective-One-Body Approach* ✦ **Thibault Damour**, Institut des Hautes Études Scientifiques

November 6
Astrophysics Informal Seminar ✦ *Structure beyond the Horizon: Inflationary Origins of the Cosmic Power Asymmetry* ✦ **Adrienne Erickcek**, California Institute of Technology

November 11
Astrophysics Seminar ✦ *Analysis of Comet Samples Returned by the Stardust Mission: New Insight into the Origin of Comets and Crystalline Silicates in Disks* ✦ **Don Brownlee**, University of Washington

November 13
Astrophysics Informal Seminar ✦ *Understanding Local and Global Influences on the Galaxy Population* ✦ **Nelson Padilla**, Universidad Católica de Chile

November 18
Astrophysics Seminar ✦ *Large-Scale Structure and Galaxy Evolution in the COSMOS Survey* ✦ **Nick Scoville**, California Institute of Technology

November 20
Astrophysics Informal Seminar ✦ *Gravitational Lensing by Stochastic Substructure* ✦ **Chuck Keeton**, Rutgers, The State University of New Jersey; Member, School of Natural Sciences

November 25
Astrophysics Seminar ✦ *Cosmic Evolution of Active Galactic Nuclei* ✦ **Günther Hasinger**, Max-Planck-Institut für Extraterrestrische Physik

December 2
Astrophysics Seminar ✦ *The Highest Magnetic Field Neutron Stars* ✦ **Vicky Kaspi**, McGill University

December 4
Astrophysics Informal Seminar ✦ *The Hunt for Dark Matter—Insights from N-body Simulations* ✦ **Mark Vogelsberger**, Max-Planck-Institut für Astrophysik

December 9
Astrophysics Seminar ✦ *Titan Unveiled* ✦ **Ralph Lorenz**, The John Hopkins University Applied Physics Laboratory

December 11
Astrophysics Informal Seminar ✦ *Numerical Experiments in Core-Collapse Supernova Hydrodynamics* ✦ **Rodrigo Fernandez**, University of Toronto

January 27
Astrophysics Seminar ✦ *The Roles of "Theory" and "Models" in Understanding the Earth's Climate and Other Complex Systems* ✦ **Geoffrey Vallis**, Geophysical Fluid Dynamics Laboratory, Princeton University

January 29
Astrophysics Informal Seminar ✦ *High Lorentz Factors and Periodic Components of Variability in Blazars* ✦ **Paul Wiita**, Georgia State University; Member, School of Natural Sciences

February 3
Astrophysics Seminar ✦ *Cosmology with Giant Arcs: Simulations vs. Observations* ✦ **Joachim Wambsganss**, Universität Heidelberg and Princeton University

February 5
Astrophysics Informal Seminar ✦ *Two-Dimensional Ionized Gas Kinematics in Spiral Galaxies* ✦ **Kambiz Fathi**, Stockholm Observatory, Stockholm University

February 10
Astrophysics Seminar ✦ *The Dynamics of the Local Group* ✦ **Roeland van der Marel**, Space Telescope Science Institute, NASA, Baltimore

February 12
Astrophysics Informal Seminar ✦ *Updates on Hydrodynamic Self Similar Solutions* ✦ **Re'em Sari**, California Institute of Technology

February 17
Astrophysics Seminar ✦ *Major Events in the History of the Solar System Revealed by Extraterrestrial 3He in Deep Sea Sediments* ✦ **Ken Farley**, California Institute of Technology

February 24
Astrophysics Seminar ✦ *Supernova Shock Breakouts and Their Possible Relation to XRFs/GRBs* ✦ **Eli Waxman**, Weizmann Institute of Science

March 3
Astrophysics Seminar ✦ *Angular Momentum and the Formation of Stars and Black Holes* ✦ **Richard Larson**, Yale University

March 5
Astrophysics Informal Seminar ✦ *What If the Milky Way Isn't Integrable and Isn't Phase-Mixed?* ✦ **David Hogg**, New York University

March 10
Astrophysics Seminar ✦ *Mach's Principle: Is Space-Time Created by Its Energy Content?* ✦ **Donald Lynden-Bell**, University of Cambridge

March 12
Astrophysics Informal Seminar ✦ *How Much Dust Is There in the Universe?* ✦ **Brice Menard**, Canadian Institute for Theoretical Astrophysics ✦ **Masataka Fukugita**, University of Tokyo

March 17
Astrophysics Seminar ✦ *Accretion Disks, Gravitational Instability, and Planet Formation* ✦ **Roman Rafikov**, Princeton University

March 19
Astrophysics Informal Seminar ✦ *1. Introduction to IR Space Astronomy: Past and Future Missions 2. Molecular Hydrogen in Infrared Galaxies* ✦ **Nadia Zakamska**, Member, School of Natural Sciences

March 24
Astrophysics Seminar ✦ *Fast 3D Reconnection of Weakly Stochastic Magnetic Field: Reconnection without Discrimination* ✦ **Alex Lazarian**, University of Wisconsin–Madison

March 26
Astrophysics Informal Seminar ✦ *Planetesimal Formation and Migration* ✦ **Mordecai-Mark Mac Low**, American Museum of Natural History

March 31
Astrophysics Seminar ✦ *Measuring Black Hole Spin* ✦ **Ramesh Narayan**, Harvard-Smithsonian Center for Astrophysics

April 2
Astrophysics Informal Seminar ✦ *The ARCHIPELAGO Search for Planets* ✦ **Eric Gaidos**, University of Hawaii

April 7
Astrophysics Seminar ✦ *The Role of AGN in Cooling Core Clusters of Galaxies* ✦ **Chris Reynolds**, University of Maryland

April 9
Astrophysics Informal Seminar ✦ *Can a Single Graviton Be Observed?* ✦ **Freeman J. Dyson**, Professor Emeritus, School of Natural Sciences

April 14
Astrophysics Seminar ✦ *The Blandford-Znajek Mechanism and Gamma-Ray Bursts* ✦ **Serguei Komissarov**, University of Leeds

April 16
Astrophysics Informal Seminar ✦ *The Early Stages of Planet Formation* ✦ **Andrew Youdin**, Canadian Institute for Theoretical Astrophysics

April 21
Astrophysics Seminar ✦ *Two Distinct Phases in the Formation of Giant Elliptical Galaxies* ✦ **Jerry Ostriker**, Princeton University

April 23
Astrophysics Informal Seminar ✦ *Molecular Hydrogen in ULIRGs* ✦ **Nadia Zakamska**, Member, School of Natural Sciences

April 28
Astrophysics Seminar ✦ *Habitability Zones in Space and Time for Super Earths* ✦ **Ray Pierrehumbert**, The University of Chicago

April 30
Astrophysics Informal Seminar ✦ *Future Gravity Wave Experiments* ✦ **Bence Kocsis**, Member, School of Natural Sciences

May 5
Astrophysics Seminar ✦ *The Coevolution of Black Holes and Galaxies: Clues in the Local Universe* ✦ **Tim Heckman**, Johns Hopkins University

May 7
Astrophysics Informal Seminar ✦ *Multi-planet Extrasolar Planetary Systems* ✦ **Eric Ford**, University of Florida

May 12
Astrophysics Seminar ✦ *Spin-Orbit Coupling* ✦ **Peter Goldreich**, Professor, School of Natural Sciences

May 14
Astrophysics Informal Seminar ✦ *What Do the Spectra Mean in MHD Turbulence?* ✦ **Chi-kwan Chan**, Institute for Theory and Computation, Harvard-Smithsonian Center for Astrophysics

May 19
Astrophysics Seminar ✦ *(Massive) Black Hole X-Ray Binaries* ✦ **Roger Blandford**, Kavli Institute of Particle Astrophysics; Stanford Linear Accelerator Center, Stanford University

May 21
Astrophysics Informal Seminar ✦ *Dance of Lyman-Alpha Photons: Modeling Lyman Alpha Emitters around the End of Reionization* ✦ **Zheng Zheng**, Member, School of Natural Sciences

May 26
Astrophysics Informal Seminar ✦ *Self-Organizing Black Hole Nuclei* ✦ **Jihad Touma**, American University of Beirut

June 2
Astrophysics Seminar ✦ *The Polarization of X-Ray Lines from Clusters of Galaxies as a Way to Investigate Tangential Velocity of the Bulk Flows* ✦ **Rashid Sunyaev**, Max-Planck-Institut für Astrophysik

Particle Physics Activities

September 11
Informal Phenomenology Seminar ✦ *Top Jets and Boosted QCD Jets at the LHC* ✦ **Seung Lee**, Stony Brook University, The State University of New York

September 15
High Energy Theory Seminar ✦ *"Exciting" Dark Matter, Positrons, and PAMELA* ✦ **Douglas Finkbeiner**, Harvard University

September 17
Physics Group Meeting ✦ *Argyres-Seiberg Duality and the Higgs Branch* ✦ **Yuji Tachikawa**, Member, School of Natural Sciences

September 19
High Energy Theory Seminar ✦ *Gauge Mediation in F-theory GUT Models* ✦ **Natalia Saulina**, California Institute of Technology

September 22
High Energy Theory Seminar ✦ *Model-Independent Upper Bounds for Conformal Operator Dimensions* ✦ **Vyacheslav Rychkov**, Scuola Normale Superiore, Pisa, Italy

September 29
High Energy Theory Seminar ✦ *From F-theory GUTs to the Weak Scale* ✦ **Jonathan Heckman**, Harvard University

October 10
High Energy Theory Seminar ✦ *Generating Tree Amplitudes in N=4 SYM and N=8 Supergravity* ✦ **Henriette Elvang**, Member, School of Natural Sciences

October 23
Physics Group Meeting ✦ *Holography and the Massive IIA* ✦ **Davide Gaiotto**, Member, School of Natural Sciences

Informal Phenomenology Seminar ✦ *Understanding Flavor and CP Violation* ✦ **Yossi Nir**, Weizmann Institute of Science

October 24
High Energy Theory Seminar ✦ *Higher Derivative 3-Algebras* ✦ **Sunil Mukhi**, Tata Institute of Fundamental Research, Mumbai, India

October 27
High Energy Theory Seminar ✦ *M2-branes: Puzzles and Prospects* ✦ **Mark Van Raamsdonk**, The University of British Columbia

October 29
Physics Group Meeting ✦ *Discussion on Holographic Superconductivity* ✦ **Brian Wecht**, Member, School of Natural Sciences

October 30
Physics Group Meeting ✦ *Informal Discussion on Signals for Dark Matter* ✦ **Nima Arkani-Hamed**, Professor, School of Natural Sciences

November 5
Physics Group Meeting ✦ *Extremal N=2 2D CFT and Constraints of Modularity* ✦ **Greg Moore**, Rutgers, The State University of New Jersey

November 12
Physics Group Meeting ✦ *Informal Discussion on (Semi-)direct Gauge Mediation* ✦ **Tomer Volansky**, Member, School of Natural Sciences

November 14
High Energy Theory Seminar ✦ *A Counterexample to the a-theorem* ✦ **Yuji Tachikawa**, Member, School of Natural Sciences

November 17
High Energy Theory Seminar ✦ *Supersymmetric Vacua and Quantum Integrability* ✦ **Nikita Nekrasov**, Institut des Hautes Études Scientifiques

November 20
Informal Phenomenology Seminar ✦ *Effective Field Theory for Gravitational Bound States* ✦ **Andreas Ross**, Yale University

December 1
High Energy Theory Seminar ✦ *Nonrelativistic Conformal Invariance and Its Holographic Realization* ✦ **Dam Thanh Son**, University of Washington

December 3
Physics Group Meeting ✦ *Anthropy and Entropy* ✦ **Irit Maor**, Case Western Reserve University

December 12
High Energy Theory Seminar ✦ *Implications of the PAMELA and ATIC Excesses on the Dark Matter Properties* ✦ **Alessandro Strumia**, Università di Pisa and Instituto Nazionale di Fisica Nucleare

December 15
High Energy Theory Seminar ✦ *Dual Superconformal Symmetry of Scattering Amplitudes in N=4 SYM Theory* ✦ **Emery Sokatchev**, CERN

January 23
High Energy Theory Seminar ✦ *Aspects of Confining Gauge Theories at Large vs. Small 't Hooft Coupling* ✦ **Matthew Reece**, Princeton University

January 30
High Energy Theory Seminar ✦ *Aspects of Supersymmetry and R-Symmetry Breaking* ✦ **Zohar Komargodski**, Weizmann Institute of Science; Member, School of Natural Sciences

February 4
Physics Group Meeting ✦ *Spinor Helicity in Six Dimensions* ✦ **Donal O'Connell**, Member, School of Natural Sciences

February 6
High Energy Theory Seminar ✦ *Exploring General Gauge Mediation* ✦ **Matthew Buican**, Princeton University

February 9
High Energy Theory Seminar ✦ *Large N Phase Transitions under Scaling* ✦ **Herbert Neuberger**, Rutgers, The State University of New Jersey

February 20
High Energy Theory Seminar ✦ *Two Approaches to the Natural MSSM* ✦ **Hyung Do Kim**, Seoul National University; Member, School of Natural Sciences

February 23
Joint High Energy Theory/Astrophysics Seminar ✦ *Some Comments on the Recent Galactic Cosmic-Ray Anomalies* ✦ **Eli Waxman**, Weizmann Institute of Science

March 4
Physics Group Meeting ✦ *On Anomaly Mediation (Gaugino Mass in AdS Space)* ✦ **Hyung Do Kim**, Seoul National University; Member, School of Natural Sciences

March 6
High Energy Theory Seminar ✦ *Large N Gauge Theory on the Lightcone Worldsheet* ✦ **Charles B. Thorn**, University of Florida; Member, School of Natural Sciences

March 9
High Energy Theory Seminar ✦ *Landscape of Superconducting Membranes* ✦ **Sean Hartnoll**, Harvard University

March 12
Informal Phenomenology Seminar ✦ *Entropy and Intermediate Mass Black Holes in Halos* ✦ **Paul Frampton**, University of North Carolina

March 16
High Energy Theory Seminar ✦ *Orientiholes* ✦ **Frederik Denef**, Harvard University

March 18
Physics Group Meeting ✦ *Stability Wall Crossing in Heterotic Effective Theories* ✦ **Lara Anderson**, University of Pennsylvania

March 20
High Energy Theory Seminar ✦ *Null-polygonal Wilson Loops and Minimal Surfaces in AdS* ✦ **Luis Fernando Alday**, Utrecht University; Member, School of Natural Sciences

March 30
High Energy Theory Seminar ✦ *Bergman Kernel, Balanced Metrics and Black Holes* ✦ **Semyon Klevstov**, Rutgers, The State University of New Jersey

April 3
High Energy Theory Seminar ✦ *On the Effective Action of Warped Compactifications* ✦ **Gary Shiu**, University of Wisconsin–Madison; Member, School of Natural Sciences

April 13
High Energy Theory Seminar ✦ *N=2 Field Theories and M5 Branes* ✦ **Davide Gaiotto**, Member, School of Natural Sciences

April 16
Informal Phenomenology Seminar ✦ *Infrared Singularities of Gauge Theory Amplitudes* ✦ **Thomas Becher**, Fermi National Accelerator Laboratory

April 17
High Energy Theory Seminar ✦ *Weak Field Black Hole Formation in Asymptotically AdS Spacetimes* ✦ **Shiraz Minwalla**, Tata Institute of Fundamental Research, Mumbai, India

April 23–24
Physics Workshop ✦ *Current Trends in Dark Matter* ✦ Organizers: **Nima Arkani-Hamed**, Professor, School of Natural Sciences, and Members **Patrick Meade**, **Michele Papucci**, and **Tomer Volansky**

April 27
High Energy Theory Seminar ✦ *A Pyramid Scheme for Particle Physics* ✦ **Jean-Francois Fortin**, Rutgers, The State University of New Jersey

April 29
Physics Group Meeting ✦ *Holography and the S-matrix* ✦ **Nima Arkani-Hamed**, Professor, School of Natural Sciences

April 30
Informal Phenomenology Seminar ✦ *Soft IR Breaking of BRST Symmetry* ✦ **Laurent Baulieu**, Laboratoire de Physique Théorique et Hautes Energies, CNRS

May 1
High Energy Theory Seminar ✦ *Factorization Beyond Leading Power* ✦ **Gil Paz**, Member, School of Natural Sciences

May 8
High Energy Theory Seminar ✦ *PAMELA after Fermi* ✦ **Michele Papucci**, Member, School of Natural Sciences

May 18
High Energy Theory Seminar ✦ *Flavor Symmetries, Quark Masses, Neutrino Masses, and Neutrino Oscillations* ✦ **Harald Fritzsch**, Universität München

May 22
High Energy Theory Seminar ✦ *Recent Developments in Models of Spontaneous Wave Function Collapse* ✦ **Angelo Bassi**, Università degli Studi di Trieste

May 27
Physics Group Meeting ✦ *Holography and the S-matrix, II* ✦ **Nima Arkani-Hamed**, Professor, School of Natural Sciences

June 1
High Energy Theory Seminar ✦ *Numerical Relativity and Application to Black Hole Physics* ✦ **Frans Pretorius**, Princeton University

June 8
High Energy Theory Seminar ✦ *The Ultraviolet Behavior of N=8 Supergravity at Four Loops and Beyond* ✦ **Henrik Johansson**, University of California, Los Angeles

June 12
Informal Phenomenology Seminar ✦ *A Randall-Sundrum Model in the Reach of LHC* ✦ **Stefania Gori**, Technische Universität München

July 10
High Energy Theory Seminar ✦ *A Universal Inequality for CFT and Quantum Gravity* ✦ **Simeon Hellerman**, Institute for Physics and Mathematics of the Universe, The University of Tokyo

The Simons Center for Systems Biology Activities

July 2
The Simons Center for Systems Biology Seminar ✦ *Impact of Macromolecular Crowding on Cell Metabolism* ✦ **Zoltan Oltvai**, School of Medicine, University of Pittsburgh

July 10
The Simons Center for Systems Biology Seminar ✦ *The Roles of p53 and SNPs of its Pathway in Cancer and Fecundity* ✦ **Wenwei Hu**, The Cancer Institute of New Jersey

