

# IAS

## The Institute Letter

Fall 2008



COURTESY OF MONICA DIRAC

Former Member Paul Dirac (see article, page 7), pictured here on the grounds of the Institute around 1962, began his first yearlong sabbatical at the Institute in 1934. One of the youngest theoreticians to win the Nobel Prize in Physics, Dirac would often set off on Saturday mornings with an axe over his shoulder to help Oswald Veblen, one of the Institute's first Faculty members (see article, page 6), and others clear paths in the Institute Woods.

# IAS The Institute Letter

Institute for Advanced Study

Fall 2008

## Mathematician Helmut Hofer Appointed to the Institute



Helmut Hofer

Helmut Hofer, one of the founders of the area of symplectic topology, will join the Faculty of the School of Mathematics at the Institute for Advanced Study, effective July 1, 2009. Currently Silver Professor of Mathematics at the Courant Institute of Mathematical Sciences of New York University, Hofer works on symplectic geometry, dynamical systems, and partial differential equations. He was a Member in the School of Mathematics in 1987, 2001–02, and 2005.

“Helmut Hofer has taken a leading role in the development of symplectic geometry, one of the most exciting areas of mathematics today,” commented Director Peter Goddard. “His combination of geometric insight and deep analytical skills, together with his energy and enthusiasm, has provided inspiration for many other mathematicians. We are delighted that he will be joining

the Faculty of our School of Mathematics.”

Hofer has worked in a number of fields including variational problems in Hamiltonian dynamics and symplectic and contact geometry/topology. His work with Ivar Ekeland in the late 1980s introduced new invariants of symplectic domains called symplectic capacities, which were used to establish a number of the foundational results in symplectic topology. The Arnold Conjecture, perhaps the most striking result in symplectic topology to date, relates the number of fixed points of a Hamiltonian symplectomorphism to the topology of the underlying manifold. Hofer, together with Dietmar Salamon, made a major contribution toward the solution of this conjecture. Their work, like all others, built on the work of Andreas Floer and in particular Floer

*(Continued on page 5)*

## Ancient Historian Angelos Chaniotis Joins the Faculty

Angelos Chaniotis, whose prolific, broad, and insightful work on the ancient Mediterranean has shaped critical thinking in the field over the past two decades, has been appointed to the Faculty of the Institute for Advanced Study. Chaniotis, who will become Professor in the Institute’s School of Historical Studies effective July 1, 2010, succeeds Professor Emeritus Glen Bowersock, an eminent authority on Greek, Roman, and Near Eastern history and culture as well as the classical tradition in modern literature.

Internationally regarded for his original and wide-ranging research in the social, cultural, religious, legal, and economic history of the Hellenistic world and the Roman East, Chaniotis is currently Senior Research Fellow for Classics at All Souls College in the University of Oxford. The author of four books and some 150 articles and book contributions, and the editor of fourteen volumes, he works in innovative ways on a wide variety of topics: war, memory, identity, emotions, the communicative aspects of rituals, and strategies of persuasion in the ancient world. Significant questions and dialogues in the field have grown out of Chaniotis’s pioneering contributions, which have helped to advance understanding of previously unexplored aspects of the ancient world.

Director Peter Goddard noted that Chaniotis is recognized “not only for his remarkable breadth and depth of scholarship in classical studies, but also for his collegiality and enthusiasm. His appointment will ensure the Institute’s international leadership in a field in which it has a distinguished history going back to our founding.”

According to Heinrich von Staden, Professor in the School of Historical Studies, Chaniotis “is eminently qualified not only to continue the Institute’s distinguished

*(Continued on page 5)*



Angelos Chaniotis

## Charles Simonyi Elected Chairman of the Board of Trustees

Charles Simonyi, President and Chief Executive Officer of Intentional Software Corporation, will become Chairman of the Board of Trustees at the Institute for Advanced Study on October 25. Simonyi succeeds Martin L. Leibowitz, Managing Director at Morgan Stanley, who served as Chairman for one year after the retirement in October 2007 of James D. Wolfensohn, now Chairman Emeritus.

“It is with a profound sense of humility that I follow Marty in organizing the work of the Board of Trustees of this unique institution of higher learning,” remarked Simonyi. “We have a highly engaged Board of distinguished individuals who will continue to support and maintain the environment for world-class scholarship and research at the Institute. I know that the Board is dedicated to its mission just as the scholars at the Institute are dedicated to uncovering the mysteries in their fields, be that in mathematics, biology, astrophysics, social sciences, historical studies, or high-energy physics.”

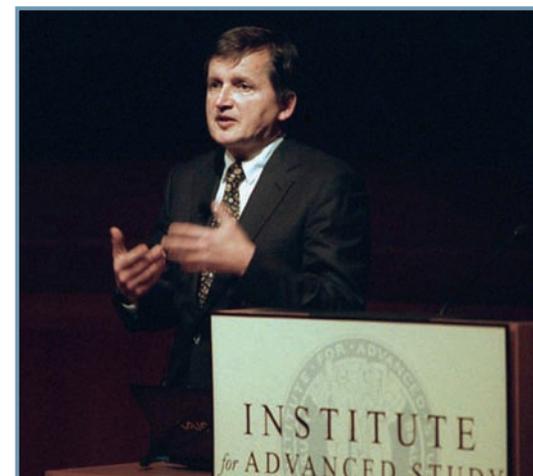
A Trustee of the Institute since 1997, Simonyi has served as President of the Corporation since 2003 and is Chairman of the Academic Affairs Committee. After earning a B.S. in engineering and mathematics from the University of California, Berkeley, in 1972, the Hungarian-born Simonyi earned his Ph.D. in computer science from Stanford University in 1977. From 1972 until 1980, he worked at the renowned Xerox Palo Alto Research Center, where he did most of the design and the critical implementation work on Bravo, the first WYSIWYG (what-you-see-is-what-you-get) editor, and led the team that built it. He then joined Microsoft, where he worked on the development of microcomputer application programs and was responsible for hiring and managing

teams who developed such well-known programs as Microsoft Word, Microsoft Excel, Multiplan, and others. In 2002, Simonyi left Microsoft to start the Intentional Software Corporation, a software engineering company with an emphasis on productivity applications.

“Charles has been an inspiring member of the Board and demonstrates a deep commitment to the Institute and its mission,” commented Director Peter Goddard. “He brings not only a strong understanding of the Institute and the way it works, but a profound appreciation of science and the humanities and

also a lifetime of business experience, which will ensure exceptional leadership for this institution. We are deeply grateful to Marty Leibowitz for his guidance and direction, particularly in this past year, and are also delighted that he will continue to serve as Vice

*(Continued on page 9)*



Charles Simonyi

## News of the Institute Community

PETER GOLDREICH, Professor in the School of Natural Sciences, will receive an honorary degree from the Weizmann Institute of Science in Rehovot, Israel, in November. He is being honored along with political activist Elie Wiesel, President Shimon Peres of Israel, Nobel Laureate and biologist Aaron Ciechanover, and Lorry I. Lokey, the founder of Business Wire International.



The Science Initiative Group (SIG) at the Institute has received a total of \$4.9 million from the Carnegie Corporation of New York to support the Regional Initiative in Science and Education (RISE). RISE aims to strengthen higher education in the sciences and engineering by increasing the population of skilled scientists and engineers teaching in Africa's universities. To date, five networks of sub-Saharan universities have received grants from SIG, which is leading the RISE initiative in consultation with African partners including the Nairobi-based African Academy of Sciences, the initiative's coadministrator. PHILLIP A. GRIFFITHS, Professor in the School of Mathematics and former Institute Director (1991–2003), is Chairman of the Board of SIG.



The Abdus Salam International Centre for Theoretical Physics has awarded the 2008 Dirac Medal to JUAN MALDACENA, Professor in the School of Natural Sciences; Joseph Polchinski of the Kavli Institute for Theoretical Physics, University of California, Santa Barbara; and CUMRUN VAFA (former Joint Member, School of Mathematics and School of Natural Sciences, 1994) of Harvard University for their fundamental contributions to superstring theory.



In June, ERIC S. MASKIN, Albert O. Hirschman Professor in the School of Social Science, was invited to participate in the fourth annual conference of Nobel Laureates in Petra, Jordan, by the King Abdullah II Fund for Development and the Elie Wiesel Foundation for Humanity. He recently received honorary degrees from Bard College and Corvinus University of Budapest, and in June he was named Distinguished Fellow of the House of Finance at the University of Frankfurt. Maskin has been executive vice president and president-elect of the Game Theory Society since August 1, and this past summer he began a five-year term as Director of the Summer School in Economic Theory of the Institute for Advanced Studies at The Hebrew University of Jerusalem.

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Questions and comments regarding  
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via email at [kdthomas@ias.edu](mailto:kdthomas@ias.edu)  
or by telephone at (609) 734-8091.