July 11
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July 15
Cancer Immunology Workshop ✦ *Detecting Functional Variants in the Stress Response Pathway* ✦ **Gurinder Atwal**, Member (2005–08), School of Natural Sciences ✦ *Patterns in Viral Evolution* ✦ **Raúl Rabadán**, Member (2006–08), School of Natural Sciences ✦ *Kinase Target Discovery and Inhibitor Development* ✦ **Matthew Lorenzi**, Bristol-Myers Squibb ✦ *CTCF Confines the Distal Action of Estrogen Receptor* ✦ **Chang Chan**, Member, School of Natural Sciences

July 16
The Simons Center for Systems Biology Seminar ✦ *Sub-cellular Evolution: Proteomes from Mitochondia and Peroxisomes Tell Different but Interconnected Stories* ✦ **Toni Gabaldón**, Centro de Investigación Principe Felipe, Valencia, Spain

July 18
Infectious Disease Group Meeting

August 5
The Simons Center for Systems Biology Seminar ✦ *Immunomic Analysis of Viruses (and Human) CD8+ T Cell Epitope Repertoire* ✦ **Yoram Louzoun**, Bar-Ilan University

Infectious Disease Group Meeting

Autism Group Meeting

August 7
Autism Group Meeting

September 16
The Simons Center for Systems Biology Seminar ✦ *Epigenetics and the Nervous System* ✦ **Mark F. Mehler**, Albert Einstein College of Medicine

September 17
Drug Discovery Symposium ✦ *Picking Winners at the Discovery Stage of Drug Development* ✦ **Michael C. Venuti**, BioSeek, Inc. ✦ *Development of the Novel Hsp90 Inhibitor IPI-504 and Insights into the Tumor Cell Selectivity of*

Hsp90 Inhibitors ✦ Julian Adams, Infinity Pharmaceuticals, Inc. ✦ *Mechanism-Based Combination Therapy* ✦ **Neal Rosen**, Memorial Sloan-Kettering Cancer Center ✦ *Targeting Validated Oncogenic Mechanisms to Improve Anticancer Drug Discovery and Development* ✦ **George D. Demetri**, Dana-Farber Cancer Institute; Harvard Medical School; Ludwig Institute for Cancer Research ✦ *Genomic Alternations in Human Cancer* ✦ **Matthew L. Meyerson**, Dana Farber Cancer Institute; Harvard Medical School; Broad Institute ✦ *Signatures for Small Molecule Discovery* ✦ **Todd Golub**, Broad Institute; Dana-Farber Cancer Institute; Harvard Medical School; Howard Hughes Medical Institute ✦ *Identifying Single Nucleotide Polymorphisms that Affect Human Cancer Using the NCI60 Human Tumor Cell Line Anticancer Drug Screen* ✦ **Alexei Vazquez**, Member, School of Natural Sciences ✦ *Overcoming Resistance to Molecularly Targeted Therapy* ✦ **Charles L. Sawyers**, Memorial Sloan-Kettering Cancer Center; Howard Hughes Medical Institute ✦ *Molecular Analysis of Circulating Tumor Cells: A Guide for Genotype-Directed Cancer Therapies* ✦ **Daniel A. Haber**, Massachusetts General Hospital Cancer Center

Panel Discussion
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Stephen Friend, Merck & Co., Inc.
William N. Hait, Johnson & Johnson
Robert Kramer, Bristol-Myers Squibb
Allen I. Oliff, GlaxoSmithKline

September 19
Autism Group Meeting

October 6–7
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Alan Bernstein, Global HIV Vaccine Enterprise
Jesse Bloom, California Institute of Technology
Raúl Rabadán, Columbia University College of Physicians and Surgeons
Harlan Robins, Fred Hutchinson Cancer Research Center
Alex Sigal, California Institute of Technology

November 14
Autism Group Meeting

The Simons Center for Systems Biology Seminar ✦ *The Immunoregulatory Role of Plasmacytoid Dendritic Cells* ✦ **Nina Bhardwaj**, NYU Medical Center

November 19
The Simons Center for Systems Biology Seminar ✦ *Hyperstructures, Topology, and Datasets* ✦ **Nils A. Baas**, Norwegian University of Science and Technology, Trondheim, Norway

November 20
The Simons Center for Systems Biology Seminar ✦ *A Biophysical Mechanism for Influenza Viral Escape from Antibodies* ✦ **Wilfrid Ndifon**, Princeton University

November 21
The Simons Center for Systems Biology Seminar ✦ *Functional Screening for Factors that Maintain Epigenetic Silencing* ✦ **Richard Katz**, Fox Chase Cancer Center, Philadelphia

November 24
The Simons Center for Systems Biology Seminar ✦ *Decoding Shotgun Proteomic Mass Spectra by Sequential Statistical Models* ✦ **Bill Press**, The University of Texas at Austin

November 25
Infectious Disease Group Meeting

December 5
Autism Group Meeting

January 7
The Simons Center for Systems Biology Seminar ✦ *Confined Water, Hydrophobicity, and Protein Stability In vitro and In vivo* ✦ **Jeremy England**, Stanford University

January 13
Joint Meeting ✦ *Talk and Informal Discussion* ✦ **Robert DiPaola**, The Cancer Institute of New Jersey ✦ *Silencing Factors and DNA Repair* ✦ **Shridar Ganesan**, The Cancer Institute of New Jersey ✦ *p53, Human Fertility, and Psychological Stress* ✦ **Wenwei Hu**, The Cancer Institute of New Jersey ✦ *New Wave in Cancer Research: The Use of Zebrafish as a Cancer Model* ✦ **Hatem Sabaawy**, The Cancer Institute of New Jersey

January 15
The Simons Center for Systems Biology Seminar ✦ *Characterizing the Dynamics of Genome Evolution in Tumorigenesis* ✦ **Yong H. Woo**, The Jackson Laboratory

January 19
The Simons Center for Systems Biology Group Meeting

January 27
The Simons Center for Systems Biology Group Meeting

January 30
The Simons Center for Systems Biology Group Meeting

February 6
The Simons Center for Systems Biology Seminar ✦ *Extracting Essential Features of Biological Signaling Networks* ✦ **Natalie Arkus**, Harvard University

February 19
The Simons Center for Systems Biology Group Meeting

March 9
The Simons Center for Systems Biology Seminar ✦ *Next-Generation Sequencing of Human Genomes: A Perspective* ✦ **Elaine Mardis**, Washington University in St. Louis

March 18
Genetic Epidemiology and Population Biology Meeting ✦ *Genetic Epidemiology of EBV* ✦ **John Blaho**, Medical Diagnostic Laboratories and The Cancer Institute of New Jersey, and **Todd P. Michael**, Waksman Institute of Microbiology, Rutgers, The State University of New Jersey; Visitor, School of Natural Sciences ✦ *Influenza and Innate Immunity* ✦ **Benjamin Greenbaum**, Member, School of Natural Sciences ✦ *Regulation of Estrogen and Androgen Gene Expression* ✦ **Chang Chan**, Member, School of Natural Sciences ✦ *Polymorphisms with*

Clinical Implications in Breast Cancer ✦ **Kim Hirshfield**, University of Medicine and Dentistry of New Jersey, Robert Wood Johnson Medical School, and The Cancer Institute of New Jersey ✦ *Population-Based Studies at CINJ: Opportunities for Collaboration* ✦ **Elisa Bandera**, University of Medicine and Dentistry of New Jersey, Robert Wood Johnson Medical School, and The Cancer Institute of New Jersey ✦ *The Role of p53 in Fertility* ✦ **Wenwei Hu**, University of Medicine and Dentistry of New Jersey, Robert Wood Johnson Medical School, and The Cancer Institute of New Jersey ✦ *Haplotype Analysis of the p53 Pathway* ✦ **Gurinder Atwal**, Cold Spring Harbor Laboratory ✦ *Computational Methods to Identify Candidate Functional SNPs* ✦ **Alexei Vazquez**, Member, School of Natural Sciences ✦ *Environmental Carcinogens and Exposure Biology Challenges* ✦ **Panos Georgopoulos**, University of Medicine and Dentistry of New Jersey, Robert Wood Johnson Medical School, and Rutgers, The State University of New Jersey

March 20

The Simons Center for Systems Biology Seminar ✦ *Population Genomics of microRNA and Transcription Factor Binding Sites* ✦ **Kevin Chen**, New York University

April 3

The Simons Center for Systems Biology Seminar ✦ *Site-Specific Self-Catalyzed DNA Depurination and the Origin of Somatic Mutations and Associated Diseases* ✦ **Jacques R. Fresco**, Princeton University

April 10

Autism Group Meeting

April 27

Autism Group Meeting

April 28

The Governor's Conference on Effective Partnering in Cancer Research: Human Viruses and Cancer ✦ *Papillomaviruses and Human Cancer* ✦ **Peter M. Howley**, Harvard Medical School ✦ *Vaccines Against Oncogenic Viruses* ✦ **Adel A. F. Mahmoud**, Princeton University ✦ *Epstein-Barr Virus Sustains its Associated Cancers* ✦ **Bill Sugden**, University of Wisconsin School of Medicine and Public Health ✦ *KSHV Infection and the Biology of Kaposi's Sarcoma* ✦ **Donald E. Ganem**, University of California, San Francisco, and Howard Hughes Medical Institute ✦ *Identification and Characterization of Merkel Cell Polyomavirus* ✦ **Yuan Chang**, University of Pittsburgh Cancer Institute ✦ *From Fibrosis to Cancer and Back: The KLF6 Tumor Suppressor Story* ✦ **Scott L. Friedman**, Mount Sinai School of Medicine ✦ *Pathogenesis of Human T-Cell Leukemia Virus Type I Infections: Roles of Viral and Immune Activation* ✦ **Arnold B. Rabson**, University of Medicine and Dentistry of New Jersey, Robert Wood Johnson Medical School, and Child Health Institute of New Jersey

May 4

Epstein-Barr Virus Group Meeting

May 15

The Simons Center for Systems Biology Seminar ✦ *A Proteomic Approach for Understanding Chromatin Structure* ✦ **Benjamin A. Garcia**, Princeton University

May 18

Systems Biology of Cancer Meeting

May 20

The Simons Center for Systems Biology Seminar ✦ *Adaptive Suppression of the ATF4-CHOP Branch of the Unfolded Protein Response by Toll-Like Receptor Signaling* ✦ **Cindy Cui**

June 8

The Simons Center for Systems Biology Seminar ✦ *Neuroendocrine Tumors* ✦ **Laura H. Tang**, Memorial Sloan-Kettering Cancer Center

Prospects in Theoretical Physics

Prospects in Theoretical Physics (PiTP) is an intensive two-week summer program geared specifically to graduate students and postdoctoral scholars considering a career in theoretical physics or astrophysics. First held at the Institute for Advanced Study in 2002, PiTP has, in past years, covered topics ranging from cosmology to the Large Hadron Collider to string theory.

The program builds upon the strong relationship between the research groups at the Institute and Princeton University. Representatives from both institutions are among the program's organizers and lecturers. PiTP encourages the participation of women, minorities, and students from smaller institutions that do not have extensive programs in theoretical physics or astrophysics.

PiTP 2009 was held July 13–24 on the campus of the Institute. The theme of the 2009 program was "Computational Astrophysics." This program was designed for young researchers to hone the numerical methods they employ in their own research and to learn about the techniques used in other areas of computational astrophysics. The lectures covered numerical methods used in cosmology, general relativity, hydrodynamics and magnetohydrodynamics, long-term orbit integrations, N-body dynamics (both collisionless and rigid-body), and radiation hydrodynamics, as well as computing with GPUs. The program was organized as a workshop, with ninety-minute lectures in the morning and active student participation in the afternoon, including homework and discussion sessions.

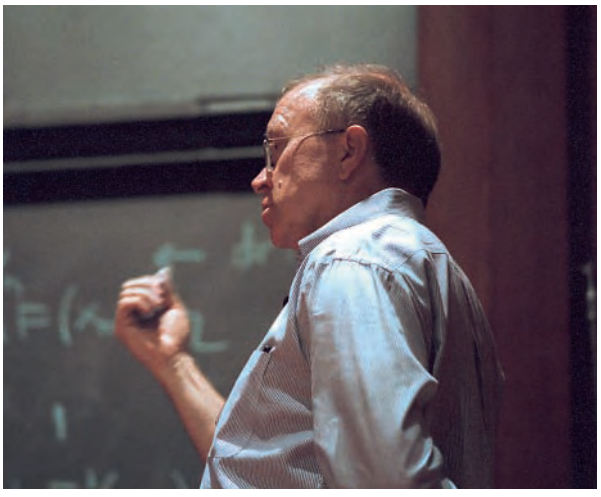
Roughly 120 participants from fifteen countries were officially enrolled in the program, with a majority of the visiting students living in the Institute's housing complex during the two-week program. Moreover, the program lectures attracted many students, postdoctoral scholars, and professors from nearby institutions.

The 2009 PiTP program was under the direction of Scott Tremaine, Richard Black Professor in the School of Natural Sciences at the Institute. He was assisted by a scientific organizing committee that included Jim Stone of Princeton University and Peter Teuben of the University of Maryland.

In addition to the organizers, lecturers included: Kevin Bowers (Los Alamos National Laboratory and D. E. Shaw Research), William Dorland (University of Maryland), Brian Kernighan (Princeton University), Michael Norman (University of California, San Diego), Frans Pretorius (Princeton University), Derek Richardson (University of Maryland), Anatoly Spitkovsky (Princeton University), and Volker Springel (Max-Planck-Institut für Astrophysik).

PiTP 2009 was supported by the Concordia Foundation.

ANDREA KANE



RANDALL HAGADORN

The 2009 Prospects in Theoretical Physics program, "Computational Astrophysics," was designed for young researchers to hone the numerical methods they employ in their own research and to learn about the techniques used in other areas of computational astrophysics. It was directed by Professor Scott Tremaine (right), who was among the lecturers during the intensive two-week program.

BENTLEY DREZNER

Professor Danielle Allen participated in the discussion following the Leon Levy Foundation Lecture given by Member Barry O'Neill on honor and violence.

The School of Social Science

Faculty

Danielle S. Allen, UPS Foundation Professor

Eric S. Maskin, Albert O. Hirschman Professor

Joan Wallach Scott, Harold F. Linder Professor

Professors Emeriti

Albert O. Hirschman

Michael Walzer

The School of Social Science invited nineteen scholars from a pool of 208 applicants from the United States and abroad to be part of the School's scholarly community as Members for the 2008–09 academic year. Eleven Visitors and one Research Assistant also participated in the year's activities. The Florence Gould Foundation helped to support a Member from France. Other Members were funded through endowments created by gifts from Institute Trustee Roger W. Ferguson Jr. and his wife Annette L. Nazareth, Richard B. Fisher, and Deutsche Bank. A grant from the Leon Levy Foundation also supported a Member. Fields of inquiry of the group included law, political science, economics, anthropology, history, philosophy, and sociology.

The thematic focus for 2008–09 was "Social Norms and Cooperation." Social norms are necessary for human cooperation: only if individuals know what behavior is acceptable and what is not are they likely to act collaboratively in their group, community, or society. Even so, such norms are not sufficient for collaboration. One norm may conflict with another, and within the same society different groups may disagree about what the shared standards should be. Because of the importance of social norms and the contention they generate, their analysis embraces virtually all the social sciences (as well as other disciplines, such as neuroscience, ecology, and evolutionary biology). Thus, for example, ethnographers detail the great variability in norms (and the penalties for breaching them) across different cultures. Historians study the factors that lead to changes in the formal and informal rules of conduct that regulate economic, familial, and social transactions. Economists are interested in circumstances in which shared norms interfere with market functioning, on the one hand, and solve market failures, on the other. Legal scholars examine the interplay between norms, whose violation carries informal sanctions, and laws, for which there are institutionalized mechanisms for punishment. Political theorists and political scientists argue about the relative significance of norms and interests in regulating public and international affairs. Social psychologists seek to understand why individuals conform to social norms and why they punish those who do not.

In addition, all of these scholars share an interest in the question of whether social norms have a constructive role to play in societal efforts to regulate behavior. How do particular attitudes and behaviors become social norms? How do norms serve to promote cooperation? What are their other effects? The thematic year was led by Eric S. Maskin, Albert O. Hirschman Professor, in consultation with Simon A. Levin, Professor of Ecology and Evolutionary Biology, and Deborah A. Prentice, Professor of Psychology, both of Princeton University.

The School conducted three seminar series—the Social Science Thursday Luncheon Seminar; the "Social Norms and Cooperation" Thematic Seminar, which alternated weeks in the fall semester meeting at the Institute and with a larger group at Princeton University; and the "Non-normative Seminar," which drew together those Members whose work was not applicable to the year's formal theme. The School also continued publication of

its series of *Occasional Papers* and *Economics Working Papers*, which can be accessed online from the School's website, www.sss.ias.edu.

The School conducted a search for a fourth Faculty member, seeking a distinguished scholar whose work is informed by ethnographic approaches and is focused on non-Western areas of the world. The School looks forward to welcoming social and political anthropologist Didier Fassin in fall of 2009 as the Institute's first James D. Wolfensohn Professor.

Danielle S. Allen, UPS Foundation Professor, finished a book, *Why Plato Wrote*, to be published by Wiley-Blackwell, as well as articles on the origins of political philosophy, anonymous speech and the public sphere, and other topics in American politics. She curated an exhibit at the University of Chicago ("Integrating the Life of the Mind: African-Americans at the University of Chicago 1870–1940"); lectured at Stanford University, Baylor University, the University of Alabama, Columbia University, New York University, and Princeton University; and continued her service on the boards of the Mellon Foundation and the Pulitzer Prizes, among others. She also cochaired an ongoing seminar on "Language, History, and Political Theory" with Patchen Markell of the University of Chicago and prepared the 2009–10 theme year on "Education, Schools, and the State," with co-organizer Rob Reich of Stanford University.

CLIFF MOORE

Professor Eric Maskin lectured internationally on mechanism design, elections and strategic voting, and why global markets have not reduced inequality. He also spoke on discounting and future generations at the St. James Palace Symposium of Nobel Laureates.

In September 2008, **Eric S. Maskin**, Albert O. Hirschman Professor, gave the Max Weber Lecture at the European University Institute, Florence, on the subject of mechanism design. This was also the subject of his John F. Nash Lecture at Georgetown University in April 2009 and of public lectures in Prato, Budapest, Buenos Aires, Seoul, Bologna, the Santa Fe Institute, Berlin, Moscow, Nizhny Novgorod, Venlo, and Bonn. In June 2009, Maskin gave the Vilfredo Pareto Lecture at the Collegio Carlo Alberto, Turin, on "Elections and Strategic Voting." This was also the subject of his Bogen Lecture at the Hebrew University of Jerusalem and of lectures at Princeton University; the Massachusetts Institute of Technology; the Society for the Advancement of Economic Theory meeting in Ischia; the Gerard-Varet Memorial meeting in Marseille; the University of California, Irvine; Pennsylvania State University; the University of California, Los Angeles; the Econometric Society Latin American meeting in Rio de Janeiro; and the Institute for Advanced Study. Finally, Maskin spoke on "Why Global Markets Have Not Reduced Inequality" in symposia at the Massachusetts Institute of Technology, Madrid, Shenzhen, and Beijing, and on "Discounting and Future Generations" at the St. James Palace Symposium of Nobel Laureates.

ANDREA KANE

In May, a panel of Members in the School of Social Science discussed work by Member Diego von Vacano (standing) on Machiavelli, Nietzsche, and the making of aesthetic political theory.

He continued to direct the Summer School in Economic Theory at the Hebrew University of Jerusalem and began a two-year term as Executive Vice President of the Game Theory Society. In 2008–09, Maskin received the degree of Doctor Honoris Causa from Corvinus University of Budapest and honorary professorships from Shenzhen University and the State University–Higher School of Economics, Moscow. He was also awarded the Grande Médaille of the City of Marseille.

In 2008–09, **Joan Wallach Scott**, Harold F. Linder Professor, published *Théorie Critique de l'Histoire: Identités, Expériences, Politiques* (Fayard, 2009); "Finding Critical History," in *Becoming Historians* (The University of Chicago Press, 2009), edited by James M. Banner and John R. Gillis; "Back to the Future," *History and Theory*, 47:2 (2008); and "Knowledge, Power, and Academic Freedom," *Social Research*, 76:2 (2009). She edited a volume of essays, *Women's Studies on the Edge* (Duke University Press, 2008). *The American Historical Review* published a forum on her work on "gender," for which she wrote a comment, "Unanswered Questions" (December 2008). She lectured at Butler University; the Institute for European Studies at the University of California, Berkeley; the State University of New York, Purchase; the City University of New York Graduate Center; Carleton University; Concordia University; McGill University; Lehigh University; Université Libre de Bruxelles; and the New York University Center in Paris,

Professor Joan Wallach Scott (left) published *Théorie Critique de l'Histoire: Identités, Expériences, Politiques*, in which she argues for a vigorous analysis of the foundational premises of categories of difference.

BENTLEY DREZNER

and she conducted a seminar on her work for graduate students in anthropology at Harvard University. She presented a paper at a conference on academic freedom at the New School for Social Research in New York City, and commented on papers on Muslim immigration in Europe at the International Studies Association meetings. She gave the keynote address at a conference in Vienna sponsored by the European Union network on "The Veil in Europe." She gave the Ursula Hirschmann Lecture at the European University Institute in Florence. Scott received an award for Scholarly Distinction at the 2009 meetings of the American Historical Association. She was also awarded the degree of Doctor of Humane Letters by the University of Wisconsin–Madison.

CLIFF MOORE

Professor Emeritus Michael Walzer, seen here at a School lunch seminar, was a panelist at the symposium "Can Cosmopolitan Principles Foster World Democracy After the Iraq War?" during the annual meeting of the American Political Science Association.

During the academic year 2008–09, Professor Emeritus **Michael Walzer** traveled to Italy, where he received an honorary degree at the University of Modena and participated in the inaugural Master in Civic Education Program of the Ethica Forum in Asti. At Laterza Publishing in Rome and at the Collegio Carlo Alberto in Turin, he spoke on "Politics, War and Justice: Ideas for a Democratic America." In the United States, Walzer gave the lecture "War and the Jewish Tradition" for the Distinguished Scholar Series of the Foundation for Jewish Studies in Rockville, Maryland. He spoke on the same topic at Johns Hopkins University and at the University of California, Los Angeles. He also lectured at the Army War College, Dickinson College, Williams College, Temple University, and Yeshiva University. At Westminster College in Salt Lake City, he gave the Tanner-McMurrin Lecture on the History and Philosophy of Religion. Walzer was a panelist at the symposium "Can Cosmopolitan Principles Foster World Democracy After the Iraq War?" during the annual meeting of the American Political Science Association, at the Stanley Hoffmann Symposium "Ethics and International Relations" at Harvard University, and at a MacArthur Foundation meeting, "Digital Media and Democratic Participation," in Chicago. Walzer is currently working on the third volume (of four projected) of *The Jewish Political Tradition*, a comprehensive collaborative project focused on the history of Jewish political thought published by Yale University Press. His most recent book, *Thinking Politically: Essays in Political Theory*, was published in 2007, also by Yale. Two collections of essays, *Justice Without Boundaries* and *War and Death,* were published in the Netherlands. His 1990 Tanner Lectures at the University of Oxford were printed in a Hebrew translation under the title *Nation and Universe. Politics and Passion* is forthcoming in Albanian, but its publication was barred in China.

MEMBERS, VISITORS, AND RESEARCH STAFF

f First Term ✦ *s* Second Term ✦
v Visitor ✦ *vp* Visiting Professor ✦
a Research Assistant

Robert B. Ahdieh
Law ✦ Emory University ✦ *v*

Jessica R. Cattelino
Anthropology ✦ University of California, Los Angeles

Aurelian Craiutu
Political Science ✦ Indiana University

Lee Cronk
Anthropology ✦ Rutgers, The State University of New Jersey

James Doyle
Philosophy ✦ University of Bristol ✦ *v, f*

Souad Eddouada
Anthropology, Law ✦ Université Ibn Tofail ✦ *v, f*

Zouhair Ghazzal
Law ✦ Loyola University Chicago

Michelle Girvan
Physics ✦ University of Maryland
Ginny and Robert Loughlin Founders' Circle Member

Joanne Gowa
Political Science ✦ Princeton University

Charles M. Haar
Law ✦ Harvard Law School ✦ *v*

Yuval Jobani
Hebrew Culture ✦ Tel Aviv University ✦ *a*

Robert O. Keohane
Political Science ✦ Princeton University ✦ *v*

Beth L. Leech
Political Science ✦ Rutgers, The State University of New Jersey ✦ *v*

Simon A. Levin
Ecology and Evolutionary Biology ✦ Princeton University ✦ *vp*

Charles J-H Macdonald
Social Anthropology ✦ CNRS and Université de la Méditerranée, Aix-Marseille II
Funding provided by the Florence Gould Foundation Fund

Darrel Moellendorf
Philosophy ✦ San Diego State University
Friends of the Institute for Advanced Study Member

Helen Nissenbaum
Moral and Political Analysis of Digital Technologies and Information Systems ✦ New York University ✦ *v, f*

Sten Nyberg
Economics ✦ Stockholm University
Deutsche Bank Member

Barry O'Neill
Political Science ✦ University of California, Los Angeles
Leon Levy Foundation Member

Deborah A. Prentice
Social Psychology ✦ Princeton University ✦ *vp*

Jonathan Rieder
Sociology ✦ Barnard College ✦ *v*

Catherine J. Ross
Law ✦ The George Washington University Law School

Daniel I. Rubenstein
Ecology and Evolutionary Biology ✦ Princeton University ✦ *v*

Teemu Ruskola
Law ✦ Emory University

Rajiv Sethi
Economics ✦ Barnard College
Richard B. Fisher Member

Richard A. Shweder
Anthropology ✦ The University of Chicago
Rosanna and Charles Jaffin Founders' Circle Member

Michael E. Staub
Cultural History ✦ Baruch College, The City University of New York

Pontus Strimling
Economics ✦ Centre for the Study of Cultural Evolution, Stockholm University ✦ *v, f*

Kazuko Suzuki
Sociology ✦ Texas A&M University ✦ *v*

Diego A. von Vacano
Political Science ✦ Texas A&M University

Jonathan L. Weinstein
Economics ✦ Northwestern University
Deutsche Bank Member

Niza Yanay
Sociology ✦ Ben-Gurion University of the Negev

Muhamet Yildiz
Economics ✦ Massachusetts Institute of Technology
Roger W. Ferguson, Jr., and Annette L. Nazareth Member

RECORD OF EVENTS

September 22
IAS/Princeton University Joint Social Norms and Cooperation Seminar ✦ *Conversation on Social Norms: Recent Research and Outstanding Problems* ✦ **Avinash Dixit**, Princeton University ✦ **Robert O. Keohane**, Princeton University; Visitor, School of Social Science ✦ **Simon A. Levin**, Princeton University; Visiting Professor, School of Social Science

September 25
Social Science Thursday Lunch Seminar ✦ *Madness Is Civilization: Psycho Politics and Postwar America* ✦ **Michael E. Staub**, Baruch College, The City University of New York; Member, School of Social Science

September 29
Social Norms and Cooperation Thematic Seminar ✦ *Orientation and Planning Session*

October 2
Social Science Thursday Lunch Seminar ✦ *Framing Trust Games with a Maasai Social Norm: Results from Kenya and the U.S.* ✦ **Lee Cronk**, Rutgers, The State University of New Jersey; Member, School of Social Science

October 6
IAS/Princeton University Joint Social Norms and Cooperation Seminar ✦ *Modeling Intergroup Inequality in Diffusion Processes with Strong Network Externalities* ✦ **Paul DiMaggio**, Princeton University ✦ **Filiz Garip**, Harvard University

October 9
Social Science Thursday Lunch Seminar ✦ *Justice and the Assignment of the Intergenerational Costs of Climate Change* ✦ **Darrel Moellendorf**, San Diego State University; Member, School of Social Science

October 13
Social Norms and Cooperation Thematic Seminar ✦ *Why Do People Punish Norm Violators?* ✦ **Deborah A. Prentice**, Princeton University; Visiting Professor, School of Social Science

October 15
Non-normative Seminar ✦ *Thinking Politically: Raymond Aron and the 1968 Moment in France* ✦ **Aurelian Craiutu**, Indiana University; Member, School of Social Science

October 16
Social Science Thursday Lunch Seminar ✦ *Privacy in Context* ✦ **Helen Nissenbaum**, New York University; Visitor, School of Social Science

October 20
IAS/Princeton University Joint Social Norms and Cooperation Seminar ✦ *Community Structure in Social Networks: Mechanisms and Measurements* ✦ **Michelle Girvan**, University of Maryland; Member, School of Social Science

October 23
Social Science Thursday Lunch Seminar ✦ *Group Inequality* ✦ **Rajiv Sethi**, Barnard College; Member, School of Social Science

October 27
Social Norms and Cooperation Thematic Seminar ✦ *Property Rights, Land Settlement, and Land Conflicts on Frontiers: Evidence from Australia, Brazil, and the U.S.* ✦ **Lee Alston**, University of Colorado and the National Bureau of Economic Research

October 29
Non-normative Seminar ✦ *After Just Schools: The Equality-Difference Paradox and Conflicting Varieties of Liberal Hope* ✦ **Richard A. Shweder**, The University of Chicago; Member, School of Social Science

October 30
Social Science Thursday Lunch Seminar ✦ *Elections and Strategic Voting* ✦ **Eric S. Maskin**, Albert O. Hirschman Professor, School of Social Science

November 3
IAS/Princeton University Joint Social Norms and Cooperation Seminar ✦ *Diffusion on Social Networks: New Theory and Experiments* ✦ **Damon Centola**, Massachusetts Institute of Technology

November 6
Social Science Thursday Lunch Seminar ✦ *China, For Example: China and the Making of Modern International Law* ✦ **Teemu Ruskola**, Emory University; Member, School of Social Science

November 10
Social Norms and Cooperation Thematic Seminar ✦ *Sincerity in Promises* ✦ **Barry O'Neill**, University of California, Los Angeles; Member, School of Social Science

November 12
Non-normative Seminar ✦ *Need-Based Sovereignty: The Economic Logics of Florida Seminole Termination in the Casino Era* ✦ **Jessica R. Cattelino**, University of California, Los Angeles; Member, School of Social Science

November 13
Social Science Thursday Lunch Seminar ✦ *Barriers to Peace: On Prejudice and the Political Unconscious* ✦ **Niza Yanay**, Ben-Gurion University of the Negev; Member, School of Social Science

November 17
IAS/Princeton University Joint Social Norms and Cooperation Seminar ✦ *The Nonpecuniary Costs of Unemployment* ✦ **Cristobal Young**, Princeton University

November 20
Social Science Thursday Lunch Seminar ✦ *Women, Islam, and the "Common Good" in Morocco* ✦ **Souad Eddouada**, Université Ibn Tofail; Visitor, School of Social Science

November 24
Social Norms and Cooperation Thematic Seminar ✦ *Behavioral Types and Evolution of Institutions and Social Contracts* ✦ **Pontus Strimling**, Centre for the Study of Cultural Evolution, Stockholm University; Visitor, School of Social Science

December 1
IAS/Princeton University Joint Social Norms and Cooperation Seminar ✦ *Work and the "Maghribi"* ✦ **Jessica Goldberg**, University of Pennsylvania

December 3
Non-normative Seminar ✦ *Sexularism* ✦ **Joan W. Scott**, Harold F. Linder Professor, School of Social Science

December 4
Social Science Thursday Lunch Seminar ✦ *The Color of Citizenship: Racial Identity in Latin American Political Thought* ✦ **Diego A. von Vacano**, Texas A&M University; Member, School of Social Science

December 8
Social Norms and Cooperation Thematic Seminar ✦ *Caste and Punishment: A History of Repression Moderates Informal Norm Enforcement* (with Mayuresh Kshetramade and Ernst Fehr) ✦ **Karla Hoff**, The World Bank

December 11
Social Science Thursday Lunch Seminar ✦ *Global and Local Justice* ✦ **Michael Walzer**, Professor Emeritus, School of Social Science

December 17
Non-normative Seminar ✦ *Strategic Empowerment between the Global and the Local* ✦ **Souad Eddouada**, Université Ibn Tofail; Visitor, School of Social Science

January 15
Social Science Thursday Lunch Seminar ✦ *Anarchy as a Topic and Anarchism as a Theory: An Anthropological View* ✦ **Charles J-H Macdonald**, CNRS and Université de la Méditerranée, Aix-Marseille II; Member, School of Social Science

January 22
Social Science Thursday Lunch Seminar ✦ *Policing Stabilizes the Construction of Social Niches in Primates* ✦ **Michelle Girvan**, University of Maryland; Member, School of Social Science

January 26
Social Norms and Cooperation Thematic Seminar ✦ *Israel, Gaza, and Just Wars* ✦ **Michael Walzer**, Professor Emeritus, School of Social Science

January 28
Non-normative Seminar ✦ *Policy Legends and Folklists: Traditional Beliefs in the Public Sphere* ✦ **Barry O'Neill**, University of California, Los Angeles; Member, School of Social Science

January 29
Social Science Thursday Lunch Seminar ✦ *Norms of Mediocrity* ✦ **Sten Nyberg**, Stockholm University; Member, School of Social Science

February 2
Social Norms and Cooperation Thematic Seminar ✦ *Public Disagreement* ✦ **Rajiv Sethi**, Barnard College; Member, School of Social Science

February 5
Social Science Thursday Lunch Seminar ✦ *The Emergence of Dysfunctional Social Norms* ✦ **Deborah A. Prentice**, Princeton University; Visiting Professor, School of Social Science

February 12
Social Science Thursday Lunch Seminar ✦ *Nuclear Prestige and the Nuclear Taboo* ✦ **Barry O'Neill**, University of California, Los Angeles; Member, School of Social Science

February 19
Social Science Thursday Lunch Seminar ✦ *The Textuality of Murder: Representations of the Homo Criminalis in Contemporary Syrian Courts* ✦ **Zouhair Ghazzal**, Loyola University Chicago; Member, School of Social Science

February 23
Social Norms and Cooperation Thematic Seminar ✦ *Social Formation of Prosocial Preferences* ✦ **Avinash Dixit**, Princeton University

February 26
Social Science Thursday Lunch Seminar ✦ *Fight or Flight: Disputes over Values and Rights in Public Schools* ✦ **Catherine J. Ross**, The George Washington University Law School; Member, School of Social Science

March 5
Social Science Thursday Lunch Seminar ✦ *Florida Seminoles and the Cultural Politics of the Everglades* ✦ **Jessica R. Cattelino**, University of California, Los Angeles; Member, School of Social Science

March 9
Social Norms and Cooperation Thematic Seminar ✦ *"You Want Me to Do What?!": Morality and the Practice of Male Circumcision* ✦ **Richard A. Shweder**, The University of Chicago; Member, School of Social Science

March 12
Social Science Thursday Lunch Seminar ✦ *The Elusive Center: Moderation in the Writings of the Group of Coppet (Madame de Stael, Jacques Necker, and Benjamin Constant)* ✦ **Aurelian Craiutu**, Indiana University; Member, School of Social Science

March 16
Social Norms and Cooperation Thematic Seminar ✦ *Durability of Bargaining Power and Stochastic Deadlines* (with Alp Simsek) ✦ **Muhamet Yildiz**, Massachusetts Institute of Technology; Member, School of Social Science

March 19
Social Science Thursday Lunch Seminar ✦ *From Regulation to Coordination* ✦ **Robert B. Ahdieh**, Emory University; Visitor, School of Social Science

March 23
Social Norms and Cooperation Thematic Seminar ✦ *A Model of the Unraveling of Ethical Behavior* ✦ **Jonathan L. Weinstein**, Northwestern University; Member, School of Social Science

March 26
Social Science Thursday Lunch Seminar ✦ *Divided Fates: The State, Race, and Adaptation of Korean Immigrants in Japan and the United States* ✦ **Kazuko Suzuki**, Texas A&M University; Visitor, School of Social Science