Duke University Press has published *Women's Studies on the Edge*, edited by JOAN WALLACH SCOTT, Harold F. Linder Professor in the School of Social Science. In the book, leading feminist scholars tackle the critical, political, and institutional challenges that women's studies has faced since its widespread integration into university curricula.



AVI WIGDERSON, Herbert H. Maass Professor in the School of Mathematics, and RUSSELL IMPAGLIAZZO, Visiting Professor in the School of Mathematics, represent the Institute as part of a team of researchers that will share a recent \$10 million Expeditions in Computing grant from the National Science Foundation to advance research and education in the study of computational intractability. The team also includes members from Princeton University; Rutgers, The State University of New Jersey; and New York University.



Institute Trustee VARTAN GREGORIAN, President of the Carnegie Corporation of New York, has been honored by the Council for Advancement and Support of Education (CASE) for extraordinary service to education of national and international significance. Gregorian was named recipient of the 2008 James L. Fisher Award for Distinguished Service to Education at the CASE Summit for Advancement Leaders, held in New York City in July. Gregorian has served on the Institute's Board of Trustees since 1987.



SALVATORE TORQUATO, Visitor (2008–09) and former Member (2007–08) in the School of Natural Sciences, is the recipient of the 2009 American Physical Society's David Adler Lectureship Award in the Field of Material Physics.



YOICHIRO NAMBU, former Member (1952–54) in the School of Mathematics, has won, along with two collaborators, the 2008 Nobel Prize in Physics for discovering the mechanism of spontaneous broken symmetry in subatomic physics. Former Director J. Robert Oppenheimer invited Nambu to the Institute in 1952; it was his first academic home in the United States.



NANCY SIRAISSI, former Member (1985–86) in the School of Historical Studies, has been named a 2008 MacArthur Fellow for her work as a historian of medicine. She was cited for "elucidating in meticulously researched and elegant prose the profound impact of medical theory and practice on Renaissance society, culture, and religion."



DIANE L. SOUVAINE, former Member (1994–95) in the School of Mathematics and Professor and Department Chair of Computer Science at Tufts University, has been nominated by President George W. Bush to serve on the National Science Board. The board is an independent body of advisers to both the President and Congress on broad national policy issues related to science and engineering research and education. It also serves as the oversight body for the National Science Foundation.



SERGEY YEKHANIN, former Member (2007–08) in the School of Mathematics, has won the 2007 Doctoral Dissertation Award from the Association for Computing Machinery. A researcher at Microsoft Research Silicon Valley Lab, Yekhanin was selected for developing a novel approach to protecting the privacy of users' queries when they are accessing a public database.

## The Centennial Council

The Centennial Council of the Institute for Advanced Study recently held its inaugural event hosted by Institute Board Chairman (as of October 25) Charles Simonyi. The Centennial Council recognizes the Institute's most active and involved donors and seeks to engage these donors more deeply in the work of the Institute. Donors at the Centennial Council level provide major operating and endowment support for the Institute, which is essential to maintaining its academic independence and the sustained focus on groundbreaking research that has defined it since its beginnings.

The setting for the Centennial Council event was SKAT, Simonyi's private yacht, which was moored at Chelsea Piers in New York City. Director Peter Goddard introduced a panel discussion on the evening's subject—commercial space travel and space tourism. Panelists included School of Natural Sciences Professor Emeritus Freeman Dyson, Richard Black Professor Scott Tremaine, Charles Simonyi, and Trustee Jeffrey Bezos. Topics covered both theoretical and practical aspects of commercial space travel and space tourism: cost-effective launch technologies; the possibility of intelligent life outside our solar system; the physiological affects of space flight on the human body; and private attempts to launch rockets into suborbital space. Panelists answered questions and shared their personal thoughts and experiences during a more casual discussion following the presentations. This included comments by Greg Olsen, President of GHO Ventures in Princeton, who was the third private citizen to orbit the earth on the International Space Station. A buffet dinner and cruise around lower Manhattan completed the evening.

Additional events for Centennial Council members are being planned, including attending an October 25 performance of *Doctor Atomic* at the Metropolitan Opera. *Doctor Atomic* is a contemporary masterpiece by John Adams that explores the creation of the atomic bomb and the role of J. Robert Oppenheimer, Director of the Institute (1947–66). The performance will be preceded by a special panel presentation on Oppenheimer and dinner in the Met's Opera Club.

In addition to opportunities such as these, annual members in the Centennial Council are able to name a Membership in the School of their choice. Lifetime membership in the Centennial Council and additional naming opportunities are available to donors of endowment gifts, with designations to be determined in consultation with the Director.

Please contact Catie Newcombe, Major Gifts Officer, at (609) 951-4542 or [cnewcombe@ias.edu](mailto:cnewcombe@ias.edu) for more information.

### Centennial Council (as of September 30, 2008)

- Anonymous (2)
- Jeffrey P. Bezos<sup>+</sup>
- Mr. and Mrs. Richard<sup>+</sup> B. Black
- Addie and Harold Broitman
- Mrs. Ann Lee Saunders Brown
- Helen and Martin<sup>+</sup> Chooljian
- Roger W. Ferguson<sup>+</sup> and Annette L. Nazareth
- Drs. Luisa and Robert Fernholz
- Mr. and Mrs. Charles L. Jaffin
- Bob and Lynn Johnston
- Immanuel and Vera Kohn
- Sarah and Martin<sup>+</sup> Leibowitz
- David K. P. Li<sup>+</sup>
- Virginia and Robert W. Loughlin
- Nancy<sup>+</sup> and Duncan MacMillan
- Hamish Maxwell
- Robert B. Menschel
- Peter G. Peterson
- Elena Petronio
- David Rockefeller
- Eric<sup>+</sup> and Wendy Schmidt
- James Simons<sup>+</sup>
- Dr. Charles Simonyi<sup>+</sup>
- Peter Svennilson
- Margaret E. Taplin
- Mr. and Mrs. Ladislaus von Hoffmann
- Shelby White<sup>+</sup>
- James<sup>+</sup> and Elaine Wolfensohn

<sup>+</sup> denotes current Trustee of the Institute for Advanced Study

## New Professorship Established in Honor of James D. Wolfensohn



James D. Wolfensohn

The Institute for Advanced Study has established a Professorship in its School of Social Science in honor of James D. Wolfensohn, former Chairman of its Board of Trustees from 1986 to 2007. The James D. Wolfensohn Professorship in Social Science was funded by donations from Institute Trustees and Faculty as well as Wolfensohn's colleagues and friends to acknowledge his twenty-one years of distinguished service.

More than \$5 million was raised to create the Professorship, which is intended to be filled by a scholar who analyzes the cultures of non-Western countries ethnographically, and whose research is aimed at studying these local and national cultures to gain an understanding of how they work in terms of their

histories and their place in international and global contexts.

"I am deeply moved by the action of the Institute community and our friends in making possible the naming of a Chair for me in the School of Social Science," said Wolfensohn, now Chairman Emeritus. "It is gratifying that this Professorship will be devoted to issues relating to non-Western cultures, thus linking my work at the World Bank with my commitment to the Institute as a great center for learning and research."

A new Membership in the School, to be associated with this Professorship, has been created by a generous donation from the Wolfensohn family. The Wolfensohn Family Membership is an expression of the Wolfensohns' commitment to the Institute and its mission, and it reflects their belief in the importance and future of local cultures and their desire to strengthen scholarship in the field.

"The whole Institute community is delighted that, through the generosity of many friends and admirers of Jim Wolfensohn, we have been able to endow this Professorship," commented Director Peter Goddard. "It will both support the study of cultures in the

developing world, to which Jim has contributed so much, and also commemorate his extraordinary achievements as Chairman of our Board of Trustees. The Wolfensohn Family Membership provides further testimony to the commitment of Jim and Elaine and their family to the mission of the Institute and to the study and preservation of local cultures."

Danielle Allen, UPS Foundation Professor in the School of Social Science, noted, "The Wolfensohn Chair and Membership will anchor fundamental lines of inquiry in the social sciences, including questions related to the culture and politics of the developing world, utilizing the tools and methods of ethnography. The work of the Wolfensohn Professor and Wolfensohn Family Member will provide opportunities for all Members of the School of Social Science to expand their capacities at comparative work as well as ensure that quantitative methods of analysis are always complemented with qualitative and interpretive approaches. This gift will foster the richest and most probing analyses possible of social experience. The School is deeply grateful for this foundational support."

Wolfensohn, former President of the World Bank and current Chairman of Wolfensohn & Company, L.L.C., has been a Trustee of the Institute since 1979. While Chairman, Wolfensohn oversaw the Institute's successful endowment of six Professorships across the four Schools, including the Albert O. Hirschman Professorship in the School of Social Science, currently held by economist Eric S. Maskin, and the George F. Kennan Professorship in the School of Historical Studies, currently held by political philosopher Avishai Margalit. With former Institute Director (1991–2003) and current School of Mathematics Professor Phillip Griffiths, he worked to initiate the Millennium Science Initiative, a program that aims to create and nurture world-class science and scientific talent in the developing world.

As Board Chairman, Wolfensohn helped steward the growth of the Institute's endowment, which more than quadrupled during his tenure. Together with his wife Elaine, he has been an energetic supporter of the Institute's IAS/Park City Mathematics Institute and has also led building projects such as Simonyi Hall (1993) and Bloomberg Hall (2002), which respectively house the Institute's Schools of Mathematics and Natural Sciences. The Institute's lecture and performance hall, Wolfensohn Hall, was dedicated in 1993 in his honor and is a reflection of both his long-standing commitment to the Institute and his own personal love of music.

## Islamic Freethinking and Western Radicalism

To what extent did Islamic freethinking contribute to the development of Western Radicalism in the seventeenth and eighteenth centuries? Or how far were Islamic and European freethinking simply parallel developments on the basis of similar heritages? These questions were the focus of "Islamic Freethinking and Western Radicalism," a conference organized by Andrew W. Mellon Professor Patricia Crone and Professor Jonathan Israel of the School of Historical Studies with Martin Mulsow, a former Member (2002–03) in the School, who is currently Professor of History at Rutgers, The State University of New Jersey.

The conference, which was attended by experts in Islamic and European medieval and early modern history from diverse parts of the world, and an associated public lecture given by Israel, were made possible with funding from the Carnegie Corporation of New York and the Dr. S. T. Lee Fund for Historical Studies. "We spent several days very intensively in discussion," said Israel of the conference, which was held in April. "A lot of extremely interesting insights and perspectives emerged that, I think, were new for both the Islamicists and the early modernists."

The conference continued and to some extent built upon shared research from an earlier workshop held at the Institute in May 2007, "The Materialistic Worldview from Late Antiquity to Islam," which was organized by Crone and Professor Heinrich von Staden and focused on freethinkers in the early Islamic world up to the ninth century.

"Radical freethinking was quite a prominent feature of the first centuries in the Islamic world and probably also later, at the time of the European Radical Enlightenment," explained Crone. "Some ideas expressed by early Islamic freethinkers are very similar to later Enlightenment ideas. A few of them had passed to Europe well before the Enlightenment without their Islamic origin being known. Others, which were well known to be of Muslim origin, were not actually radical back home, only in a European setting. Given that Enlightenment thinkers themselves were convinced that they had predecessors in Islam, it made sense to consider precisely where and how the neighborhood with the Islamic world made a difference."

In his lecture, Israel discussed the Radical Enlightenment, the part of the Western Enlightenment that from around 1660 onward, pushed for full freedom of thought, religious freedom, and personal liberty together with democracy and the principle of equality. This part of the Enlightenment, which might be broadly termed the Democratic Enlightenment, has come to be much more intensively studied and better understood in recent years than it was before the 1990s. One of its characteristic features is its interpretation of medieval Islamic freethinkers and their ideas, which were used to illustrate and



Professors Patricia Crone and Jonathan Israel

broaden arguments for transforming the Western world.

"From the late seventeenth century to the Napoleonic period there is a continuous and pronounced tradition amongst the radical writers and thinkers in Europe, a preoccupation with certain figures, texts, and legends in medieval Islam," said Israel.

Conference participants looked at the possibility that Islamic freethinking ideas were transmitted through the medical or Arabic astrological and alchemical traditions that were eagerly adopted in medieval Europe and during the Renaissance. They also looked at how Enlightenment authors arrived at the idea that they had predecessors in the Islamic world, how far the thought rightly or wrongly associated with these predecessors actually served to radicalize these authors, on what sources the

Enlightenment authors based these narratives, and their accuracy by modern standards. "What we, in this conference, were trying to do was to discover what the sources of information were behind some of these legends and these topoi," said Israel, "and what specific knowledge Enlightenment thinkers had about some of the Islamic stories and narratives that they bring up."

The Dr. S. T. Lee Fund for Historical Studies has been endowed to support an annual symposium or workshop on a topic within the fields of Historical Studies represented at the Institute for Advanced Study.

The Director of the Lee Group of Companies, a Singapore-based conglomerate of firms in industries that include rubber, pineapple, banking, and investments, Lee is well known for his philanthropy. A patron of the arts with a lifelong commitment to the support of educational and social programs in Asia, he is a noted bibliophile and an amateur naturalist who has made significant contributions to higher education worldwide.

Lee is a graduate of the Wharton School, University of Pennsylvania, and a recipient of its Distinguished Service Award. He is also an Honorary Fellow of the British Academy, a Foreign Honorary Member of the American Academy of Arts and Sciences, and a member of the Advisory Committee of the East Asia Institute. Lee holds honorary fellowships at Oriel College, University of Oxford; Wolfson College, University of Cambridge; the Needham Research Institute at Cambridge; and the School of Oriental and African Studies at the University of London.

## Michael Walzer Conference Examines “Justice, Culture, and Tradition”

The work of one of America’s foremost political thinkers, Michael Walzer, was celebrated at “Justice, Culture, and Tradition,” a three-day conference held in Wolfensohn Hall at the Institute for Advanced Study on June 2–4. Professor Emeritus in the Institute’s School of Social Science, Walzer was recognized for his contributions to the ethical and political philosophy of the twentieth century. Walzer has written extensively on a variety of topics in political theory and moral philosophy, and his *Just and Unjust Wars* (1977) is the classic contemporary text on the morality of war. Walzer joined the Faculty of the Institute in 1980 and was named UPS Foundation Professor in 1986, a title he retained until retiring in 2007.

Thirty-two scholars participated in the conference, which was organized by former School of Social Science Member (2006–07) and Research Assistant (2000–01, 2001–02) Yitzhak Benbaji of Bar-Ilan University and the Shalom Hartman Institute, in conjunction with Danielle Candy of the Carnegie Council for Ethics in International Affairs. The academic committee for the conference included Benbaji and former School of Social Science Visitor (1981–82) Amy Gutmann, the President of the University of Pennsylvania, and Avishai Margalit, George F. Kennan Professor in the Institute’s School of Historical Studies. Participants, including Joan Wallach Scott, Harold F. Linder Professor in the School of Social Science, convened to address pertinent and probing questions relevant to Walzer’s work in a series of panel discussions that featured lively interchange, including commentary from Walzer himself. The sessions, which covered topics ranging from just war to distributive justice to social criticism, were attended by Institute Faculty, Members, and other academic colleagues, the public, and many of Walzer’s friends and family.

Benbaji noted that while the conference title did not do justice to the range of subjects that would be discussed nor to the range of Walzer’s philosophical interests and contributions to the political thought of the last decades, there was probably no title that could. “Walzer is perhaps the major just-war theorist of the twentieth century,” Benbaji said. “His defense and criticism of the war-convention are often described as the standard articulation of the broadly accepted moral and legal views about war.” Every aspect of Walzer’s theory, based on a strong belief in the right of self-determination of communities, nations, and peoples, has been challenged by philosophers. The conference, which was made possible by generous support from the Fritz Thyssen Stiftung, the Carnegie Council for Ethics in International Affairs, the Institute for Advanced Study, Shalom Hartman Institute, YIVO Institute for Jewish Research, Bar-Ilan University Faculty of Law, and the Heinrich Böll Foundation, hosted some of the leading critics as well as defenders of his views. Excerpts from the conference follow.

### Terrorism

“Terrorism” is usually defined as “an organized use of violence to attack noncombatants for political purposes.” Its prevalence notwithstanding, this definition of “terrorism” is subject to well-known doubts and objections. One complaint is that the definition is too narrow, in that violence exercised against soldiers (combatants) who justifiably defend their homeland is not classified as terrorism, despite the fact that these soldiers are as morally innocent as civilians, since they are rightfully defending themselves. A second complaint is that the definition is too broad, in that it counts, and implicitly denounces, assassinating “engaged civilians”—e.g., political leaders who initiate a war of aggression and civilians who contribute to the war effort—as terrorism. Together these two complaints imply a moral anomaly: engaged civilians seem more liable than just combatants, yet the definition makes targeting the former, but not the latter, condemnable as terrorism. According to the traditional just-war theory, soldiers are liable to being killed in war, whether or not they fight for a just cause,



Professor Emeritus Michael Walzer speaking at the podium

and civilians are immune to being killed in war whether or not they are culpable for an unjust aggression. It seems, therefore, that terrorism—according to the definition—is a violation of the immunity conferred upon civilians by the traditional war convention.