March 30
Social Norms and Cooperation Thematic Seminar ✦ *Collective Motion and Decision-Making in Animal Groups* ✦ **Iain Couzin**, Princeton University

April 2
Social Science Thursday Lunch Seminar ✦ *Institutions and Outcomes: The GATT/WTO and Postwar Trade* ✦ **Joanne Gowa**, Princeton University; Member, School of Social Science

April 6
IAS/Princeton University Joint Social Norms and Cooperation Seminar ✦ *Social Norms: Theory and Evidence* ✦ **Peyton Young**, University of Oxford and Johns Hopkins University

April 13
Social Norms and Cooperation Thematic Seminar ✦ *Social Norms and International Relations* ✦ **Robert O. Keohane**, Princeton University; Visitor, School of Social Science

April 15
Non-normative Seminar ✦ *Crucibles of Liberty* ✦ **Catherine J. Ross**, The George Washington University Law School; Member, School of Social Science

April 16
Social Science Thursday Lunch Seminar ✦ *Robust Cultural Pluralism and Dedicated Political Liberalism: Can They Be Reconciled?* ✦ **Richard A. Shweder**, The University of Chicago; Member, School of Social Science

April 20
Social Norms and Cooperation Thematic Seminar ✦ *Social Norms and Simple Rules: Agent-Based Models of Cooperation* ✦ **Lee Cronk**, Rutgers, The State University of New Jersey; Member, School of Social Science ✦ **Rolando de Aguiar**, Rutgers, The State University of New Jersey ✦ **Athena Aktipis**, The University of Arizona

April 22
Social Norms and Cooperation Thematic Seminar ✦ *Crucibles of Liberty* ✦ **Catherine J. Ross**, The George Washington University Law School; Member, School of Social Science

April 23
Social Science Thursday Lunch Seminar ✦ *What Is Probability?* ✦ **Jonathan L. Weinstein**, Northwestern University; Member, School of Social Science

April 27
Social Norms and Cooperation Thematic Seminar ✦ *The Fast and the Furious: Rates of Adaptation and the Evolution of Social Complexity* ✦ **Robert Boyd**, University of California, Los Angeles

April 29
Non-normative Seminar ✦ *The Power of Proximity/The Fear of Dependence* ✦ **Niza Yanay**, Ben-Gurion University of the Negev; Member, School of Social Science

April 30
Social Science Thursday Lunch Seminar ✦ *Endogenous Communication Networks with Belief Heterogeneity* ✦ **Muhamet Yildiz**, Massachusetts Institute of Technology; Member, School of Social Science

May 4
Social Norms and Cooperation Thematic Seminar ✦ *Michel Foucault and the Historicity of Social Norms* ✦ **Zouhair Ghazzal**, Loyola University Chicago; Member, School of Social Science

May 6
Non-normative Seminar ✦ *Why Plato Wrote* ✦ **Danielle S. Allen**, UPS Foundation Professor, School of Social Science

May 7
Social Science Thursday Lunch Seminar ✦ *Democracy-Enhancing Multilateralism* ✦ **Robert O. Keohane**, Princeton University; Visitor, School of Social Science

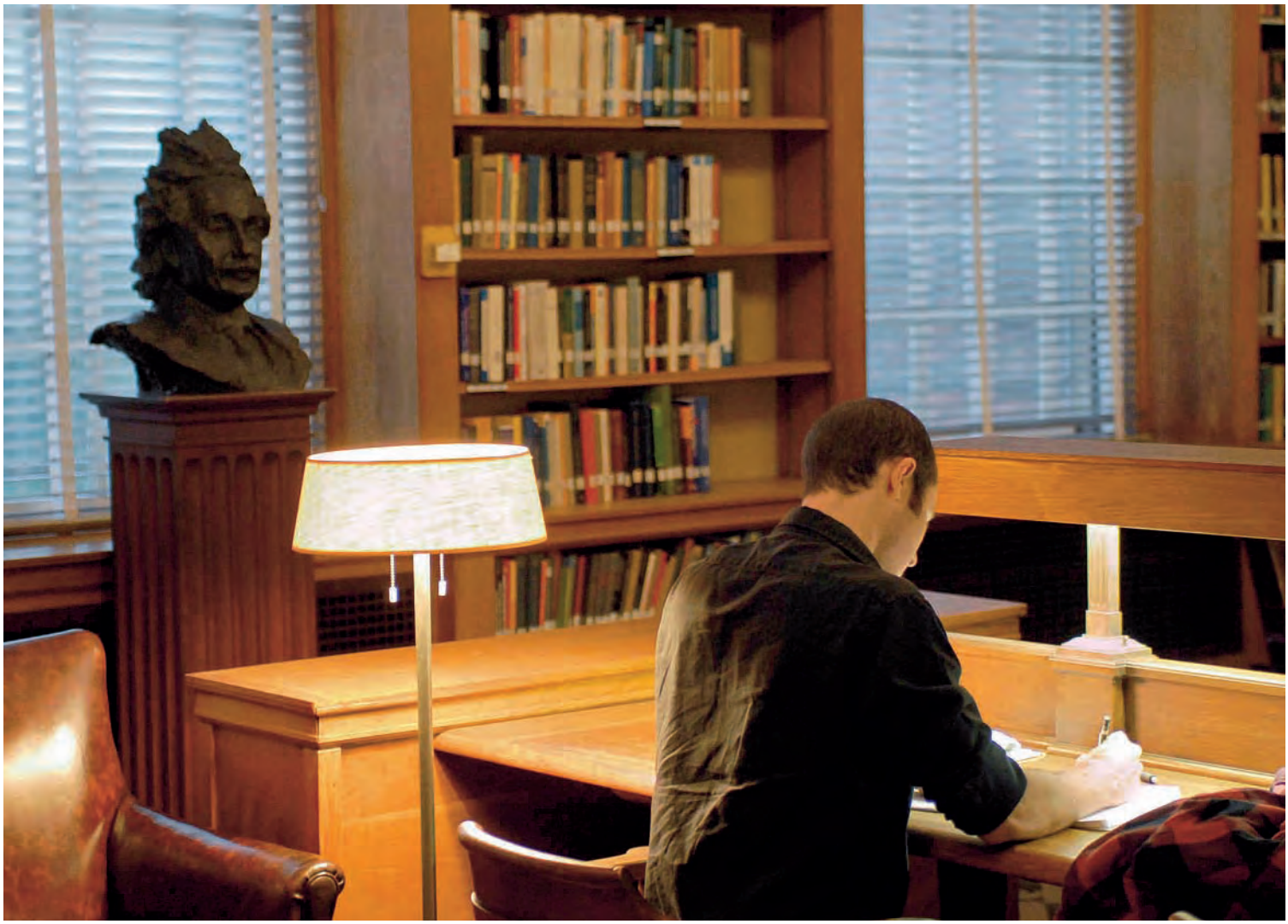
May 11
Social Norms and Cooperation Thematic Seminar ✦ *Kin Ties and Social Norms* ✦ **Charles J-H Macdonald**, CNRS and Université de la Méditerranée, Aix-Marseille II; Member, School of Social Science

May 13
Non-normative Seminar ✦ *Language, Politics, and Communities in Medieval Islamic Contexts* ✦ **Jennifer A. London**, The University of Chicago

May 18
Social Norms and Cooperation Thematic Seminar ✦ *Some Thoughts on Social Norms and Economics* ✦ **Sten Nyberg**, Stockholm University; Member, School of Social Science

May 20
Author Meets Critics Book Event ✦ *The Art of Power: Machiavelli, Nietzsche, and the Making of Aesthetic Political Theory* ✦ **Diego A. von Vacano**, Texas A&M University; Member, School of Social Science

May 21
Non-normative Seminar ✦ *From Microstoria to Ethnomethodology: Crime-in-Action in Contemporary Syria* ✦ **Zouhair Ghazzal**, Loyola University Chicago; Member, School of Social Science



CLIFF MOORE

Applicants to the Schools are primarily motivated by their need for free time in which to carry on research and writing.

The Libraries

The Historical Studies–Social Science Library (Marcia Tucker, Librarian) contains some 120,000 volumes and has subscriptions to over 1,000 journals. The Library is strongest in classical studies, ancient history, and archaeology, but it contains basic document collections, reference works, and important secondary works of scholarship in most fields of history and the social sciences. The journal collection is extensive, and fairly complete back runs exist to the founding of the Institute. The HS-SS Library has occupied its present building since 1964.

The Institute's rare book collection, the gift of Lessing J. Rosenwald, consists of about 2,000 volumes on the history of science and was compiled by Herbert M. Evans in the 1930s. The collection, which is housed in a special room, includes numerous first editions of important scientific works in mathematics, astronomy, physics, and the life sciences. Additional volumes have been added through various gifts, most notably through the Leon Levy Fund, expanding the subject scope of the collection. The HS-SS Library continues to process books from the library of Walther Heissig, a noted Central Asian–studies scholar. Walther Heissig's library came to the Institute partly as a gift and partly on deposit from the Princeton University East Asian Studies Department and Princeton University Library.

The HS-SS Library has an extensive collection of offprints including those received by Professors Andrew E. Z. Alföldi, Marshall Clagett, Kurt Gödel, Ernst H. Kantorowicz, Elias Avery Lowe, Millard Meiss, Erwin Panofsky, and Harry Woolf and former Members Robert Huygens and Walther Kirchner.

The microfilm collections of the HS-SS Library include a large selection from *Manuscripta*, a collection of several thousand fifteenth- to nineteenth-century printed books from the Vatican Library. The Bavarian Academy in 1965 provided the Institute with a microfilm copy of slips presented for the *Thesaurus Linguae Latinae* along with recent additional material on CD. The library has microfilm copies of the papers of Kurt Gödel and Simone Weil.

The Library houses the Institute archives. The records in the collection date from the 1930s and include official correspondence of the Director's Office, minutes of meetings of the Faculty and the Board of Trustees, correspondence concerning past Faculty and Members, records of the Electronic Computer Project, and the papers of select Faculty members. The archives also include the Institute's photograph collection and a growing oral history collection.

Through the generosity of the Leon Levy Foundation, the archives have been expanded significantly and are now staffed by a full-time archivist and archival assistant. The Shelby White and Leon Levy Archives Center enables the Institute to formally organize and preserve the important historical materials already in its possession and to serve as a repository for other essential source materials moving forward. The gift reflects the continuing, dedicated support of Institute Trustee Shelby White and the Leon Levy Foundation, a not-for-profit foundation formed after the death of White's husband Leon Levy, a leading financier who served as an Institute Trustee from 1988 to 2003.

The Mathematics–Natural Sciences Library (Momota Ganguli, Librarian) is based in Fuld Hall, with smaller departmental branches in Bloomberg Hall, and compact shelving spread across campus. The collection, which includes about 30,000 volumes of monographs and bound periodicals as well as 160 print and/or electronic subscriptions, spans pure and applied mathematics, astrophysics, theoretical and mathematical physics, and biology. The M–NS Library has an extensive collection of the collected works of mathematicians including those of Cauchy, Descartes, Fermat, Gauss, Hardy, and Poincaré. Each year, the M–NS Library adds about three hundred books to its collection.

Both of the Institute's libraries participate in the shared cataloguing system OCLC, which gives Institute scholars computerized access to a database that is in use by 57,000 libraries in 112 countries. The Institute is a member of the RLG Program SHARES partnership, a resource-sharing program. The Institute's Web-accessible online catalogue provides holdings information for the libraries and is accessible via http://library.hs.ias.edu from anywhere in the world.

The Historical Studies–Social Science Library maintains computers that provide access to scanners, a variety of software packages for both PCs and Macintoshes, and databases in the fields of Classics, the history of science, and Islamic and French studies. The M-NS Library's electronic resources include access to Math-SciNet, an online catalogue, a variety of indexes, and a growing collection of full-text journals. All scholars affiliated with the Institute enjoy the same privileges as Princeton University faculty in the Princeton University Library system. All scholars also have privileges in the Robert E. Speer Library of the Princeton Theological Seminary. The Librarians and the Faculty of all four Schools at the Institute warmly appreciate gifts of books and publications from former and current Members of the Institute.

The IAS Community

For seventy-nine years, the Institute for Advanced Study has had a profound influence on the fields of study represented here: Historical Studies, Mathematics, Natural Sciences, and Social Science. Any day at lunch or tea, you will hear leading scientists and scholars from around the world discussing topics as diverse as the response to terrorism, how to combat the next influenza virus, fourteenth-century Mongolian history, the very latest developments in string theory, and the mathematical basis of computer security.

Members, who typically stay for one year but may stay for up to five years, live together with their families in housing adjacent to the Institute campus in what might be described as a true academic village. Throughout the year, the Office of the Director hosts a broad range of concerts, lectures, programs, and forums, as listed on the following pages. In addition, the Institute offers a series of activities for Members, Visitors, and their families. In the 2008–09 academic year, these included films, play readings, ballroom dancing classes, yoga, tennis lessons, trips to museums and other cultural sites, and activities for children in the Institute community.

RECORD OF EVENTS

September 23
Member Welcome Reception

October 7
Lecture for the Institute Community ✦ *Half-Moon Needle in the Silk Rain Forest* ✦ **Sheila Hicks**, Artist

October 10
Friends Fireside Chat ✦ *Some Mountains of Asia* ✦ **Jeremy Bernstein**, Professor Emeritus, Stevens Institute of Technology

October 11
Edward T. Cone Concert Series ✦ *Tradition Redefined* ✦ **Orpheus Chamber Orchestra**

October 15
Public Lecture ✦ *The Fifth Element: Astronomical Evidence for Black Holes, Dark Matter, and Dark Energy* ✦ **Scott Tremaine**, Richard Black Professor, School of Natural Sciences

October 19
Princeton Symphony Orchestra Concert ✦ Works by Haydn and Brahms ✦ **Cyrus Beroukhim** and **Jesse Mills**, violins; **Dov Scheindlin**, viola; **Alistair MacRae**, cello; **Gilad Harel**, clarinet

October 24
Public Lecture ✦ *The "P vs. NP" Problem: Efficient Computation, Internet Security, and the Limits of Human Knowledge* ✦ **Avi Wigderson**, Herbert H. Maass Professor, School of Mathematics

October 27
Public Policy Lecture ✦ *Human Rights Challenges in the Next Decade* ✦ **Mary Robinson**, Chair, Realizing Rights: The Ethical Globalization Initiative

October 29
Film Screening ✦ *The Day After Trinity: J. Robert Oppenheimer and the Atomic Bomb* (1981) and *Wonders are Many: The Making of Doctor Atomic* (2007)

November 8
Live broadcast of *Doctor Atomic* from the Metropolitan Opera

Talks in Celebration of the Fiftieth Anniversary of IHÉS ✦ *The Constants of Nature* ✦ **Thibault Damour**, Professor, Institut des Hautes Études Scientifiques ✦ *Geometry in Bures and Princeton* ✦ **Robert MacPherson**, Hermann Weyl Professor, School of Mathematics

November 14 and 15
Edward T. Cone Concert Series ✦ *Tradition Redefined* ✦ **Matt Haimovitz**, cello; **Geoffrey Burleson**, piano

November 18
Film and Discussion ✦ *Wonders Are Many: The Making of Doctor Atomic* (2007) ✦ Discussion with **Freeman J. Dyson**, Professor Emeritus, School of Natural Sciences, and **Deborah Hoffmann**, editor, *Wonders Are Many*

November 19
Public Lecture ✦ *Compromises and Rotten Compromises* ✦ **Avishai Margalit**, George F. Kennan Professor, School of Historical Studies

November 21
Friends Culture and Cuisine ✦ **Ken Albala**, Professor, University of the Pacific ✦ *Lenten Controversies of the Reformation*

December 3
Friends Forum ✦ *IAS and the Globalization of Science* ✦ **Phillip A. Griffiths**, Professor, School of Mathematics, and Chair, Science Initiative Group, with **Arlen K. Hastings**, Executive Director, Science Initiative Group

December 4
Art as Knowledge Lecture Series ✦ *Anri Sala's Long Sorrow* ✦ **Michael Fried**, Professor, The Humanities Center, Johns Hopkins University

December 7
Princeton Symphony Orchestra Concert ✦ **Basia Danilow**, violin; **Ron Carbone**, viola; **Peter Sanders**, cello ✦ Goldberg Variations

January 9 and 10
Edward T. Cone Concert Series ✦ *Tradition Redefined* ✦ **eighth blackbird**

January 13
Member Welcome Reception

January 20
Art as Knowledge Lecture Series ✦ *The Unspeakable Subject of Hieronymus Bosch* ✦ **Joseph Leo Koerner**, Victor S. Thomas Professor, Department of History of Art and Architecture, Harvard University

February 4
Friends Forum ✦ *The Two Careers of Winston S. Churchill* ✦ **Peter J. Clarke**, Emeritus Professor, University of Cambridge

February 22
Princeton Symphony Orchestra Concert ✦ **Ruotao Mao** and **Hangan Zhang**, violins; **Jacqueline Watson**, viola; **Elizabeth Thompson**, cello ✦ Works by Mozart, Tchaikovsky, and Piazzolla

February 25
Public Lecture ✦ *Behavior Change as a Psychological Enterprise* ✦ **Deborah A. Prentice**, Visiting Professor, School of Social Science

PHOTO CREDITS, TOP TO BOTTOM: BENTLEY DREZNER, RANDALL HAGADORN, RANDALL HAGADORN, CLIFF MOORE, ANDREA KANE

PHOTO CREDITS, FROM TOP: BENTLEY DREZNER (FIRST THREE), KATE ABLUTZ, BENTLEY DREZNER

February 27

Friends Culture and Cuisine ✦ *Who Is General Tso and Why Are We Eating His Chicken? And Other Myths of Chinese Food Explained* ✦ **Jennifer 8. Lee**, Reporter, *The New York Times*

March 4

Lecture for the Institute Community ✦ *An Artist of and Against His Time: Ernst Barlach at the Princeton University Art Museum* ✦ **Peter Paret**, Professor Emeritus, School of Historical Studies