—Yitzhak Benbaji, Professor, Faculty of Law and Department of Philosophy, Bar-Ilan University (former Member and Research Assistant, School of Social Science)

### Nonintervention

Nonintervention has been a particularly important and occasionally disturbing principle for liberal scholars, such as J. S. Mill and Michael Walzer, and liberal statesmen, such as Bill Clinton, who share a commitment to basic and universal human rights. On the one hand, liberals have provided some of the very strongest reasons to abide by a strict form

of the nonintervention doctrine. It was only with a security of national borders that liberals such as Immanuel Kant and John Stuart Mill thought that peoples could work out the capacity to govern themselves as free citizens. On the other hand, those very same principles of universal human dignity when applied in different contexts have provided justifications for overriding or disregarding the principle of nonintervention.

—Michael W. Doyle, Harold Brown Professor of International Affairs, Law and Political Science, Columbia University (former Member, School of Social Science)

### Politics

One of Michael Walzer’s outstanding contributions to political theory is his depiction of the social critic. By following the critical biographies of the personages of the company of critics, Walzer has drawn the contours of this political type and elaborated his unique civic role. . . . The debate surrounding Walzer’s conception of political morality and his mode of social criticism has focused on its epistemological assumptions. Walzer’s version of the social critic, however, assumes also a unique political posture. Walzer’s idea of social criticism, I will argue, is embedded in a robust conception of politics and of membership. Together they form the circumstances of criticism, making it both necessary and possible.

—Menachem Lorberbaum, Professor, Department of Jewish Philosophy, Tel Aviv University (former Member and Research Assistant, School of Social Science)

### Social Meanings and Complex Identities

When I moved from teaching to administration, a friend told me I would henceforth need only two sentences: “I’m sure you must be right” and “I’m sorry you feel that way.” The context, my friend assured me, would serve to interpret each sentence’s meaning. The same holds for the social meanings that constitute the objects, practices, events, and actions of a particular intersubjective world. These are parts of contexts of beliefs, language, and behavior within which they have their sense. It may be, as Walzer explains, that a table cannot be an intercontinental missile, but, depending upon its context, it can be a desk, an altar, a butcher’s block, and any number of other things. Similarly, raising one’s hand may not be skiing, but it can be voting, asking to speak, volunteering, and any number of other actions. The point is the same in both cases. Social meanings are not sets of noises or basic acts but the repositories of shared understandings; they are constituted not by subjective intentions but by the system of conceptual and practical interconnections within which they are situated.

—Georgia Warnke, Professor and Associate Dean, College of Humanities, Arts, and Social Sciences, University of California, Riverside (former Member, School of Social Science)



“Justice, Culture, and Tradition,” a three-day conference held in Wolfensohn Hall, celebrated Walzer’s contributions to the ethical and political philosophy of the twentieth century. Panelists included Avishai Margalit, George F. Kennan Professor in the School of Historical Studies (center), and former Member Yitzhak Benbaji, an organizer of the conference (pictured right, with Walzer).

# Special Program: Geometry and Partial Differential Equations

The School of Mathematics' special program for the 2008-09 academic year is on geometric partial differential equations. The emphasis is on nonlinear partial differential equations with applications to problems in differential, conformal, and convex geometry. Alice Chang, Professor of Mathematics at Princeton University who will be in residence at the Institute for the academic year, will lead the program. Luis Caffarelli, Professor of Mathematics at The University of Texas at Austin and a former Institute Professor (1986–96), will be in residence during the second term of the program. Below Chang and Caffarelli describe how partial differential equations continue to be one of the central tools for studying geometric and even topological questions.

The idea that many physical phenomena (fluid flows, elastic deformations, heat, electricity) could be modeled or described by sets of partial differential equations developed mainly at the end of the eighteenth century and the early nineteenth century, largely in France, thanks to the establishment of the Napoleonic schools.

It was based on the idea that equilibrium configurations, propagation of perturbations (waves, deformations, etc.) were determined in the large, by the interaction of particles at very short range, and so could be described thus by infinitesimal ratios and relations.

This naturally poses questions of how to reconstruct and predict observable phenomena from these relations, and to what extent the mathematical description is “well posed,” i.e., the relations are enough to determine the problem but not excessive as to the point of being incompatible.

We can easily see already in this type of question a strong geometrical flavor: how to describe the deformation of an elastic body (Cauchy's stress and strain), the shape of an elastic membrane, etc.

Also from this period comes the idea that many phenomena in nature follow the path of least energy, a concept that motivates Lagrangian mechanics and the calculus of variations.

Riemannian geometry combines all of these ideas in a general geometric context, where knowledge of how space curves infinitesimally around a point enables the deduction of global characteristics of a manifold.

The study of these properties has been used extensively to solve problems in mathematics and describe physical phenomena, and is undoubtedly today the natural framework in which to describe many questions in mathematics, physics, image processing, and optimization.

The areas that will be covered during the special year include:

Fully nonlinear equations: fully nonlinear equations arise in differential geometry (the Monge-Ampère equation, symmetric functions of the Hessian, prescribing curvature problems in conformal geometry), game theory and mathematical finance (Hamilton-Jacobi-Bellman-Isaacs equations, American options, etc.), and mass transport problems described below.

Study of conformal invariants: construction of conformal invariants and operators, that is quantities that remain invariant under transformations that infinitesimally dilate the space but do not deform it (Q-curvature, Paneitz-GJMS operator) and the relations between these invariants and geometric quantities (renormalized volume, mass).

Measure and probability theory approaches to the Ricci tensor: Ricci tensor controls the volume growth; in recent years a generalized notion of Ricci tensor defined with respect to a probability measure (called the Bakry-Émery-Ricci tensor) has played important roles in a number of problems. For instance, the entropy functional introduced by Perelman in his solution of the Poincaré conjecture is used to study a certain type of degeneration in the Ricci flow. It also played a role in the understanding of the convexity property of Wasserstein space of probability measures on a metric space. We would like to explore the role of this idea in other traditional geometry problems.

Optimal transportation: concerns the problem of how to transport or “deform” one object into another with minimal cost. It has found many applications. For instance, it is used in image processing to denoise a medical image, in probability to measure in an efficient way how correlated are two probability measures, and to study the evolution of nonlinear flows (flow in porous media, thin films) and how they converge to equilibrium, etc.

Phase transition problems: these problems give rise to the study of how surfaces or manifolds evolve when their speed is proportional to their curvature or some other geometric property, and have applications to the evolution of phase changes and shape optimization.

Problems involving nonlocal diffusion (or aggregation): these are problems where the diffusivity or aggregation of a process is determined not just by the interaction with surrounding particles, but by long-range “knowledge”: turbulence, aggregation processes in biology mediated by a chemical potential, Levy processes in optimal control and finances, and population dynamics. Similar problems occur geometrically in the study of scattering of waves in the setting of Poincaré-Einstein spaces.

## HOFER (Continued from page 1)

homology. Hofer worked with Floer on several papers on the subject, some of which were published jointly after Floer's premature death in 1991.

“The fields of symplectic geometry, symplectic topology, and related Hamiltonian dynamics have enjoyed dramatic advances in the last twenty years,” stated School of Mathematics Professor Peter Sarnak. “Helmut Hofer is one of the main architects of these developments. Together with his engaging style, energy, record of collaborations, and mentorship, his addition to the Faculty of the School of Mathematics will position the Institute as a center for these areas.”

Following his work on the Arnold Conjecture, Hofer introduced the method of holomorphic curves in contact geometry. This led to a wealth of new results in Hamiltonian dynamics and in particular to a proof of the Weinstein Conjecture, which is concerned with the existence of periodic orbits of contact-type Hamiltonian systems in many cases. This work led him, together with Yakov Eliashberg, to the concept of contact homology. In recent works, Hofer and his collaborators Kris Wysocki and Eduard Zehnder have introduced new analytic tools to study the geometry of moduli spaces, which provide the foundations for his ongoing work with Eliashberg on symplectic field theory.

“The Institute is a unique place and I am thrilled to join its Faculty,” said Hofer. “During my professional life, I spent two years at different stages of my career at the Institute. The opportunity to meet and interact with extraordinary people had a significant impact on my professional development. I consider it as an extraordinary privilege to be part of the Institute and to further its mission to encourage and support fundamental research.”

Hofer studied at the University of Zurich, where he earned an undergraduate degree in 1979 and a Ph.D. in 1981. He taught at Zurich from 1979 to 1982, and the following year he joined the University of Bath as a Lecturer in Pure Mathematics. From there he went to Rutgers, The State University of New Jersey, where he served as Assistant Professor (1985–87), Associate Professor (1987–88), and Professor (1988–89). He then went to Germany and became a C-4 Professor at Ruhr-Universität Bochum, a position he held from 1989 to 1993. From 1993 to 1997, he was Professor at Eidgenössische Technische Hochschule in Zurich. He joined the Courant Institute of Mathematical Sciences of New York University as Professor in 1997 and was named Silver Professor in 2006.

The recipient of the 1999 Ostrowski Prize, Hofer was elected to the National Academy of Sciences and Academia Europaea in 2008. He serves as Chairman of the Scientific Advisory Board of the Max Planck Institute for Mathematics in the Sciences at Leipzig, Germany, and as cochair of the Scientific Advisory Committee of the Mathematics Science Research Institute in Berkeley.

## CHANOTIS (Continued from page 1)

tradition in ancient history but also to bring new fields and new approaches to ancient studies at the Institute. The admirable range of his research will also enable him to engage the work of scholars in several other disciplines.”

Chaniotis's most recent book, *War in the Hellenistic World: A Social and Cultural History* (2005), is a study of the political, cultural, and economic aspects of war, in which he presents an innovative examination of the narration and commemoration of wars and of the aesthetics of warfare, and analyzes how warfare shaped identities and social structures. His first book, *Historie und Historiker in den griechischen Inschriften. Epigraphische Beiträge zur griechischen Historiographie (History and Historians in Greek Inscriptions. Epigraphic Contributions to Greek Historiography, 1988)*, is a groundbreaking study devoted to the place of history and historians in ancient Greek public life over a wide geographical area and across many centuries. “A great challenge for ancient studies in our times is to enhance their dialogue with other fields of the humanities and the social sciences and to contribute to theoretical discourse, without neglecting their principal task, which is to publish and interpret source material,” commented Chaniotis. “The School of Historical Studies has long established itself as a leader both in intellectual exchange and as a research center in epigraphical studies. I am honored to have been invited to continue these traditions.”

Chaniotis, who was born in Athens, received his undergraduate education at the University of Athens. He earned a Ph.D. in ancient history from the University of Heidelberg in 1984, and then studied law at the University of Bonn from 1985 to 1986. In 1992, he received his Habilitation in Ancient History from the University of Heidelberg with a thesis on the treaties between Cretan cities in the Hellenistic epoch. He served as Assistant Professor in the Department of Ancient History at the University of Heidelberg from 1987 to 1992, after which he served as Associate Professor until 1994. In 1993, he moved to New York University as Visiting Professor in the Department of Classics and the Alexander S. Onassis Center for Hellenic Studies. Chaniotis became Associate Professor of Greek History at New York University in 1994 and served as Acting Chair of the Department of Classics in 1996. He was appointed Professor of Greek History and Director of Graduate Studies in 1997.

In 1998, Chaniotis returned to Heidelberg as Professor of Ancient History and Chair of the Department of Ancient History. In 2006, Chaniotis was appointed Senior Research Fellow in Classics at All Souls College in the University of Oxford. Chaniotis is Senior Editor of the *Supplementum Epigraphicum Graecum*, the editor or coeditor of the journals *Tekmeria*, *Kernos*, and *Mnemosyne*, and the series editor of *Heidelberger Althistorische Beiträge und Epigraphische Studien* and *New Approaches to the Ancient World*. He is the recipient of the Baden-Württemberg Prize for Pure Research (2001) and the Nikos Svoronos History Award from the Institute of Mediterranean Studies/Institute of Technology and Research, Crete (1991), among other honors.

# Institute for Advanced Study: Opening Day, October 2, 1933

by Steve Batterson

Seventy-five years ago, after nearly four years of discussion and planning, the Institute for Advanced Study opened on Monday, October 2, 1933. The Director, Abraham Flexner, called together the Faculty of its only school, the School of Mathematics. Present for the meeting were Oswald Veblen, James Alexander, and John von Neumann. The Institute's other two Professors, Albert Einstein and Hermann Weyl, were in Europe and would arrive later in the month. This article recounts how these individuals became the first Faculty members.

From the Institute's conception, Flexner's overarching ambition was to elevate research in the United States. His inspiration was Daniel Coit Gilman, who had recruited mathematician J. J. Sylvester, classicist Basil Gildersleeve, and physicist Henry Rowland along with three professors in other fields for the opening of Johns Hopkins. Flexner wrote to his brother Simon in June 1930: "I realize fully that everything depends, as it depended in Baltimore in 1876, on bringing together a group of persons. If I can get them it will succeed—if I can't, it won't." As Gilman before him, Flexner was open-minded as to subjects. He never intended, however, for the first five Faculty members to belong to the same school.

In his search for personnel, Flexner traveled to the intellectual centers of the United States and Europe. He sought to identify the best American scholars who had already achieved world-class standing. By early 1931, the list of candidates had narrowed to Chicago economist Jacob Viner and Harvard mathematician George D. Birkhoff. In April, Flexner decided that a Birkhoff-led School of Mathematics was the place to start.

A number of factors entered into the decision, not the least of which was Flexner's personal assessment of the two scholars. Flexner himself was completely ignorant in mathematics. From the experts he had learned that G. H. Hardy at Oxford and Hermann Weyl at Göttingen were the world's foremost mathematicians, with Birkhoff the best American. The leading American departments were at Harvard and Princeton, but both trailed the finest European institutions. Flexner's plan was to locate the Institute in Princeton where Birkhoff, together with the Princeton University mathematicians, would establish an American center for the subject. To succeed he would have to lure Birkhoff from Harvard and dissuade the founders, Louis Bamberger and his sister Caroline Fuld, from their desire for a venue in their hometown of Newark. Flexner set out to



When the Institute opened on October 2, 1933, its Faculty consisted of (clockwise from top left): Oswald Veblen, Albert Einstein, Hermann Weyl, James Alexander (in the driver's seat with Solomon Lefschetz of Princeton University), and John von Neumann.

convince that the physicist was enthusiastic about joining the Faculty. To bring Birkhoff, Weyl, and Einstein to Princeton would elevate the New Jersey town's standing in mathematics to the highest level in the world. Flexner obtained the Bambergers' approval to approach the three men with attractive salary offers.

The next move was a letter to Weyl, expressing interest in having him join the Faculty and proposing to discuss the matter in Europe. Flexner had already scheduled a summer follow-up with Einstein at Oxford. The first formal offer then went to Birkhoff at the end of February. Birkhoff weighed the scholarly opportunities and financial advantages with his longstanding successful career at Harvard. Twice he accepted, only to reconsider.

Birkhoff's final decision to remain in Cambridge was a huge setback for Flexner, who was determined to have Americans lead the Institute. Two years of searching had turned up Birkhoff as the one perfect Faculty candidate. As Flexner sailed to Europe for meetings with Einstein and Weyl, he pondered a new American name, Oswald Veblen.

Veblen had made important contributions to the foundations of projective geometry and algebraic topology. More than any American mathematician, he shared Flexner's vision for promoting research in the United States. Over the past decade, Veblen had sought to create a mathematics institute at Princeton University similar in structure to

(Continued on page 9)

## Decadal Review: Examining the Current Course of the Institute

*"In the interest of clarity, I began by recapitulating the reasons why the Institute for Advanced Study was established and what its main characteristics should be; for only by recapitulation from time to time can we be sure that we will not be drawn or drift out of our course."*  
—Founding Director Abraham Flexner

The Institute for Advanced Study is currently undertaking a Decadal Review, which is intended as a comprehensive consideration of the Institute's current and future role in the rapidly changing world of scholarship. Through this review, the Institute is gathering information from a wide range of perspectives about all aspects of the life and work of the Institute. The review process, conducted by the Institute's Board of Trustees, will examine the current course of the Institute, reflect on the appropriateness of that course, and recommend any adjustments that should be considered for the future.

The Institute was founded with the aim of providing an institution where scientists and scholars could pursue fundamental research, free both from the distractions of teaching and administration and from the requirements of pursuing predetermined outcomes or short-term goals. Thanks to the generosity of its founders and subsequent benefactors, and the independence from outside pressures that this has provided, the Institute has remained remarkably true to this mission.

Indeed, it was the "express wish" of the founders, stated in their letter of invitation to

the first Trustees, that the fundamental aim of the Institute should never be modified. However, it is appropriate that the Institute review how this mission should be interpreted in the present context, both in terms of the world of scholarship and of the world beyond.

Approximately every ten years since the mid-1950s, the Institute has reaffirmed its commitment to enhancing the opportunities it offers to its Faculty and Members by reviewing its structure, by exploring new ways to provide greater coherence among all components of the Institute community, and by planning strategically to provide sufficient resources.

In the initial phase of the Decadal Review, which spanned the 2007–08 academic year, committees of visiting scholars for each of the four Schools convened at the Institute with the objective of understanding and evaluating the Schools' missions, whether and how well they are being realized, prospects for the future, and whether there are particular issues or problems to be addressed. The second and final phase of the process will build on the reports of the Visiting Committees through a variety of additional activities, including vital input from members of the Institute community. The aim is to produce a final report with recommendations by October 2009.

Individuals who wish to participate in the review are encouraged to contribute their comments and suggestions by contacting Robert Ruggiero, Special Assistant to the Director for the Decadal Review, via email at [ruggiero@ias.edu](mailto:ruggiero@ias.edu).