March 10

Art as Knowledge Lecture Series ✦ *Sovereign Power, Death, and Monuments* ✦ **Zainab Bahrani**, Edith Porada Professor of Ancient Near Eastern Art and Archaeology, Columbia University

March 11

Friends Forum ✦ *Morality and Climate Change* ✦ **Darrel Moellendorf**, Member, School of Social Science

March 20 and 21

Edward T. Cone Concert Series ✦ *Tradition Redefined* ✦ **Trio Solisti** with **Amy Burton**, lyric soprano

March 25

Public Lecture ✦ *Search for Randomness* ✦ **Jean Bourgain**, Professor, School of Mathematics

March 27

Concert for the Institute Community ✦ **The Choir of St. John's College, University of Cambridge**; Andrew Nethsingha, Director of Music

April 1

Friends Forum ✦ *Opera Preview: The Letter* ✦ **Paul Moravec**, Artistic Consultant, Institute for Advanced Study

April 19

Princeton Symphony Orchestra Concert ✦ Works by Telemann, Piston, Debussy, and others ✦ **Jayn Rosenfeld**, flute; **Stephanie Griffin**, viola; **Elizabeth Panzer**, harp

April 24

Friends Fireside Chat ✦ *Living Through London's Most Deadly Plague* ✦ **Dorothy C. Moote**, medical microbiologist, and **A. Lloyd Moote**, Emeritus Professor, University of Southern California

April 30

Leon Levy Foundation Lecture ✦ *Honor and Violence* ✦ **Barry O'Neill**, Leon Levy Foundation Member, School of Social Science

May 1

Public Lecture ✦ *Science and Technology in the Developing World: The Institute's Role* ✦ **Phillip A. Griffiths**, Professor, School of Mathematics, and Chair, Science Initiative Group

May 21

Einstein Legacy Society Lecture ✦ *Dreams Deferred? Rebuilding Your Retirement Strategy* ✦ **Brett Hammond**, Managing Director and Chief Investment Strategist, TIAA-CREF

June 11

Staff Picnic

After Hours Conversations

After Hours Conversations, a program conceived and organized by Caroline Walker Bynum of the School of Historical Studies and Piet Hut of the Program in Interdisciplinary Studies, was launched in February 2008 to encourage inter-School conversations in an informal and relaxed environment. In 2008–09, the program continued with talks held in Harry's Bar on the upper level of the Dining Hall every Monday, Tuesday, and Thursday in October and November and every Monday and Thursday in February and March. After a ten-minute presentation of a theme or problem of broad significance, there were twenty minutes of lively group discussion, often followed by continuing conversation as people lingered over drinks. Attendance varied from fifteen to sixty, and topics ranged from the Large Hadron Collider to the introduction of violin playing into Japan; the moons of Saturn; the role of women in physics; the problems raised by academic journal rankings; feminist history after the classic article written in 1986 by Joan Wallach Scott, Harold F. Linder Professor in the School of Social Science; and the Great Wall of China.

A webpage (www.ids.ias.edu/conversations0809.html) provides information on dates, speakers, and topics. The program will continue in 2009–10.

BENTLEY DREZNER

Professor Patricia Crone of the School of Historical Studies discusses a Muslim view of tolerance during After Hours Conversations.

RANDALL HAGADORN

Special Programs range from interdisciplinary studies and musical endeavors to building science capacity in the developing world.

Special Programs

Program in Interdisciplinary Studies

Professor **Piet Hut**'s activities included both his astrophysics research and his responsibilities as the Head of the Program of Interdisciplinary Studies. The latter program had twenty-one visitors, with durations of their visits ranging from days to months, in fields including physics, mathematics, biology, computational science, artificial intelligence, cognitive science, philosophy, history, education, law, library science, and media.

During the year, Hut, together with Professor Caroline Walker Bynum from the School of Historical Studies, organized a series of After Hours Conversations, which were held at the Institute in Harry's Bar, two or three times a week for a period of two months during each semester. Each gathering had a more formal part lasting thirty minutes, starting with a ten-minute talk by a speaker and followed by a twenty-minute period of questions. In addition, many participants would continue informal conversations afterward. These activities were widely seen as an effective way to lower the threshold for inter-School communication at the Institute.

Hut's main research focus this year continued to be his exploration of virtual worlds, especially Second Life, currently the largest nongame three-dimensional online virtual world, with a continued presence of well over 50,000 residents at any given time. In the spring of 2008, he brought into Second Life an organization that he had founded a year earlier, the Meta Institute for Computational Astrophysics (MICA; www.mica-vw.org). During the first year of its operation, MICA developed into a kind of virtual astronomy department, with regular colloquia for professional astrophysicists as well as outreach events, including popular talks about astronomy as well as "ask an astronomer" sessions in which amateur astronomers were invited to engage in questions with the professionals present.

In addition to these weekly events, MICA organized a workshop at the California Institute of Technology where participants in Second Life joined those physically present. This was a fascinating so-called "mixed reality" event combining the advantage of face-to-face interactions between the local participants with the ease of accessing remote participants through the use of virtual world technology.

Another dimension of conducting science in virtual worlds was added in the summer of 2008, when Hut and his coworkers used an open-source version of Second Life, called OpenSim, to perform N-body simulations. Through a relatively small change in the physics engine, the software module that governs gravity and other physical effects, they were able to replace simple constant-force gravity on the surface of the earth by the Newtonian inverse-square force law. As a result, creating a bunch of stars and letting them loose in the virtual sky resulted in a realistic stellar dynamics simulation. In this way, it was straightforward to turn a virtual world into a virtual astrophysical laboratory.

Another institute cofounded by Hut, Kira (www.kira.org), was introduced into Second Life in the fall of 2008. Kira was founded twelve years ago as a broadly interdisciplinary institute by faculty members from Stanford University, Princeton University, the Institute, and elsewhere, as a forum to discuss the nature of scientific knowledge and to compare it with other ways of knowing, from philosophy and art to various contemplative traditions. The move into a virtual world was very successful. Whereas Kira had been able to offer one summer school and several weekend workshops annually, the virtual Kira Institute soon offered half-a-dozen events every day. In this way, Kira has become one of the most vibrant organizations in Second Life.

RANDALL HAGADORN

Professor Piet Hut (near right) continued his exploration of conducting science in virtual worlds.

Artist-in-Residence Program

Paul Moravec, Composer

The 2008–09 academic year marked the second season of "Tradition Redefined," led by Pulitzer Prize-winning composer Paul Moravec, who served this year as Artistic Consultant to the Institute. "Tradition Redefined" was developed to explore the wide variety of aesthetic perspectives in art music, especially of the twentieth and twenty-first centuries, through chamber music concerts and talks.

The Edward T. Cone Concert Series began with the Orpheus Chamber Orchestra, which performed a commissioned piece by Moravec, *Brandenburg Gate*. Orpheus premiered this piece at Carnegie Hall the week following their Institute appearance. The Orpheus concerts, which were scheduled back-to-back on Saturday rather than the usual Friday and Saturday performances, also featured the Haydn Symphony No. 59 in A Major. The second concert weekend of the season featured cellist Matt Haimovitz, who was joined by pianist Geoffrey Burleson in a program of music by Beethoven, Elliott Carter, Samuel Barber, and Moravec. The spring concerts began with performances by eighth blackbird and featured the music of contemporary composers including Franco Donatoni, Kati Agócs, Frederic Rzewski, Stephen Hartke, Thomas Adès, Dennis DeSantis, Roshanne Etezady, and Moravec. The final concerts of the season featured a return visit by Trio Solisti, this time accompanied by soprano Amy Burton. Music included works by Schubert, Brahms, Mussorgsky, and the world premiere of Moravec's *Vita Brevis*.

In addition to directing "Tradition Redefined," during the 2008–09 year Moravec composed a Concerto for Clarinet and Orchestra, which had its premiere by the Princeton Symphony Orchestra in January 2009, two pieces for Charles Simonyi, Chairman of the Institute's Board of Trustees, and Board Vice Chairman Martin Leibowitz in October 2008, and several short works for the New Jersey Music Teachers Association. He also composed *Mortal Flesh* for Quartet New Generation and *Quattrocelli* for 4inCorrespondence. His opera *The Letter* was scheduled to premiere at the Santa Fe Opera in July 2009.

Moravec returned to his position as University Professor at Adelphi University when his term ended on June 30, 2009.

RANDALL HAGADORN

Artistic Consultant Paul Moravec (far right) on stage in Wolfensohn Hall with the Orpheus Chamber Orchestra

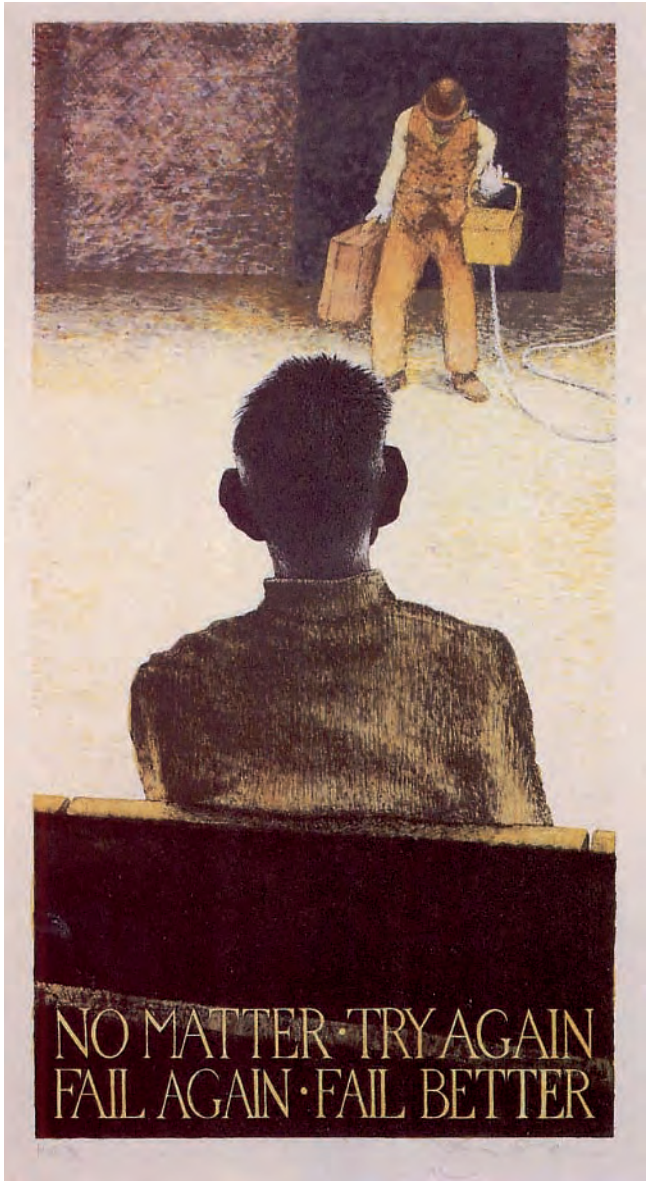
Director's Visitors

Director's Visitors, scholars who work in a variety of fields, including areas not represented in the Schools, contribute much to the vitality of the Institute. They are invited to the Institute for varying periods of time, depending on the nature of their work.

Peter Clarke, Emeritus Professor of Modern British History at the University of Cambridge and a Fellow of the British Academy, expected to work on Winston Churchill and the concept of the English-speaking peoples. He gave a well-attended lecture to the Friends of the Institute for Advanced Study on February 4, "The Two Careers of Winston S. Churchill," which explored the seriousness of Churchill's commitment—and earnings—as a writer. However, with the economic crisis and the debate over appropriate responses to it, Clarke decided to revive his earlier research on John Maynard Keynes, with a new study of the economist's continuing relevance. The book that resulted, *Keynes: The Twentieth Century's Most Influential Economist*, will be published by Bloomsbury in New York and London in September. Its foundations were laid at the Institute, not only through the availability of research facilities but also through the intellectual stimulation of Clarke's many informal discussions with other scholars.

The greatest luxury one can have in a career is that of failure and this year in fine surroundings and good company **Tom Phillips** (painter, writer, composer) failed to come up with the thought goods in two projects. This was of great value to him. In Samuel Beckett's words: No matter. Try again. Fail again. Fail better.

Maria Tippett, former Senior Research Fellow of Churchill College at the University of Cambridge and a Fellow of the Royal Society of Canada whose books have dealt with the cultural history of Canada and Britain, came to the Institute to complete work on a very different area of study: the family biography of Paul and Sonia Ho whose son, David Ho, is not only a distinguished scientist but also Director of the Aaron Diamond AIDS Research Center in New York. During her stay at the Institute, Tippett not only completed her book, *Family Matters*, she benefited from the expertise of two scholars in radically different fields: School of Historical Studies Visitor Miaw-fen Lu of the Academia Sinica in Taiwan and Arnold Levine, Professor in the School of Natural Sciences. In addition, she enjoyed the lively discussions and weekly seminars.



Samuel Beckett at Riverside Studios, 1984, a lithograph by Tom Phillips

Institute for Advanced Study/Park City Mathematics Institute (PCMI)

The IAS/Park City Mathematics Institute (PCMI) is a program of professional development for the mathematics community, including research mathematicians, graduate students, undergraduate students, mathematics education researchers, undergraduate faculty, and mathematics teachers at the secondary school level. PCMI has been an outreach program of the Institute for Advanced Study since 1994.

The flagship activity of PCMI is the three-week residential Summer Session, held annually in Park City, Utah, a program that combines high-quality lectures/seminars with activities and events designed to foster all-institute interaction. This interaction serves to increase awareness of the roles of professionals in all mathematics-based occupations and creates a strong sense of community.

In addition to the annual Summer Session, PCMI offers year-round professional development activities to secondary school mathematics teachers through its Math Science Partnership project or in the many Professional Development and Outreach (PDO) groups.

The Graduate Summer School lectures are typically disseminated through the *Park City Mathematics Series* of lecture notes, a series targeted at graduate students and researchers, published by the American Mathematical Society (AMS). Also published by the AMS is a series of lectures from PCMI's Undergraduate Summer School. The Math Forum publishes online the products created by PCMI's Secondary School Teachers Program, and the proceedings and briefs authored by PCMI's International Seminar on Mathematics Education are also available on the Math Forum website.

A more detailed Annual Report is available at http://pcmi.ias.edu.

The Annual Summer Session

The nineteenth annual Summer Session, held June 28–July 18, 2009, in Park City, Utah, attracted some 325 participants in all programs.

The following programs took place during the Summer Session:

Designing and Delivering Professional Development Seminar (one week)
Graduate Summer School
International Seminar on Mathematics Education (one week)
Research Program in Mathematics
Secondary School Teachers Program
Undergraduate Faculty Program
Undergraduate Summer School

Except as noted, all programs met for the entire three weeks.

The mathematical topic informs the courses and seminars for the Graduate Summer School, the Research Program, the Undergraduate Summer School, and the Undergraduate Faculty Program; in 2009, the topic was "The Arithmetic of L-functions." The topic "Making Mathematical Connections" provided the focus for the International Seminar, the Designing and Delivering Professional Development seminar, and the Secondary School Teachers Program.

Each of the programs met daily for a series of courses and seminars. The groups also met together for Cross Program Activities three or four days each week.

Opening social events were held for each program on the evening of registration day. They were designed to introduce participants to their program's leaders in a casual setting and to foster early acquaintances among the diverse population of each program.

Graduate Summer School and Research Program

The Graduate Summer School and the Research Program were organized by Professors Cristian Popescu, University of California, San Diego; Karl Rubin, University of California, Irvine; and Alice Silverberg, University of California, Irvine. This year's program focused on recent developments in the area of special values of L-functions. The main themes were Stark's conjecture, the Birch and Swinnerton-Dyer conjecture, their generalizations, and related topics.

With the addition of financial support from institutional and individual research grants, the program was able to accommodate seventy-seven graduate student participants and fifty-five researchers. The stimulating environment of PCMI will leave a lasting mark on the field through the many students who were able to benefit from the courses and from the collaborations forged among the research participants.

The Graduate Summer School

The 2009 Graduate Summer School included a series of lectures to introduce Stark's conjecture and the Birch and Swinnerton-Dyer conjecture, and a series of lectures describing the methods used to attack these conjectures over the past thirty years, as well as current research. The speakers did an excellent job of making their lectures as accessible as possible to the students.

CAROL HATTAN

Participants in the Secondary School Teachers Program spent three weeks learning mathematics and reflecting on what it means to teach mathematics.

In addition to daily discussion sessions, there were eight series of lectures, each consisting of approximately five lectures, plus two special lectures: "Introduction to Stark's Conjectures," John Tate, University of Texas, Austin; "Root Numbers," David Rohrlich, Boston University; "Introduction to the Birch and Swinnerton-Dyer Conjecture," Benedict Gross, Harvard University; "The Equivariant Tamagawa Number Conjecture," David Burns, King's College London, and Guido Kings, Universität Regensburg; "Integral Abelian Stark-type Conjectures," Manfred Kolster, McMaster University, and Cristian Popescu, University of California, San Diego; "Euler Systems," Karl Rubin, University of California, Irvine; "The Birch and Swinnerton-Dyer Conjecture over Function Fields," Douglas Ulmer, University of Arizona; "Complex Multiplication and Heegner Points," Vinayak Vatsal, University of British Columbia; "Historical Overview," Bryan Birch, University of Oxford; "Introduction to Elliptic Curves," Alice Silverberg, University of California, Irvine.

On the final afternoon there was an extended session of graduate student presentations. The student participants had an opportunity to give short talks on their work to an audience of their peers and experts in the field.

The Research Program

The Research Program consisted of two daily talks given by experts in the field. In addition, most of the Research Program participants attended the Graduate Summer School lectures, and there was plenty of time available for informal discussions. A complete list of the Research Program seminars may be found in the Annual Report posted at http://pcmi.ias.edu.

Clay Mathematics Institute Senior Scholars-in-Residence

Through the generous support of the Clay Mathematics Institute, Cambridge, Massachusetts, PCMI welcomed three Senior Scholars-in-Residence to the 2009 Summer Session: John Tate of the University of Texas at Austin, Benedict Gross of Harvard University, and Bryan Birch of the University of Oxford. All three Scholars played pivotal roles in the Research Program, both formally and informally.