# Paul Dirac: The Mozart of Science

by Graham Farmelo

When Hitler became Chancellor of Germany in January 1933, Albert Einstein had already left the country. He was in the United States and in contact with the founders of his new academic home, the Institute for Advanced Study, which would open in fall 1933. He and the mathematician Oswald Veblen would be the first Faculty members and plans were afoot to recruit their colleagues. When Veblen asked Einstein in March to name the physicist he would most like to join him, Einstein chose the English theoretical physicist Paul Dirac as “the best possible choice for another chair.”

Einstein’s recommendation was not controversial. Dirac, then thirty, held the Lucasian Chair of Mathematics—once occupied by Newton—and was about to become the youngest theoretician to win the Nobel Prize for Physics, a record that stood until T.D. Lee, then a Member of the Institute, won the Prize in 1957. As Einstein and the Institute’s founders knew, it was going to be difficult to prise Dirac from his comfortable life at the University of Cambridge, where he had been based for almost a decade. In the end, it proved impossible to persuade Dirac to take a post at the Institute, but the Institute succeeded in becoming his second academic home for the next thirty-five years.

In 1931, a year after the Institute was founded, Dirac had been invited to Princeton University by Veblen, then a professor at the University. By that time, Dirac had established himself as a world-class scientist, one of the discoverers of quantum theory, a revolutionary set of laws that describe matter on the smallest scale. Many of the early papers in this field now look dated and tentative, but Dirac’s have a timeless purity, written with a special grace, mathematical elegance, and concision. He never used a paragraph where a sentence sufficed, nor did he ever deploy an unfamiliar word when a common one would do.

In the view of School of Natural Sciences Professor Emeritus Freeman Dyson, “Dirac’s great discoveries were like exquisitely carved marble statues falling out the sky, one after another.” One example of this was the beautiful equation Dirac found to describe behavior of every electron in a way consistent with both quantum theory and the special theory of relativity. In 1928, when he published this equation, physicists all over the world regarded it as wondrous, not least because it accounted naturally for the electron’s spin, a mystery since experimenters discovered it three years before.

When Veblen’s invitation arrived in Cambridge, Dirac was working in St. John’s College on a new approach to theoretical physics. Dirac encouraged theoreticians to proceed not by taking their cues from new experimental results but by using appealing mathematics as their primary inspiration. Dirac described this idea in a landmark paper whose main purpose was to set out an innovative theory suggesting the existence of a single magnetic pole, hitherto undetected. Almost in passing, he also tentatively suggested the existence of an anti-electron, a particle with the same mass as the electron but with the opposite electrical charge. This paper, which appeared in American libraries a few days before his arrival in Princeton at the end of September 1931, formed the basis of his work in the plush new Fine Hall (now Jones Hall) at Princeton University.

On the day after he arrived, Dirac gave a joint seminar with the Austrian theoretician Wolfgang Pauli, each of them describing how theoretical reasoning had led them to suggest the existence of a new particle. The colloquium—“a first national attraction,” Pauli wrote—was an exciting beginning to the new academic term for Princeton’s physicists. Dirac began by reviewing his theory of isolated magnetic poles, then Pauli went on to argue that there might exist an electrically neutral particle of roughly zero mass (later dubbed the neutrino). At that time, both contributions were regarded as extremely daring because, as Dirac later explained, it was almost universally assumed that the number of fundamental particles is tiny and that the existence of new ones (if there were any) was a matter for experimenters to explore, not theoreticians.

A few weeks later, during a lecture course at the university on quantum theory, he spent just a few minutes discussing the anti-electron. Although he had hinted at the possibility of such a particle in his landmark paper, it was in Princeton that he came closest to predicting its existence. Contrary to current myth, hardly any physicists took Dirac’s idea seriously, and there was no fanfare when the experimenter Carl Anderson first caught sight of the anti-electron (the first observed anti-matter) among the cosmic rays raining down from the summer skies over Los Angeles in 1932. Anderson was unaware of the prediction made by Dirac, who, in turn, knew nothing of the discovery until a few months later. Today, this event is usually regarded as one of the great triumphs of modern science, because Dirac’s prediction is widely taken to be the first motivated solely by faith in pure theory, without a hint from data.

Dirac began his first yearlong sabbatical at the Institute in the fall of 1934, a stay that

later stood out as one of the most memorable times of his life. Working alone as usual, he intended to use his new approach of growing fundamental physical theories from purely mathematical seeds. But the year was dominated by two diversions. First, his closest friend, the Russian experimenter Peter Kapitza, was detained against his will by Stalin’s police during a summer visit when on vacation from Cambridge. As soon as Dirac heard about this, he spent months trying to get his friend released, on one occasion lobbying the Soviet Ambassador in Washington. Dirac’s second distraction began over lunch on Nassau Street when the Hungarian theoretician Eugene Wigner introduced him to his sister, who would later become Dirac’s wife, Manci Balazs. The Diracs were in many ways opposites—he was shy, modest, taciturn, and he often appeared cold and distant; she was outgoing, confident, talkative, a warm and considerate friend. It was an unlikely relationship, but their marriage worked and was ended only by his death almost half a century later.

During the war, Dirac contributed more to engineering than he did to physics. Mainly working at home in Cambridge, he did demanding calculations for the British team working on nuclear weapons and developed a method of isotope separation using an apparatus with no moving parts, an invention he had made a few years before (the nuclear power industry still uses some of the concepts he introduced). After the conflict, he escaped the postwar austerities in the United Kingdom by accepting an offer from his old friend, J. Robert Oppenheimer, newly appointed Director of the Institute, to spend a sabbatical there in the 1947–48 academic year.

In this restorative stay, Dirac did much-admired work on magnetic monopoles and quantum theory, regaining research momentum that he had lost during the war. The calm, the excellent facilities, and the quality of the academic company at the Institute were just what he needed: he worked in Fuld Hall alongside several friends—Niels Bohr, Albert Einstein, and Oswald Veblen—and toward the end of his stay, he made the acquaintance of a scientist he later much

admired, Freeman Dyson. Dirac worked hard on weekdays but reserved weekends for family and for socializing with his colleagues (his elder daughter long remembered having tea one Sunday with the Einstein household). On Saturday mornings, Dirac would set off with an axe over his shoulder to help Veblen and others clear another path in the Institute’s woodlands.

Having been assured by Oppenheimer of a permanent welcome at the Institute, Dirac stayed there many times during the next eighteen years. On one occasion, a failure in the arrangements made the front page of *The New York Times*: in the spring of 1954, at the height of the McCarthy era, Oppenheimer heard during a weekend break in his security hearing that Dirac had been refused a visa to travel to the United States (probably because of Dirac’s friendship with several Soviet scientists and his sympathies for Stalin’s government in the 1930s). After an outcry among American physicists, the government granted Dirac his visa in early August, but it was too late. He had already made arrangements to spend his year in India, having tried in vain—perhaps to cock a snook at the authorities—to take his sabbatical in Russia.

Dirac continued to be productive in his fifties and sixties. During his sabbatical at the Institute in 1958–59, he developed an important new way of formulating Einstein’s theory of gravity, using his own preferred way of formulating the laws of quantum theory based on techniques originally set out by the Irish mathematician William Hamilton. Four years later, Dirac returned to quantum theory, beginning work that would later be valuable in research on gauge theories and string theories. He wrote these papers in his characteristic style, developing each new idea with an elegance and simplicity that gave the impression that the theory could not be realized in any other way, in much the same way as a great composer’s music often has a sense of inevitability. The Hungarian physicist Nandor Balazs had this analogy in mind when he described Dirac as “the Mozart of science.”

From the early 1930s, he was convinced that quantum theory was unable to give a mathematically coherent account of even the simplest interactions between electrons and photons (particles of light) because, in his reading of the equations, they generated meaningless infinities when used to predict measurable quantities that must, perforce, be finite. For him, a fundamental theory of nature must be mathematically beautiful, whereas advanced quantum theory was unendurably ugly. Decades later, Dirac refused to accept the consensus that these problems had been solved, and he insisted repeatedly that nothing short of a radically new approach to quantum theory was needed.

Aware that many theoreticians at that time privately regarded his views as principled but impractical or even cranky, Dirac’s morale was sometimes low. No doubt with this in mind, the late Princeton physicist John Wheeler wrote him a characteristically

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Paul Dirac (center) with Director Robert Oppenheimer (left) and Abraham Pais (right), Professor in the School of Mathematics (1950–63), during afternoon tea at the Institute in November 1947

ALFRED EISENSTADT/GETTY IMAGES

## Friends of the Institute

The Friends of the Institute for Advanced Study provide the Institute with significant discretionary income every year, supplying stipends for Members, matching funds necessary to secure grants from other sources, and contributing in many other valuable ways to the sustainability of the Institute's mission. The Friends continue to thrive, with new leadership and a range of events this academic year to involve these committed donors in the work of the Institute.

John H. Rassweiler, Jr., a Friend since 1992, a member of the Friends Executive Committee since 2002, and Secretary of the Executive Committee since 2007, has been elected to serve a two-year term as Chair of the Friends. Rassweiler is the retired Chairman of Health Enhancement Systems, Inc., and worked previously for American Cyanamid and Johnson & Johnson. An organic biochemist, Rassweiler earned his Ph.D. from the University of Illinois and then studied in Zurich at the ETH. He is active on the boards of the D&R Greenway Land Trust, the Princeton Singers, Friends of the Princeton University Art Museum, and Friends of the Princeton University Library.

Rassweiler will be working closely with Carolyn Sanderson, who has been elected to serve a two-year term as Vice Chair of the Friends and Chair of the Membership Committee. Sanderson and her husband George have been Friends of the Institute since 1998, and she has been a member of the Friends Executive Committee since 2006. A cum laude graduate of Harvard, Sanderson is a client adviser and Managing Director in J. P. Morgan's Private Wealth Management Group. She is active in the Princeton community, currently serving on the boards of the Princeton HealthCare System Foundation, McCarter Theatre, and Trinity Counseling Service.

Five new members were elected to the Friends Executive Committee: Lynn Johnston; Florence B. Kahn; John J. McCarthy, Jr.; Michael Morandi; and Vivian Shapiro. When welcoming the group at their fall meeting in September, Institute Director Peter Goddard expressed appreciation to the Committee, and noted that the Friends "add enormously to the life of the Institute. To have a highly informed group of people who can represent the Institute more widely and provide significant financial support is of inestimable value."

In mid-September, Friends were invited to join Goddard for a tour of the campus and a talk, "There Are No Excuses in Paradise, The Institute for Advanced Study: Past, Present and Future," which provided an engaging overview of the Institute's history and its place in the world. On October 10, former School of Natural Sciences Member (1957–59) Jeremy Bernstein, Professor Emeritus of Physics at Stevens Institute of Technology and a former staff writer for *The New Yorker*, presented a retrospective of some forty years of his travels to places such as Nepal, Bhutan, Tibet, Pakistan, and Afghanistan.

Upcoming Friends events include:

On **November 21**, Ken Albala, a food historian from the University of the Pacific, will give a lecture as part of the Friends Culture and Cuisine series. Albala has authored a number of books, including *Eating Right in the Renaissance*, *Food in Early Modern Europe*, and *Cooking in Europe 1250–1650*. His talk for the Friends will be on fasting and Lenten controversies in the Reformation.

Phillip Griffiths, Professor in the School of Mathematics and former Director (1991–2003) of the Institute, currently chairs the Science Initiative Group (SIG), an international team of scientific leaders and supporters dedicated to fostering science in developing countries. On **December 3**, Griffiths and Arlen Hastings, Executive Director of SIG, will jointly give a Friends Forum talk, "IAS and the Globalization of Science."

On **January 30, 2009**, the Executive Committee will host a reception for those individuals who are interested in learning more about the Friends.

For more information about the Friends, please contact Pamela Hughes, Senior Development Officer, at (609) 734-8204 or [phughes@ias.edu](mailto:phughes@ias.edu).

## Crucial Support Provided by New Memberships

Memberships are critical to the intellectual life of the Institute and its community. Some 200 Members come each year to the Institute and are given the freedom to work on the attainment of long-term goals without pressure for immediate results. In order to continue to provide a haven for theoretical research and intellectual inquiry, the Institute continues to seek support for its Members through both annual gifts and endowments.

Among the new Memberships at the Institute is the **Charles L. Brown Membership in Biology**, named for the former Institute Trustee and Chairman of AT&T. During his years as Trustee, Brown served on the Finance, Housing, and Budget committees, becoming Vice Chairman and then President of the Institute's Corporation. Among his other contributions, Brown served on the search committee that recommended Phillip Griffiths's appointment as the seventh Director of the Institute. On his retirement from the Board in 1995, Brown became Trustee Emeritus and remained a generous friend of the Institute until his death in November 2003. Brown's wife, Ann Lee Saunders Brown, recently made a gift to recognize Brown's distinguished service to the Institute, endowing the Charles L. Brown Membership.

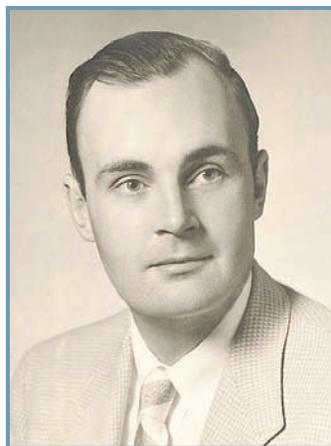
A generous gift from Zurich Financial Services has created an endowment for a Membership intended for scholars and scientists from China, including Hong Kong and Taiwan. The **Zurich Financial Services Membership** will be offered to Chinese candidates conducting research in the fields of mathematics, economics, and the sciences. James J. Schiro, Institute Trustee and Chief Executive Officer of Zurich Financial Services, worked with the Institute to conceptualize the Membership and bring it to fruition.

Eric E. Schmidt, Chairman of the Board and Chief Executive Officer of Google Inc., a recent addition to the Institute's Board of Trustees, has made a gift to endow the **Eric and Wendy Schmidt Membership in Biology**. Their generous support is critical as the Institute seeks to further endow The Simons Center for Systems Biology and the pioneering research being conducted by its Faculty and Members.

The **Gerda Henkel Stiftung** has renewed its funding for an additional five years to support a Member in the School of Historical Studies. In renewing funding for scholars from Europe beginning in 2010, when the current five-year grant expires, the Chairman of the Gerda Henkel Stiftung cited the excellent working experience the Institute has provided for Members. The organization has shown generous and continuing support for scholars at the Institute for some twenty years, and in addition to Member support, they have provided funding for conferences in East Asian studies at the Institute.

The Institute has also received funding from the **Qiu Shi Science and Technologies Foundation** of Hong Kong for two Memberships for scholars and scientists from China in 2009–10 and 2010–11. The Qiu Shi Foundation was founded in 1994 by noted Chinese industrialist Chi-ming Cha (1914–2007) and his family in Hong Kong. The primary goal of the foundation is to promote science and technology research in China and to encourage and reward successful Chinese scholars within these fields. This is accomplished through a series of awards and scholarships given to facilitate training of emerging talent in the sciences. C. N. Yang (former Member, 1949–54, and Professor in the School of Mathematics, 1955–66) is one of a panel of six prominent Chinese scientists that regularly consults with the Qiu Shi Foundation.

## Charitable Gift Annuity Honors Jacob C. E. Dekker



Jacob C. E. Dekker

COURTESY OF HENNY DEKKER

There are hundreds of gifted mathematicians whose career paths were influenced by the opportunity to pursue their studies at the Institute for Advanced Study. One such academic was Jacob C.E. Dekker, who came to the United States from the Netherlands after World War II to study at Syracuse University at the invitation of Lipman Bers. In the 1940s mathematics flourished at Syracuse, and its faculty included Paul Erdős, Dan Mostow, and Atle Selberg.

In 1956, Dekker was invited by Kurt Gödel for a two-year stay at the Institute, and in 1957, he was joined by Anil Nerode and John Myhill, mathematicians he met while working at The University of Chicago in the early 1950s.

Dekker flourished as a mathematician, and he had an illustrious career that included faculty positions at The University of Chicago, Northwestern University, the University of Kansas, and Rutgers, The State University of New Jersey, where he was a member of the mathematics faculty from 1959 until 1986. Dekker and Henny, his

wife of fifty-three years, made their home in Princeton, and they often came back to the Institute to visit with old friends and walk the grounds. When he passed away in 2004, Nerode wrote in *The Bulletin of Symbolic Logic* that "Dekker was a 'complete gentleman' in the best sense, a droll wit blessed with a sunny disposition, who always treated students, friends, and colleagues with patience, kindness, and respect."

When Henny Dekker learned that the Institute was offering charitable gift annuities, she included the Institute in her estate plans. By establishing a charitable gift annuity, she now receives a lifetime income from the Institute, and she has honored her husband's memory and the important role that the Institute played in his career.

A charitable gift annuity is an example of a life income gift. It is only one of the ways you can make a gift to the Institute and at the same time provide a stream of income for yourself or others. To learn more about charitable gift annuities and other life income gifts—including the tax advantages that such gifts may offer—please contact Peggy Jackson, Planned Giving Officer, at (609) 951-4612 or [pjackson@ias.edu](mailto:pjackson@ias.edu). You may also visit the "Ways to Give" pages on the Institute's website, [www.ias.edu](http://www.ias.edu).