Undergraduate Summer School

More than forty undergraduate students attended the Undergraduate Summer School (USS) at the PCMI Summer Session. As usual, it was organized around two courses: the introductory course, "Elliptic Curves, Modular Forms, and L-functions," was given by Alvaro Lozano-Robledo of the University of Connecticut; the advanced course, "Dirichlet L-functions, Generalizations and Applications," was given by Keith Conrad, also of the University of Connecticut.

The USS is connected to a three-week Research Experience for Undergraduates (REU) summer program held at the University of Utah; the REU program, "Integral Binary Quadratic Forms," immediately preceded PCMI and was conducted by Gordan Savin of the University of Utah. Twelve of the REU students participated in PCMI's USS.

Undergraduate Faculty Program

For faculty members whose main focus is teaching undergraduate students, the Undergraduate Faculty Program (UFP) at PCMI offers the opportunity to renew excitement about mathematics, talk with peers about new teaching approaches, address some challenging research questions, and interact with the broader mathematical community. The UFP is unique in that it bridges the educational and research objectives of PCMI, attracting, in addition to the UFP participants, undergraduates and graduate students as well as participants from the Secondary School Teachers Program.

This year's UFP instructor/coordinator was David Pollack of Wesleyan University. The centerpiece of the UFP was a compressed introductory lecture course on number theory, with each lecture accompanied by a discussion of teaching techniques. Pollack also met with the participants in a seminar setting every day to discuss the context and breadth of the subject. In addition, the participants worked together in small groups to produce classroom modules on topics in algebraic number theory.

The Secondary School Teachers Program

Fifty-five middle school and high school teachers spent three weeks learning mathematics, reflecting on what it means to teach mathematics, and working together to create a product to share with their colleagues both at PCMI and more broadly through the PCMI website.

Of the teacher participants, about one-third were returning for a second or third year; eight participants were fellows from the Math for America program; more than half of the participants were affiliated with either PCMI's Math Science Partnership Project (also known as PD^3) or PCMI's PDO groups; and the remaining participants came as individuals from a variety of locations across the country. The range of teaching experience among participants in the Secondary School Teachers Program (SSTP) ran from one year of teaching to seasoned veterans.

As in the past eight years, the mathematics session, "Developing Mathematics: Some Questions and Problems from Arithmetic," used materials created by a team led by Al Cuoco and Bowen Kerins from the Educational Development Center (EDC) and the PROMYS for Teachers program at Boston University. Instructors for the course were Darryl Yong from Harvey Mudd College and Kerins, a former teacher and mathematics educator from EDC.

In the daily "Reflecting on Practice" session, participants considered the role of questioning in student learning. Videos of classrooms from the United States and other countries, as well as transcripts, research findings, articles, state assessment results, and instructional materials were used to prompt an analysis of why questioning is important and how questions can be used to push and probe student thinking about mathematics.

Participants also took part in one of seven working groups on data analysis, functions, geometry, discrete mathematics, observation of teaching, lesson study, and the mathematics course given as part of PCMI's UFP. The working groups explored technology, developed lessons and classroom activities, and created drafts of potential articles on interesting and useful mathematics that will be tested in classrooms when appropriate, reviewed during the coming year, revised as necessary, and posted on the PCMI website.

Designing and Delivering Professional Development

During the second week of the SSTP program, fourteen mathematics supervisors and university faculty attended the one-week workshop on Designing and Delivering Professional Development (DDPD). The goals of the DDPD program are to provide professional development for the leaders of PCMI's PDO groups and PCMI's PD^3 project, allow experienced PDO leaders to mentor new ones, allow the PDO and PD^3 leaders to interact with their participants in the SSTP, and encourage the formation of new PDO groups.

The DDPD participants attended some SSTP sessions and, under the leadership of Johnny Lott from the University of Mississippi, spent time considering the role of functions and their treatment in secondary mathematics and in professional development programs.

International Seminar on Mathematics Education

Begun in 2001, the annual PCMI International Seminar "Mathematics Education: Bridging Policy and Practice" brings diverse perspectives and practices to a U.S. national dialogue on mathematics education. The 2009 International Seminar focused on the topic of functions: the teaching of functions and teacher preparation for the teaching of functions, as well as the implications of technology and the mathematical knowledge needed by teachers working with this concept. This year's seminar brought teams from Australia, Cambodia, Denmark, Israel, Namibia, Peru, and Vietnam to work with a team from the U.S. Each country was invited to send two participants: a currently practicing teacher and an educational policy or university person.

During the seminar, team members presented a response based on their country's view of secondary education to specific questions related to function and the teaching of functions. Participants raised clarifying questions and discussed the implications of the response from the perspective of their own cultures.

Cross Program Activities

Cross Program Activities take many forms and are a defining feature of PCMI, serving to build understanding, professional respect, and a sense of shared purpose among all the constituents of the mathematical enterprise. Formal and informal Cross Program Activities were held in the afternoons and evenings during the 2009 Summer Session.

Informal activities included building an entry for, and participating in, the Annual Park City Fourth of July Parade, the opening and closing dinners for participants and their families, an ice cream social hosted by the SSTP, the PCMI Film Festival, and a session of building structures with Zometools (also hosted by the SSTP).

Formal Cross Program Activities included the following presentations: "The Essential Unity of Mathematics: From a Problem in High School Mathematics to Current Research," Bill McCallum, University of Arizona; "Canonical Forms: A Mathematician's View of Musical Canons," Noam Elkies, Harvard University; "Development of Mathematics Circles in North America," Hugo Rossi and Emina Alibegovic, University of Utah; "Pell's Equation," Keith Conrad, University of Connecticut; "Cryptography: How to Keep a Secret," Alice Silverberg, University of California, Irvine; "Pizza and Problem Solving," (two sessions), Andrew Bernoff, Harvey Mudd College.

The Clay Senior Scholars-in-Residence gave two public lectures: "An Introduction to the Birch and Swinnerton-Dyer Conjecture," Benedict Gross of Harvard University; and "Infinite Sums, from Zeno to Taylor to Euler to Dirichlet," John Tate of the University of Texas at Austin.

PD^3: PCMI and Districts Partner to Design Professional Development

Through the Math Science Partnership grant awarded by the National Science Foundation (NSF) in 2003, PCMI became the prototype "institute" for the nationwide project. PCMI's award expired in the summer of 2009, and our site projects located in New Mexico, Texas, and Washington are winding down their activities.

However, through a special Noyce Teacher Salary Supplement award, some of the key professional development activities created by the PD^3 project will continue through 2011.

Through PD^3, PCMI strives to attain three goals that will bring improvement in teaching and learning mathematics in a target school: a) teachers open their doors (to colleagues, administrators, and parents) and make teaching public; b) district and building administrators' support the PD^3 professional development program; c) teachers serve as leaders in developing and modeling ways to improve mathematics teaching and learning in their buildings and districts.

The PD^3 project comprises targeted schools in three specific areas of the United States: Seattle, Washington; McAllen, Texas; and Las Cruces, New Mexico (including the neighboring Gadsden School District). In each of the schools/districts, the teachers and district administrators work in concert with university mathematicians and mathematics educators to design professional development offerings that are unique to the needs of each school's teachers and curriculum. The anticipated unit of change is the individual school, with the long-term goal of infusing this process of improvement to other schools and eventually to the entire district. Progress has been made toward this goal in Seattle, with the school district having adopted key aspects of the offerings of PD^3, in particular supporting professional development around complex instruction. In McAllen, the project enjoys excellent support from the school district and has created a district-wide camp for rising ninth graders known as "Jump Up to High School Math." The New Mexico site was a latecomer to the project; however, professional development focused on Japanese lesson study has begun to make a difference in how teachers think about their practice and has been noticed by district administrators.

Teacher Professional Continuum (TPC) Project

Since 2001, PCMI has offered a problem-based mathematics course to SSTP participants at the annual Summer Session based on a mathematical theme related in some way to the PCMI mathematical topic. In 2006, the NSF awarded a grant to PCMI whereby this mathematical course is being developed into a published series of professional development materials suitable for use 1) by universities as undergraduate courses, 2) by professional development organizations, and 3) by other programs and organizations, including in-service teachers. The materials, created by the Education Development Center, are unique in their approach to mathematics-based professional development for teachers, requiring group work and offering multiple points of access to accommodate the varying education levels of participants.

Publication Series

Published by the American Mathematical Society (AMS), the *Park City Mathematics Series* comprises nearly all of the lectures ever given in PCMI's Graduate Summer School. Also published are six volumes in the *Park City Mathematics Institute Subseries,* a subsection of the AMS *Student Mathematics Series*. These volumes are aimed at undergraduate students and are published independently of the *Park City Mathematics Series*. The SSTP disseminates its teacher-created materials and other resources via a special website created by the Math Forum at Drexel University. A full list of PCMI's publications is included in the Annual Report available at http://pcmi.ias.edu.

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Appreciation is also extended to the Department of Mathematics at the University of Utah.

The topic for the 2010 Summer Session will be "Image Processing." The organizers are Tony F. Chan of the University of California, Los Angeles; Ronald A. DeVore of the University of South Carolina, Columbia; Stanley Osher of the University of California, Los Angeles; and Hongkai Zhao of the University of California, Irvine. The Clay Senior Scholars-in-Residence for the 2010 Summer Session will be Jean-Michel Morel of École Normale Supérieure de Cachan and Ingrid Daubechies of Princeton University.

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Science Initiative Group (SIG)

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Some seventy-five students are enrolled in the fifteen universities and research institutes that make up the five RISE networks in sub-Saharan Africa, which provide Ph.D. and M.S. training in science and engineering.

A year ago, the Science Initiative Group reported on the establishment of the Regional Initiative in Science and Education (RISE), which provides Ph.D. and M.S. training in science and engineering at networks of universities in sub-Saharan Africa. As of June 2008, three RISE networks had been selected from among forty-eight candidates to receive funding through a grant to SIG from Carnegie Corporation of New York. At the strong urging of the RISE selection committee, SIG obtained a supplementary grant from Carnegie Corporation to support two additional outstanding networks. They are:

African Natural Products Network (RISE-AFNNET)

Academic Director: John David Kabasa, Natural Products Research Laboratory, Department of Physiological Sciences, Makerere University, Uganda

Other participating institutions:
University of Nairobi, Kenya
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Sub-Saharan Africa Water Resources Network (SSAWRN)

Academic Director: Denis Hughes, Director, Institute for Water Research, Rhodes University, South Africa

Other participating institutions:
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Makerere University, Uganda

These two networks—along with the earlier-named African Materials Science and Engineering Network (AMSEN, with participating institutions in Botswana, Kenya, Namibia, Nigeria, and South Africa); Southern African Biochemistry and Informatics for Natural Products (SABINA, in Malawi, Namibia, South Africa, and Tanzania); and Western Indian Ocean Regional Initiative in Marine Science and Education (WIO-RISE, in Mozambique, South Africa, and Tanzania)—initiated their research and training programs in early 2009.

Students earning their degrees through RISE come from all nine countries where RISE has a presence. Some are recent university graduates who are continuing their education with an eye toward university research and teaching careers, while others are faculty members seeking to upgrade their qualifications and then resume teaching and research at their home universities. Some seventy-five students are enrolled in the fifteen universities and research institutes that make up the five RISE networks, and each has access to the facilities and expertise available at all institutions within the network.

The work at **AMSEN** focuses on developing the skills in materials science and engineering needed to add value to the extensive mineral deposits in southern Africa.

Faculty and students involved with **RISE-AFFNET** are seeking to develop Africa's rich biodiversity into a natural products industry of social and economic significance through coursework and research in engineering, biochemistry, environmental science, pharmacology, economic development, and nutrition.

SABINA takes advantage of the biodiversity of southern Africa, working with natural products that have the potential to increase food security, public health, and value-added exports. SABINA's research emphasis is on biochemistry and chemistry of natural products.

At **SSAWRN**, research and instruction centers on the most pressing water issues of sub-Saharan Africa, including rising use, declining quality, insufficient research and teaching capacity, inadequate weather stations, and the likelihood of increased variability of water supplies associated with future climates.

WIO-RISE provides research and training in skills associated with the utilization of coastal and marine resources and protection of the coastal and marine environment.

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Institute for Advanced Study—
Louis Bamberger and Mrs. Felix Fuld Foundation

Financial Statements
June 30, 2009 and 2008

(With Independent Auditors' Report Thereon)

Independent Auditors' Report

The Board of Trustees
Institute for Advanced Study–Louis Bamberger and Mrs. Felix Fuld Foundation:

We have audited the accompanying statements of financial position of Institute for Advanced Study–Louis Bamberger and Mrs. Felix Fuld Foundation (the Institute) as of June 30, 2009 and 2008, and the related statements of activities and cash flows for the years then ended. These financial statements are the responsibility of the Institute's management. Our responsibility is to express an opinion on these financial statements based on our audits.

We conducted our audits in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes consideration of internal control over financial reporting as a basis for designing audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Institute's internal control over financial reporting. Accordingly, we express no such opinion. An audit also includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of Institute for Advanced Study–Louis Bamberger and Mrs. Felix Fuld Foundation as of June 30, 2009 and 2008, and the changes in its net assets and its cash flows for the years then ended in conformity with U.S. generally accepted accounting principles.

KPMG LLP

November 17, 2009

STATEMENTS OF FINANCIAL POSITION
JUNE 30, 2009 AND 2008

Assets		2009	2008
Cash	$	312,162	954,245
Accounts receivable		1,328,265	905,024
Government grants and contracts receivable		2,107,272	2,780,100
Prepaid and other assets		498,011	683,449
Contributions receivable—net		3,047,310	3,558,944
Unamortized debt issuance costs—net		632,006	695,483
Funds held by trustee		8,587,408	10,864,390
Beneficial interest in remainder trust		2,654,256	3,350,996
Land, buildings and improvements, equipment and rare book collection—net		60,693,542	60,465,060
Investments		530,320,152	666,901,593
Total assets	$	610,180,384	751,159,284
Liabilities and Net Assets			
Liabilities:			
Accounts payable and accrued expenses	$	7,560,855	7,049,395
Deferred revenue		9,403,447	6,704,673
Liabilities under split-interest agreements		2,247,809	2,387,758
Accrued benefit obligation		10,469,000	9,089,256
Asset retirement obligation		908,878	874,438
Bond swap liability		3,514,367	1,874,573
Note payable		557,724	621,402
Long-term debt		60,064,009	62,458,856
Total liabilities		94,726,089	91,060,351
Net assets:			
Unrestricted		322,590,494	423,316,404
Temporarily restricted		114,834,907	165,627,184
Permanently restricted		78,028,894	71,155,345
Total net assets		515,454,295	660,098,933
Total liabilities and net assets	$	610,180,384	751,159,284

See accompanying notes to financial statements.

STATEMENT OF ACTIVITIES
YEAR ENDED JUNE 30, 2009

	Unrestricted	Temporarily restricted	Permanently restricted	Total
Operating revenues, gains and other support:				
Private contributions and grants	$ —	6,645,957	—	6,645,957
Government grants	—	6,893,184	—	6,893,184
Endowment spending policy	25,874,809	10,218,991	—	36,093,800
Auxiliary activity	4,815,473	—	—	4,815,473
Net assets released from restrictions—satisfaction of program restrictions	23,758,132	(23,758,132)	—	—
Total operating revenues, gains and other support	54,448,414	—	—	54,448,414
Expenses:				
School of Mathematics	9,312,306	—	—	9,312,306
School of Natural Sciences	10,563,018	—	—	10,563,018
School of Historical Studies	6,770,010	—	—	6,770,010
School of Social Science	3,651,834	—	—	3,651,834
Libraries and other academic	7,067,704	—	—	7,067,704
Administration and general	11,754,699	—	—	11,754,699
Auxiliary activity	5,720,414	—	—	5,720,414
Total expenses	54,839,985	—	—	54,839,985
Change in net assets from operations, including depreciation	(391,571)	—	—	(391,571)
Other revenues, gains and other support:				
Private contributions and grants	275,006	330,418	6,873,549	7,478,973
Endowment change after applying spending policy	(99,677,754)	(51,122,695)	—	(150,800,449)
Change in fair value of bond swap liability	(1,639,794)	—	—	(1,639,794)
Gain on sale of plant assets	278,072	—	—	278,072
Gain on bond swap transaction	430,131	—	—	430,131
Change in net assets	(100,725,910)	(50,792,277)	6,873,549	(144,644,638)
Net assets—beginning of year	423,316,404	165,627,184	71,155,345	660,098,933
Net assets—end of year	$ 322,590,494	114,834,907	78,028,894	515,454,295

See accompanying notes to financial statements.

STATEMENT OF ACTIVITIES
YEAR ENDED JUNE 30, 2008

	Unrestricted	Temporarily restricted	Permanently restricted	Total
Operating revenues, gains and other support:				
Private contributions and grants	$ —	4,912,365	—	4,912,365
Government grants	—	6,669,653	—	6,669,653
Endowment spending policy	22,341,145	9,528,355	—	31,869,500
Auxiliary activity	4,736,416	—	—	4,736,416
Net assets released from restrictions—satisfaction of program restrictions	21,110,373	(21,110,373)	—	—
Total operating revenues, gains and other support	48,187,934	—	—	48,187,934
Expenses:				
School of Mathematics	8,694,889	—	—	8,694,889
School of Natural Sciences	9,596,216	—	—	9,596,216
School of Historical Studies	5,699,130	—	—	5,699,130
School of Social Science	3,208,209	—	—	3,208,209
Libraries and other academic	5,300,486	—	—	5,300,486
Administration and general	11,178,375	—	—	11,178,375
Auxiliary activity	5,186,983	—	—	5,186,983
Total expenses	48,864,288	—	—	48,864,288
Change in net assets from operations, including depreciation	(676,354)	—	—	(676,354)
Other revenues, gains and other support:				
Private contributions and grants	2,709,349	1,725,690	10,546,406	14,981,445
Endowment change after applying spending policy	(20,411,124)	(8,960,212)	—	(29,371,336)
Change in fair value of bond swap liability	(1,796,708)	—	—	(1,796,708)
Gain on sale of plant assets	9,200	—	—	9,200
Gain on defeasance of debt	8,697	—	—	8,697
Change in net assets	(20,156,940)	(7,234,522)	10,546,406	(16,845,056)
Net assets—beginning of year	443,473,344	172,861,706	60,608,939	676,943,989
Net assets—end of year	$ 423,316,404	165,627,184	71,155,345	660,098,933

See accompanying notes to financial statements.

STATEMENTS OF CASH FLOWS
YEARS ENDED JUNE 30, 2009 AND 2008

	2009	2008
Cash flows from operating activities:		
Change in net assets	$ (144,644,638)	(16,845,056)
Adjustments to reconcile change in net assets to net cash used in operating activities:		
Depreciation	3,752,797	3,644,140
Contributions restricted for endowment and plant	(7,503,021)	(9,527,236)
Net realized and unrealized losses	113,984,366	5,694,264
Change in fair value of bond swap liability	1,639,794	1,796,708
Gain on sale of plant assets	(278,072)	(9,200)
Gain on defeasance of debt	—	(8,697)
Amortization of debt issuance costs	63,477	103,660
Amortization of bond discount	30,153	26,742
Changes in assets/liabilities:		
Accounts receivable and government grants and contracts receivable	249,587	596,624
Prepaid and other assets	185,438	221,256
Contributions receivable	511,634	(2,633,789)
Beneficial interest in remainder trust	696,740	424,292
Accounts payable and accrued expenses	511,460	1,446,525
Refundable advances	2,698,774	739,596
Accrued benefit obligation	1,379,744	(2,915,495)
Asset retirement obligation	34,440	28,840
Net cash used in operating activities	(26,687,327)	(17,216,826)
Cash flows from investing activities:		
Proceeds from sale of plant assets	1,075,930	537,774
Purchase of plant assets	(4,779,137)	(12,259,996)
Proceeds from sale of investments	929,042,835	727,962,734
Purchase of investments	(906,445,760)	(714,190,713)
Net cash provided by investing activities	18,893,868	2,049,799
Cash flows from financing activities:		
Contributions restricted for endowment and plant	7,503,021	9,527,236
Decrease in liabilities under split-interest agreements	(139,949)	(337,909)
Increase in unamortized debt issuance costs	—	(138,737)
Increase in bond discount on long-term debt	—	(94,253)
Repayment of long-term debt	(2,425,000)	(2,015,000)
Defeasance of long-term debt	—	(11,295,000)
Proceeds from issuance of long-term debt	—	11,544,121
Repayments of note payable	(63,678)	(62,423)
Decrease in funds held by trustee	2,276,982	6,448,835
Net cash provided by financing activities	7,151,376	13,576,870
Net decrease in cash	(642,083)	(1,590,157)
Cash—beginning of year	954,245	2,544,402
Cash—end of year	$ 312,162	954,245
Supplemental data:		
Interest paid	$ 2,041,407	1,740,125

See accompanying notes to financial statements.

(1) Organization and Summary of Significant Accounting Policies

Organization

The Institute for Advanced Study—Louis Bamberger and Mrs. Felix Fuld Foundation (the Institute), an independent, private institution devoted to the encouragement, support and patronage of learning, was founded in 1930 as a community of scholars where intellectual inquiry could be carried out in the most favorable circumstances.

Focused on mathematics and classical studies at the outset, the Institute today consists of the School of Historical Studies, the School of Mathematics, the School of Natural Sciences and the School of Social Science. Each school has a small permanent faculty, and some 190 fellowships are awarded annually to visiting members from other research institutions and universities throughout the world.

The objectives of the Institute were described as follows in the Founders' original letter to the first Trustees: "The primary purpose is the pursuit of advanced learning and exploration in fields of pure science and high scholarship to the utmost degree that the facilities of the institution and the ability of the faculty and students will permit."

Summary of Significant Accounting Policies

Basis of Presentation

The accompanying financial statements, which are presented on the accrual basis of accounting, have been prepared to focus on the Institute as a whole and to present net assets and revenues, expenses, gains, and losses based on the existence or absence of donor-imposed restrictions. Accordingly, net assets and changes therein are classified as follows:

- Permanently restricted net assets—net assets subject to donor-imposed stipulations that they be maintained permanently by the Institute. Generally, the donors of these assets permit the Institute to use all or part of the income earned on related investments for general or specific purposes.
- Temporarily restricted net assets—net assets subject to donor-imposed stipulations that will be met by actions of the Institute and/or by the passage of time.
- Unrestricted net assets—net assets not subject to donor-imposed stipulations. Unrestricted net assets may be designated for specific purposes by action of the board of trustees.

Revenues are reported as increases in unrestricted net assets unless use of the related asset is limited by donor-imposed restrictions. Expenses are reported as decreases in unrestricted net assets. Expiration of donor-imposed stipulations that simultaneously increase unrestricted net assets and decrease temporarily restricted net assets are reported as net assets released from restrictions. Temporarily restricted revenues received and expended during the same fiscal year are recorded as unrestricted revenues and expenses in the statements of activities.

Contributions and investment returns with donor-imposed restrictions are reported as temporarily restricted revenues and are reclassified to unrestricted net assets when an expense is incurred that satisfies the donor-imposed restriction.

Contributions of long-lived assets are reported as unrestricted revenue. Contributions restricted for the acquisition of grounds, buildings, and equipment are reported as temporarily restricted revenues. These contributions are reclassified to unrestricted net assets upon acquisition of the assets.

(a) Contributions

Contributions, including unconditional promises to give, are recognized as revenues in the period received. Conditional promises to give are not recognized until they become unconditional, that is when the conditions on which they depend are substantially met. Contributions of assets other than cash are recorded at their estimated fair value. Pledges of contributions to be received after one year are discounted at a risk-adjusted discount rate. The discount rates range from 0.56% to 1.11%. Amortization of discount is recorded as additional contribution revenue in accordance with donor-imposed restrictions, if any, on the contributions.

(b) Investments

All investments, including short-term investments, investments in marketable securities, limited partnerships and hedge and offshore funds, are reported in the financial statements at fair value or net asset value as a practical expe-

dient, based upon values provided by external investment managers, general partners or quoted market value. The Institute reviews and evaluates the values provided by external investment managers and general partners and agrees with the valuation methods and assumptions used in determining the fair value of funds. These estimated fair values may differ significantly from the values that would have been used had a ready market for these securities existed.

The statements of activities recognize unrealized gains and losses on investments as increases and decreases, respectively, in unrestricted net assets unless their use is temporarily or permanently restricted by explicit donor stipulation. Purchase and sale transactions are recorded on a settlement-date basis. Gains and losses on the sale of investment securities are calculated using the specific identification method.

The Institute regularly offers first mortgages on primary residences to full-time faculty and senior administrative employees who have met certain requirements stipulated by the board of trustees.

(c) Fair Value Hierarchy

Fair value is defined as the exchange price that would be received for an asset or paid to transfer a liability (an exit price) in the principal or most advantageous market for the asset or liability in an orderly transaction between market participants on the measurement date. Statement of Financial Accounting Standards (SFAS) No. 157, *Fair Value Measurements* (Statement 157) establishes a fair value hierarchy, which requires an entity to maximize the use of observable inputs and minimize the use of unobservable inputs when measuring fair value. The standard describes three levels of inputs that may be used to measure fair value:

- Level 1: Quoted prices in active markets for identical assets or liabilities. Level 1 assets and liabilities include debt and equity securities that are traded in an active exchange market, as well as U.S. Treasury securities.
- Level 2: Observable inputs other than Level 1 prices such as quoted prices for similar assets or liabilities; quoted prices in markets that are not active; or other inputs that are observable or can be corroborated by observable market data for substantially the full term of the assets or liabilities. Level 2 assets and liabilities include debt securities with quoted market prices that are traded less frequently than exchange-traded instruments. This category generally includes certain U.S. government and agency mortgage-backed debt securities, corporate-debt securities and certain alternative investments.
- Level 3: Unobservable inputs that are supported by little or no market activity and that are significant to the fair value of the asset or liabilities. This category generally includes certain private debt and equity instruments and alternative investments.

Fair value estimates are made at a specific point in time, based on available market information and judgments about the financial asset, including estimates of timing, amount of expected future cash flows and the credit standing of the issuer. In some cases, the fair value estimates cannot be substantiated by comparison to independent markets. In addition, the disclosed fair value may not be realized in the immediate settlement of the financial asset. In addition, the disclosed fair values do not reflect any premium or discount that could result from offering for sale at one time an entire holding of a particular financial asset. Potential taxes and other expenses that would be incurred in an actual sale or settlement are not reflected in amounts disclosed.

(d) Plant Assets and Depreciation

Proceeds from the sale of plant assets, if unrestricted, are transferred to operating funds, or, if restricted, to amounts temporarily restricted for plant acquisitions. Depreciation is provided over the estimated useful lives of the respective assets on a straight-line basis (buildings and capital improvements 20–40 years, equipment 3–6 years).

(e) Deferred Revenue

Conditional amounts are recorded initially as deferred restricted revenue, and are reported as revenues when expended in accordance with the terms of the condition.

(f) Split Interest Agreements

The Institute is the beneficiary of various unitrusts, pooled income funds and a gift annuity fund. The Institute's interest in these split interest agreements is reported as a contribution in the year received and is calculated as the difference between the fair value of the assets contributed to the Institute, and the estimated liability to the beneficiary. This liability is computed using actuarially determined rates and is adjusted annually. The assets held by the Institute under these arrangements are recorded at fair value as determined by quoted market price and are included as a component of investments. Changes in the life expectancy of the donor or annuitant, amortization of the discount and other changes in the estimates of future payments are reported as endowment change after applying spending policy in the accompanying statements of activities.

(g) Unamortized Debt Issuance Costs

Debt issuance costs represent costs incurred in connection with debt financing. Amortization of these costs is provided on the effective interest method extending over the remaining term of the applicable indebtedness. Debt issuance costs at June 30, 2009 and 2008 were net of accumulated amortization of $697,747 and $634,270, respectively.

(h) Other Revenues, Gains and Other Support

A portion of long-term investment income and gains and losses is allocated to operating revenue each year in accordance with the Institute's spending policy for investments held for endowment and similar purposes, as more fully discussed in note 4. All other investment income earned and gains and losses on investments held for long-term purposes and nonrecurring revenue and expenses are considered other revenues, gains and other support in the statements of activities.

(i) Asset Retirement Obligation

The Institute recognizes the fair value of a liability for legal obligations associated with asset retirements in the period in which the obligation is incurred, in accordance with Financial Accounting Standards Board (FASB) No. 143, *Asset Retirement Obligations* and FASB Interpretation (FIN) 47, *Accounting for Conditional Asset Retirement Obligations*, if a reasonable estimate of the fair value of the obligation can be made. When the liability is initially recorded, the Institute capitalizes the cost of the asset retirement obligation by increasing the carrying amount of the related long-lived asset. The liability is accreted to its present value each period, and the capitalized cost associated with the retirement obligation is depreciated over the useful life of the related asset. Upon settlement of the obligation, any difference between the cost to settle the asset retirement obligation and the liability recorded is recognized as a gain or loss in the statements of activities.

(j) Fund Raising Expenses

Fund raising expenses incurred by the Institute amounted to $1,456,427 and $1,473,629 for the years ended June 30, 2009 and 2008, respectively. This amount is included in administration and general expenses in the accompanying statements of activities.

(k) Functional Allocation of Expenses

The costs of providing program services and support services of the Institute have been summarized on a functional basis in the statements of activities. Accordingly, certain operating costs have been allocated among the functional categories.

(l) Tax Status

The Institute is exempt from federal income taxes pursuant to Section 501(c)(3) of the Internal Revenue Code (the Code) and is listed in the Internal Revenue Service Publication 78. The Institute has been classified as a public charity under Section 509(a) of the Code.

In 2008, the Institute adopted the provisions of Financial Accounting Standards Board (FASB) Interpretation No. 48, *Accounting for Uncertainty in Income Taxes, an interpretation of FASB Statement No. 109* (FIN 48). FIN 48 addresses the accounting for uncertainties in income taxes recognized in an organization's financial statements and prescribes a threshold of more-likely-than-not for recognition and de-recognition of tax positions taken or expected to be taken in a tax return. FIN 48 also provides related guidance on measurement, classification, interest and penalties, and disclosures. There was no significant impact to the Institute's financial statements as a result of the adoption of FIN 48.

(m) Use of Estimates

The preparation of financial statements in conformity with U.S. generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements. Estimates also affect the reported amounts of revenues and expenses during the reported period. Actual results could differ from those estimates.

(n) Reclassifications

Certain reclassifications have been made to the prior year balances to conform to the current year presentation.

(o) Recently Adopted Accounting Standards

Effective July 1, 2008, the Institute adopted Statement 157. Statement 157 defines fair value, establishes a framework for measuring fair value, and expands disclosures about fair value measurements. This pronouncement does not require any new fair value measurements. The effect of the adoption of Statement 157 did not have an effect on the changes in net assets or financial position of the Institute.

The Institute elected to adopt Accounting Standards Update No. 2009-12, *Investments in Certain Entities That Calculate Net Asset Value per Share (or Its Equivalent),* and apply its provisions to its investment portfolio. The guidance amends Statement 157 and permits, as a practical expedient, fair value of investments within its scope to be estimated using net asset value or its equivalent.

Effective July 1, 2008, the Institute adopted the provisions of FASB Staff Position FAS 117-1, *Endowments of Not-for-Profit Organizations: Net Asset Classification of Funds Subject to an Enacted Version of the Uniform Prudent Management of Institutional Funds Act, and Enhanced Disclosures for All Endowment Funds* (FSP 117-1). FSP 117-1 provides guidance on the net asset classification of donor-restricted endowment funds for a not-for-profit organization that is subject to an enacted version of the Uniform Prudent Management of Institutional Funds Act of 2007 (UPMIFA). FSP 117-1 also improves disclosures about an organization's donor-restricted and board-designated endowment funds. The State of New Jersey enacted UPMIFA during fiscal year 2009. The effect of the adoption of FSP 117-1 did not have an effect on the change in net assets or financial position of the Institute.

Effective June 30, 2009, the Institute adopted SFAS No. 165, *Subsequent Events* (Statement 165). Statement 165 establishes principles and requirements for subsequent events and applies to accounting for and disclosures of subsequent events not addressed in other applicable generally accepted accounting principles. The Institute evaluated events subsequent to June 30, 2009 and through November 17, 2009, the date on which the financial statements were issued. The adoption of Statement 165 had no impact on the Institute's financial statements.

(2) Contributions Receivable

Unconditional promises to give at June 30, 2009 and 2008 were as follows:

		2009	2008
Unconditional promises to give:			
Less than one year	$	1,198,166	1,221,749
One to five years		1,955,001	2,739,667
		3,153,167	3,961,416
Discount on promises to give		(105,857)	(402,472)
Total	$	3,047,310	3,558,944

(3) Investments and Funds Held by Trustee

Investments

Endowment and similar funds investments at June 30, 2009 and 2008 are comprised of the following:

		2009	2008
Cash and cash equivalents	$	10,000,000	—
Limited partnerships		102,959,298	82,940,588
Hedge and offshore funds		355,336,163	522,137,788
Debt securities		49,471,055	50,777,001
Mortgages from faculty and staff		8,151,049	6,566,023
		525,917,565	662,421,400
Funds invested separately:			
Charitable remainder and pooled income funds:			
Cash and cash equivalents		268,726	4,046,496
Fixed income securities		4,133,861	433,697
		4,402,587	4,480,193
Total	$	530,320,152	666,901,593

The Institute's interests in limited partnerships and offshore funds represent 19% and 67%, respectively, and 86% collectively, of total investments held by the Institute at June 30, 2009 and 12% and 78%, respectively, and 90% collectively, of total investments held by the Institute at June 30, 2008. These instruments may contain elements of both credit and market risk.

Such risks include, but are not limited to, limited liquidity, absence of regulatory oversight, dependence upon key individuals, emphasis on speculative investments (both derivatives and nonmarketable investments) and nondisclosure of portfolio composition.

The Institute has committed to invest $49,967,003 to its limited partnerships at June 30, 2009.

Substantially all of the investments are pooled with each individual fund subscribing to or disposing of units on the basis of the market value per unit, determined on a quarterly basis.

Funds Held by Trustee

Funds held by trustee represent the balance of the proceeds from the 2001, 2006 and 2008 New Jersey Educational Facilities Authority (the Authority) bonds that have not yet been expended for construction purposes or debt service payments. These funds are being held in trust by The Bank of New York. Such funds are invested in U.S. Government obligations with maturities of less than one year. At June 30, 2009 and 2008, the market value of such securities approximates their carrying value.

Fair Value Hierarchy

The following table presents the Institute's fair value hierarchy for those assets measured at fair value at June 30, 2009:

	Fair value	Fair value measurements at June 30 using		
		Level 1	Level 2	Level 3
Financial assets:				
Investments:				
Cash and cash equivalents	$ 10,000,000	10,000,000	—	—
Limited partnerships	102,959,298	—	—	102,959,298
Hedge and offshore funds	355,336,163	—	62,744,293	292,591,870
Debt securities	49,471,055	49,471,055	—	—
Mortgages from faculty and staff	8,151,049	—	—	8,151,049
Funds invested separately:				
Cash and cash equivalents	268,726	—	—	268,726
Fixed income securities	4,133,861	—	—	4,133,861
Funds held by trustee:				
U.S. Government obligations	8,587,408	8,587,408	—	—
Beneficial interest in remainder trust	2,654,256	—	—	2,654,256
Total	$ 541,561,816	68,058,463	62,744,293	410,759,060

The following table represents the Institute's activity for all Level 3 assets measured at fair value for the period July 1, 2008 to June 30, 2009:

	Level 3 assets
Financial assets:	
Beginning balance July 1, 2008	$ 534,489,076
Acquisitions	108,426,236
Dispositions	(124,322,481)
Net depreciation in fair value of investments	(107,833,771)
Ending balance June 30, 2009	$ 410,759,060

Redemption Restrictions – Hedge and Offshore Funds

At June 30, 2009, the Institute had hedge and offshore fund investments of approximately $355,336,000, of which approximately $255,334,000 was restricted from redemption for lock up periods. At June 30, 2008, the Institute had hedge and offshore fund investments of approximately $522,138,000, of which approximately $336,931,000 was restricted from redemption for lock up periods. Some of the investments with redemption restrictions allow early redemption for specified fees. The terms and conditions upon which an investor may redeem an investment vary, usually with the majority requiring 30 to 180 days notice after the initial lock up period.