## DIRAC (Continued from page 7)

sensitive, encouraging note on his eightieth birthday, August 8, 1982: “I write to tell you what I am not sure you divine, how many of the *younger* generation as well as older ones look up to you as a hero, as a model of how to do things right, of passion for *rectitude* as well as beauty.” At about the time he received this note, Dirac talked at a summer school in Sicily with one of his young admirers, Edward Witten, later a member of the Institute’s Faculty. The admiration was mutual: in 1983, in a handwritten note to the chair of the Papal Awards committee, Dirac recommended Witten for his “brilliant solutions to a number of problems in mathematical physics.” This seems to have been the last reference Dirac wrote.

Dirac’s final visit to the Institute had been in 1979, when he attended the symposium to mark the centenary of Einstein’s birth. By then, Dirac had accepted a Visiting Professorship at Florida State University in Tallahassee, partly so that he and his wife could be close to their elder daughter, Mary. Dirac was made exceptionally welcome in Tallahassee, where he did unconventional research on cosmology when he was not giving lectures all over the world. He had a comfortable and contented retirement, but I suspect it would have been even happier if he had accepted one of the offers the Institute had made him. In interviews to the Florida press before he died in 1984, he spoke warmly—and with more than a hint of nostalgia—of the Institute. It was, he said, “a paradise.”

*Graham Farmelo (g.farmelo@btinternet.com) wrote much of his biography of Paul Dirac, The Strangest Man, while a Director’s Visitor at the Institute. The book will be published in the United Kingdom by Faber in January.*

## OPENING DAY (Continued from page 6)

what Flexner was attempting over a variety of disciplines. While this ambitious effort had largely failed, Veblen had been remarkably successful in securing private and government funding to support other mathematical research initiatives. Aside from a few Trustees and family members, Veblen was the only person in whom Flexner had confided his plans for the Institute. So why did it take so long for Flexner to consider Veblen for a Faculty position? One reason was Flexner’s obsession with obtaining the best. While Veblen and Birkhoff were the only Americans to deliver plenary addresses at the previous International Congress of Mathematicians, Birkhoff had the better theorems. Secondly, and perhaps even more important, was Flexner’s desire to work as an ally with Princeton University. Poaching their leading mathematician hardly seemed a basis for cooperation.

Veblen had preceded Flexner to Europe on his own previously planned trip. In Göttingen, he lobbied Weyl to come to the Institute. Flexner’s 1932 European itinerary began in England. There he made an offer to Einstein, inviting him to set his own terms. Presumably Flexner was open to a salary beyond the academically unprecedented \$20,000 proposal to Birkhoff. Einstein asked to defer a decision until his return to Germany. They would meet at Einstein’s summer home in Caputh after Flexner saw Weyl.

When Flexner reached Göttingen at the end of May, two years had elapsed since the Institute’s incorporation and endowment. Yet no Faculty had been hired. At least Weyl or Einstein was needed to meet the expectations that Flexner had created. The availability of both had arisen out of the troubled circumstances in Germany. The economy was in shambles. Anti-Semitism, already prevalent, threatened to be institutionalized if Hitler came to power. The National Socialist Party was still outside the government’s ruling coalition but had been strengthening its plurality. Possibly Nazism had run its course. If not, Weyl’s wife was Jewish, subjecting his children, like Einstein himself, to the jeopardy of being non-Aryan.

Compounding the uncertainty of mid-1932 Germany for Weyl was his own pathological inability to decide on job offers. Several times over the prior decade he had become virtually paralyzed in reacting to prestigious opportunities at home and abroad. Flexner found Weyl to be interested, though noncommittal, in joining the Institute Faculty. Weyl suggested he might wish to visit for a period and then choose whether to stay or return to Göttingen. Another personnel move went more smoothly. Flexner was satisfied with his feedback on Veblen, who he had decided was needed for the School of Mathematics. For his part, Veblen had loved the Institute concept from the beginning. The 50 percent increase in salary to \$15,000 and generous pension benefit made his decision easy.

The real triumph for Flexner came in Caputh. Einstein decided to cast his lot with the Institute. As to the blank check, his salary expectations were modest. However, what Einstein did want was more dear to Flexner than any amount of money. Einstein insisted on a position for his Jewish collaborator Walther Mayer who was unable to obtain employment in Germany. Flexner acquiesced. Down the line he would assign Mayer sub-Faculty status, seriously jeopardizing relations between the Director and Einstein.

The Bambergers were elated to have Einstein in the fold. The Princeton location was settled immediately after Flexner’s return to the United States. An arrangement was made to rent temporary space in the Princeton mathematics building. Veblen remained in his office and was added to the Institute payroll.

## SIMONYI (Continued from page 1)

Chairman of the Board and President of the Corporation.”

As a leading member of the Board, Simonyi has provided foundational support to help sustain the Institute’s standing as one of the world’s leading centers for theoretical research and intellectual inquiry. In 2005, the Charles Simonyi Fund for Arts and Sciences awarded the Institute an unrestricted cash gift of \$25 million, representing the largest donation since the founding of the Institute. The gift was named The Karoly Simonyi Memorial Endowment Fund, in honor of Simonyi’s late father, an esteemed professor of electrical engineering. Simonyi provided for the endowment of the Charles Simonyi Professorship in Theoretical Physics, currently held by physicist Edward Witten of the Institute’s School of Natural Sciences. He has further demonstrated his commitment to the Institute by providing substantial funding to the School of Mathematics. Simonyi Hall, which houses the School, was dedicated in May 2000 in recognition of his participation in the life of the Institute community and his support of the work that takes place here.

A member of the Hungarian Academy of Sciences and the National Academy of Engineering, Simonyi was recently named a Fellow in the American Academy of Arts and Sciences. In 2001, he received an honorary doctorate from Hungary’s University of Pécs. In April 2007, he fulfilled a lifelong dream and became the fifth civilian to travel into space when he completed an eight-day stay aboard the International Space Station. Simonyi will wed Lisa Persdotter of Sweden later this year.

Leibowitz, who has been a Trustee of the Institute since 1995, will continue his role as Vice Chairman of the Board. He currently serves on the Finance Committee and the Endowment Campaign Task Force, and he was Chairman of the search committee for Director Goddard. Over the years, he has actively supported the Institute’s Schools of Mathematics and Historical Studies and systems biology in the School of Natural Sciences.

The Bambergers were less excited about Weyl, who continued to vacillate over the summer and fall of 1932. Weyl’s modus operandi was to promise a decision by a certain future date, at which time he would either not respond or ask for an extension. In early December, Weyl cabled his intention to accept the Institute position. It appeared that the Institute would have an impressive opening the following fall with Weyl and Einstein joining Veblen.

For his part, Veblen had been pushing Flexner to hire additional mathematicians. Suddenly his appeal gained traction as Flexner contemplated a Faculty that was majority European. The problem for Flexner was that the only viable American candidates were Princeton University professors James Alexander and Solomon Lefschetz. Veblen wanted both, but Flexner was reluctant to take another member of the Princeton faculty. In the end Flexner’s course was to give the university the choice of whom to retain. Princeton decided to keep Lefschetz. The topologist Alexander joined the Institute.

Flexner was delighted with his mathematics slate. The eminence of the four scholars, the balance between domestic and foreign, the age spread from the forty-four-year-old Alexander to the fifty-three-year-old Einstein all seemed ideal. He only hoped to assemble comparable groups in economics and other areas.

Across the Atlantic, Weyl was struggling with a post-decision anxiety attack. Then a wave of illness struck his household. During the first week of 1933, Weyl sent a bizarre sequence of telegrams accepting, declining, and then accepting the Institute position. In the midst of the ensuing uncertainty, Veblen persuaded a befuddled Flexner to consider a position for another European mathematician. The twenty-nine-year-old Jewish Hungarian John von Neumann was clear on his desire to immigrate to the United States.

Several years earlier, Veblen had instigated a partial-year appointment for von Neumann at Princeton University. The visit was a great success. Von Neumann began to split his year between Princeton and Berlin. With the departures of Veblen and Alexander, the university mathematics department was working to secure von Neumann on a permanent full-time basis. Flexner was torn over whether to compete for von Neumann with his partner institution. On January 11, Weyl sent a fourth cable pleading to remain in Germany. He was immediately replaced by von Neumann on the Institute Faculty.

Weyl’s timing was tragic. On January 30, 1933, Hitler became chancellor and set out to consolidate his grip on power. Weyl was oblivious to these developments. Depressed and dysfunctional, he had confined himself to a Berlin sanatorium. After several months of isolation, treatment, and convalescence, Weyl reentered a different Germany. Weyl realized he had made a terrible mistake and feared that his bridge to the United States was closed at both ends. Fortunately for him, both Veblen and Flexner were understanding of his plight. Despite a summer fraught with uncertainty, Weyl managed to take his family out of Germany and join the Institute Faculty shortly after the opening.

Flexner and Veblen had assembled an extraordinary Faculty in the School of Mathematics. Together with Lefschetz at the university, the Institute made the town of Princeton into the world’s foremost center for mathematics on October 2, 1933.

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