The expirations of redemption lock up periods are summarized in the table below:

		Amount
Fiscal year:		
2010	$	155,716,000
2011		49,895,000
2012		26,863,000
2013 and thereafter		22,860,000
Total	$	255,334,000

Redemption Restrictions – Limited Partnerships

At June 30, 2009 and 2008, the Institute had limited partnership investments of approximately $102,959,000 and $82,941,000, respectively, which were restricted from redemption for lock up periods. Some of the investments with redemption restrictions allow early redemption for specified fees. The terms and conditions upon which an investor may redeem an investment vary, usually with the majority requiring 30 to 180 days notice after the initial lock up period.

The expirations of redemption lock up periods are summarized in the table below:

		Amount
Fiscal year:		
2010	$	8,909,000
2011		32,393,000
2012		—
2013 and thereafter		61,657,000
Total	$	102,959,000

4) Investment Return and Endowment Spending Policy

Investment return consists of interest, dividends, and realized and unrealized gains and losses on investments. Each year, the Institute includes a portion of its endowment return in its operating budget, with the amount of such planned support determined using its spending policy. The policy of the Institute is to distribute for current spending a percentage of the fair value of pooled investments which is determined by the Board of Trustees annually. The spending rate was 5.6% and 5.4% for 2009 and 2008, respectively.

The following tables summarize the investment return and its classification in the statements of activities for the years ended June 30, 2009 and 2008:

		2009		
		Unrestricted	Temporarily restricted	Total
Dividends and interest	$	(370,813)	(351,470)	(722,283)
Net realized and unrealized losses		(73,432,132)	(40,552,234)	(113,984,366)
Total investment return		(73,802,945)	(40,903,704)	(114,706,649)
Endowment spending policy for use in operations		25,874,809	10,218,991	36,093,800
Endowment change after applying spending policy	$	(99,677,754)	(51,122,695)	(150,800,449)

	2008		
	Unrestricted	Temporarily restricted	Total
Dividends and interest	$ 5,309,488	2,882,940	8,192,428
Net realized and unrealized losses	(3,379,467)	(2,314,797)	(5,694,264)
Total investment return	1,930,021	568,143	2,498,164
Endowment spending policy for use in operations	22,341,145	9,528,355	31,869,500
Endowment change after applying spending policy	$ (20,411,124)	(8,960,212)	(29,371,336)

(5) Endowment

The Institute's endowment consists of approximately 90 individual funds established for a variety of purposes including both donor-restricted endowment funds and funds designated by the Board of Trustees to function as endowments. Net assets associated with endowments, including funds designated by the Board of Trustees to function as endowments, are classified and reported based on the existence or absence of donor-imposed restrictions.

Interpretation of Relevant Law

The Institute has interpreted the Uniform Prudent Management of Institutional Funds Act of 2007 as requiring the preservation of the purchasing power of the original gift as of the gift date of the donor-restricted endowment funds absent explicit donor stipulations to the contrary. The Institute classifies as permanently restricted net assets (a) the original value of gifts donated to the permanent endowment, (b) the original value of subsequent gifts to the permanent endowment, and (c) accumulations to the permanent endowment made in accordance with the direction of the applicable donor gift instrument at the time the accumulation is added to the fund.

Net assets associated with endowment funds are classified and reported based on the existence or absence of donor-imposed restrictions.

Endowment net assets consisted of the following at June 30, 2009 and 2008:

	2009			
	Unrestricted	Temporarily restricted	Permanently restricted	Total
Donor restricted	$ (1,612,530)	114,789,876	78,028,894	191,206,240
Board designated	322,491,061	—	—	322,491,061
	$ 320,878,531	114,789,876	78,028,894	513,697,301

	2008			
	Unrestricted	Temporarily restricted	Permanently restricted	Total
Donor restricted	$ —	164,947,754	71,155,345	236,103,099
Board designated	416,274,585	—	—	416,274,585
	$ 416,274,585	164,947,754	71,155,345	652,377,684

Changes in endowment net assets for the fiscal years ended June 30, 2009 and 2008 were as follows:

	2009			
	Unrestricted	Temporarily restricted	Permanently restricted	Total
Net assets, July 1, 2008	$ 416,274,585	164,947,754	71,155,345	652,377,684
Dividends and interest	(370,813)	(214,167)	—	(584,980)
Unrealized loss	(73,397,047)	(40,055,141)	—	(113,452,188)
Contributions	275,006	—	6,873,549	7,148,555
Appropriation for expenditure	(25,874,809)	(10,218,991)	—	(36,093,800)
Unspent appropriation returned to principal	3,971,609	330,421	—	4,302,030
Net assets, June 30, 2009	$ 320,878,531	114,789,876	78,028,894	513,697,301

	2008			
	Unrestricted	Temporarily restricted	Permanently restricted	Total
Net assets, July 1, 2007	$ 436,551,232	171,698,850	60,608,939	668,859,021
Dividends and interest	5,309,488	2,892,875	—	8,202,363
Unrealized loss	(3,379,467)	(1,839,261)	—	(5,218,728)
Contributions	2,656,116	—	10,546,406	13,202,522
Appropriation for expenditure	(22,341,145)	(9,528,355)	—	(31,869,500)
Unspent appropriation returned to principal	—	1,723,645	—	1,723,645
Additional appropriation for expenditure	(2,521,639)	—	—	(2,521,639)
Net assets, June 30, 2008	$ 416,274,585	164,947,754	71,155,345	652,377,684

Funds with Deficiencies

At June 30, 2009, the fair value of 10 endowment accounts were less than the level that the donor required the Institute to retain as a fund of perpetual duration by approximately $1,613,000.

Return Objectives and Risk Parameters

The Institute has adopted investment and spending policies for endowment assets that attempt to provide a predictable stream of funding to programs supported by its endowment while seeking to maintain the purchasing power of the endowment assets. Endowment assets include those assets of donor-restricted funds that the Institute must hold in perpetuity or for a donor-specified period as well as board-designated funds.

Strategies Employed for Achieving Objectives

The Institute manages its investments in accordance with a total return concept and the goal of maximizing returns within acceptable levels of risk. The Institute relies on a total return strategy in which investment returns are achieved through both capital appreciation (realized and unrealized) and current yield (dividends and interest). The Institute's spending policy is designed to provide a stable level of financial support and to preserve the real value of its endowment.

(6) Physical Plant

Physical plant and equipment are stated at cost at date of acquisition, less accumulated depreciation. Library books, other than rare books, are not capitalized.

A summary of plant assets at June 30, 2009 and 2008 follows:

		2009	2008
Land	$	377,470	377,470
Land improvements		1,388,588	1,169,517
Buildings and improvements		90,397,927	88,472,102
Equipment		24,944,594	24,158,152
Construction in progress		176,288	100,049
Rare book collection		203,508	203,508
Joint ownership property		2,350,158	2,381,472
		119,838,533	116,862,270
Less accumulated depreciation		(59,144,991)	(56,397,210)
Net book value	$	60,693,542	60,465,060

The Institute has capitalized interest income of $19,209 and $467,246 and interest expense of $88,746 and $411,610 in construction in progress for the years ended June 30, 2009 and 2008, respectively.

(7) Long-Term Debt

A summary of long-term debt at June 30, 2009 and 2008 follows:

		2009	2008
2001 Series A—NJEFA	$	2,735,000	2,980,000
2006 Series B—NJEFA		28,800,000	28,900,000
2006 Series C—NJEFA		19,200,000	19,600,000
2008 Series C—NJEFA		9,575,000	11,255,000
Less unamortized bond discount		(245,991)	(276,144)
Total long-term debt	$	60,064,009	62,458,856

Interest expense on long-term debt for the years ended June 30, 2009 and 2008 was $1,962,927 and $1,870,101, respectively.

2001 Series A

In May 2001, the Institute received proceeds of the Authority offering of $11,000,000 Revenue Bonds, 2001 Series A of the Institute for Advanced Study Issue. Proceeds were used for the construction of Bloomberg Hall and additional capital projects. These bonds were partially refunded through the 2006 Series B Revenue bonds detailed below.

2006 Series B

In July 2006, the Institute received proceeds of the Authority offering of $29,600,000 Revenue Bonds, 2006 Series B of the Institute for Advanced Study Issue. The 2006 Series B Bonds were issued to finance the advance refunding of the outstanding 1997 Series G Bonds, the partial advance refunding of the 2001 Series A Bonds, and to pay a portion of certain costs incidental to the sale and issuance of the 2006 Series B Bonds.

2006 Series C

In March 2007, the Institute received proceeds of the Authority offering of $20,000,000 Revenue Bonds, 2006 Series C of the Institute for Advanced Study Issue. Proceeds are being used to finance the costs of construction, renovating and equipping certain educational facilities of the Institute, to fund capitalized interest on the 2006 Series C Bonds during the renovation and construction and to pay certain costs incidental to the sale and issuance of the 2006 Series C Bonds.

2008 Series C

In March 2008, the Institute received proceeds of the Authority offering of $11,255,000 Revenue Bonds, 2008 Series C of the Institute for Advanced Study Issue. The 2008 Series C Bonds were issued to finance the advance refunding of outstanding 1997 Series F Bonds, the advance refunding of outstanding 1997 Series G, and to pay a portion of certain costs incidental to the sale and issuance of the 2008 Series C Bonds.

Interest Rates

The 1997 Series F, 1997 Series G, 2001 Series A, and 2008 Series C Bonds bear interest at rates ranging from 3% to 5%, payable semi-annually, are subject to redemption at various prices and require principal payments and sinking fund

installments through July 1, 2021. The obligation to pay the Authority on a periodic basis, in the amounts sufficient to cover principal and interest due on the bonds, is a general obligation of the Institute.

The 2006 Series B and C Bonds bear interest at variable rates. The bonds were issued in the Weekly Mode with weekly rates determined by Lehman Brothers Inc, as Remarketing Agent and paid monthly. The maximum interest rate on the 2006 Bonds shall be twelve percent (12%) per annum. The 2006 bonds are subject to redemption at various prices and require principal payments and sinking fund installments through July 1, 2036. The obligation to pay the Authority on a periodic basis, in the amounts sufficient to cover principal and interest due on the bonds, is a general obligation of the Institute. On September 18, 2008 the Institute entered into a contract with JPMorgan Chase Bank to take over as Remarketing Agent, replacing Lehman Brothers Inc.

Bond Swap Agreement

On April 18, 2006, the Institute entered into a swap agreement with Lehman Brothers Commercial Bank covering $29,600,000 of outstanding 2006 Series B Bonds that required the Institute to pay a fixed rate of 3.7702% to Lehman Brothers Commercial Bank in exchange for Lehman Brothers Commercial Bank agreeing to pay the Institute a variable rate equal to 67% of the USD-LIBOR-BBA rate with a term of three months, payable monthly, on an identical notional amount. The effective date of the swap was July 19, 2006 and the termination date of the swap agreement coincides with the maturity of the bonds, which is July 1, 2031. In September 2008, the filing of a petition in bankruptcy by Lehman Brothers Holdings Inc. constituted an "Event of Default," giving the Institute the right to terminate the swap and designate an Early Termination Date on notice to Lehman Brothers Commercial Bank.

On December 22, 2008, the Institute entered into a new swap agreement with Wells Fargo Bank covering $28,800,000 of outstanding Series B Bonds that required the Institute to pay a fixed rate of 3.7702% to Wells Fargo Bank in exchange for Wells Fargo Bank agreeing to pay the Institute a variable rate equal to 67% of the USD-LIBOR-BBA rate with a term of three months, payable monthly, on an identical notional amount. The effective date of the swap was December 22, 2008 and the termination date of the swap agreement coincides with the maturity of the bonds, which is July 1, 2031.

The accounting for this transaction has been made in accordance with Statement of Financial Accounting Standard (SFAS) No. 133, *Accounting for Derivative Instruments and Hedging Activities*. The Institute entered into this swap agreement with the intention of lowering its effective interest rate. At June 30, 2009 and 2008, the fair value of the derivative was ($3,514,367) and ($1,874,573), respectively. The swap agreement utilizes level 2 inputs to measure fair market value under Statement 157. The unrealized loss recognized during the year ended June 30, 2009 and 2008 in the amount of $1,639,794 and $1,796,708, respectively, is reported in the statements of activities in change in fair value of bond swap liability.

The bonds are repayable as follows at June 30, 2009:

	Amount
Year ending June 30:	
2010	$ 2,615,000
2011	2,725,000
2012	2,055,000
2013	2,290,000
2014	2,320,000
2015 through 2036	48,305,000
Total	$ 60,310,000

The 2001 Series A, 2006 Series B, 2006 Series C and 2008 Series C bonds are secured by a pledge of revenues pursuant to the respective Loan Agreements.

(8) Pension Plans and Other Postretirement Benefits

Separate voluntary defined contribution retirement plans are in effect for faculty members and eligible staff personnel, both of which provide for annuities, which are funded, to the Teachers Insurance and Annuity Association and/or the College Retirement Equities Fund. Contributions are based on the individual participant's compensation in accordance with the formula set forth in the plan documents on a nondiscriminatory basis. Contributions for the years ended June 30, 2009 and 2008 totaled approximately $1,936,000 and $1,918,000, respectively.

In addition to providing pension benefits, the Institute provides certain health care and life insurance benefits for retired employees and faculty. Substantially, all of the Institute's employees may become eligible for these benefits if they meet minimum age and service requirements. The Institute accrues these benefits over a period in which active employees become eligible under existing benefit plans.

The following table provides a reconciliation of the change in benefit obligation and the funded status of the plan at June 30, 2009 and 2008:

Postretirement benefit obligation:		2009	2008
Retirees	$	4,885,000	4,639,239
Fully eligible active plan participants		876,000	1,487,313
Other active plan participants		4,708,000	2,962,704
Postretirement benefit obligation	$	10,469,000	9,089,256
Change in benefit obligation:			
Benefit obligation at beginning of year	$	9,089,256	12,004,751
Service cost		277,454	389,693
Interest cost		568,507	731,672
Benefits paid		(490,699)	(554,454)
Actuarial loss (gain)		1,024,482	(3,482,406)
Benefit obligation at end of year (funded status)	$	10,469,000	9,089,256
Components of net periodic benefit cost:			
Service cost	$	277,454	389,693
Interest cost		568,507	731,672
Amortization of transition obligation		1,024,482	(3,482,406)
Net periodic postretirement benefit cost	$	1,870,443	(2,361,041)

	2009	2008
Benefit obligation weighted average assumptions at June 30, 2009 and 2008:		
Discount rate	6.19%	6.50%
Periodic benefit cost weighted average assumptions for the years ended June 30, 2009 and 2008:		
Discount rate	6.50%	6.25%

At June 30, 2009 and 2008, the trend rate used for health care costs was 3.5% and 9.0%, respectively.

The effects of a 1% increase or decrease in trend rates on total service and interest cost and the postretirement benefit obligation are as follows:

	2009		2008	
	Increase	Decrease	Increase	Decrease
Effect on total service and interest cost	$ 141,039	(111,961)	203,384	(161,678)
Effect on the postretirement benefit obligation	1,622,000	(1,313,000)	1,077,744	(892,256)

Projected payments for each of the next five fiscal years and thereafter are as follows:

	Amount
Year ending June 30:	
2010	$ 486,000
2011	522,000
2012	551,000
2013	567,000
2014	599,000
2015 through 2017	3,319,000

The Institute expects to contribute approximately $1,083,000 next year.

(9) Temporarily and Permanently Restricted Assets

Restricted net assets are available for the following purposes at June 30, 2009 and 2008:

		2009	2008
Temporarily restricted net assets are restricted to:			
School of Mathematics	$	26,671,464	39,536,754
School of Natural Sciences		6,061,912	11,925,902
School of Historical Studies		28,297,437	39,708,158
School of Social Science		46,543,273	63,781,459
Libraries and other academic		2,859,241	4,208,312
Administration and general		4,401,580	6,466,599
	$	114,834,907	165,627,184
Permanently restricted net assets are restricted to:			
Investments to be held in perpetuity, the income from which is expendable to support academic services	$	78,028,894	71,155,345

(10) Disclosures About Fair Value of Financial Instruments

The Institute is required by SFAS No. 107, *Disclosure About Fair Value of Financial Instruments*, to disclose the estimated fair value of financial instruments, both assets and liabilities recognized and not recognized in the statement of financial position, for which it is practicable to estimate fair value.

The estimated fair value amounts in the following disclosure have been determined by the Institute using available market information and appropriate valuation methodologies. The estimates are not necessarily indicative of the amounts the Institute could realize in a current market exchange, and the use of different market assumptions or methodologies could have a material effect on the estimated fair value amounts at June 30, 2009 and 2008.

		2009	2008
Assets:			
Cash	$	312,162	954,245
Government grants and contracts receivable		2,107,272	2,780,100
Funds held by trustee		8,587,408	10,864,390
Beneficial interest in remainder trust		2,654,256	3,350,996
Investments		530,320,152	666,901,593
Liabilities:			
Note payable		557,724	621,402
Long-term debt		61,002,987	64,329,256

The fair value estimates presented are based on information available to the Institute as of June 30, 2009 and 2008, and have not been revalued since that date. While the Institute is not aware of any significant factors that would affect the estimates since that date, current estimates of fair value could differ significantly from the amounts disclosed.

(11) Contingencies

The Institute has an investment in the Ariel Fund Limited (the Fund). During the past year, the fund became subject to the oversight of a Receiver appointed by the Attorney General of New York for the principal purposes of marshalling and preserving the assets of the Fund, for ultimate distribution of the proceeds to the respective investors of the Fund. There is also a potential for litigation to recover amounts from investors who have received distributions from the Fund. Management does not expect this to have a significant impact on the Institute's financial statements.

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