

# The Institute Letter

Institute for Advanced Study

Fall 2010

## In Search of an Identity: European Discourses and Ancient Paradigms

BY ANGELOS CHANIOTIS

**“W**ho are you?” A simple question sometimes requires a complex answer. When a Homeric hero is asked who he is (e.g. *Iliad* 7.123 ff.), his answer consists of more than just his name; he provides a list of his ancestors. The history of his family is an essential constituent of his identity. When the city of Aphrodisias (in Asia Minor) decided to honor a prominent citizen with a public funeral (ca. 50 B.C.E.), the decree in his honor identified him in the following manner:

*Hermogenes, son of Hephaestion, the so-called Theodotos, one of the first and most illustrious citizens, a man who has as his ancestors men among the greatest and among those who built together the community and have lived in virtue, love of glory, many promises of benefactions, and the most beautiful deeds for the fatherland; a man who has been himself good and virtuous, a lover of the fatherland, a constructor, a benefactor of the polis, and a savior . . .*

The components of Hermogenes’ identity include his name and nickname (Theodotos = “the gift of the gods”), his social class, the history of his family, and his personal achievements.



Figure 1. Aeneas, the son of Aphrodite and the founder of Rome, escapes from Troy in this relief panel in the Sebasteion (a building dedicated to imperial cult) at Aphrodisias (mid-first century C.E.).

We can define “identity” in an elementary manner as the answer to the questions “who and what are you?” Depending on the context in which the question is asked and who wants to know, the answer may vary and change over time.

It is hard to imagine contexts in which a modern-day citizen of a European country when confronted with these questions would give the answer: “I am a European.” And yet discussions about European identity abound, usually tacitly taking the existence of European identity, cultural rather than political, for granted. Studies of how identity was defined in other cultures invites us to critically reflect on modern discourses of European identity.

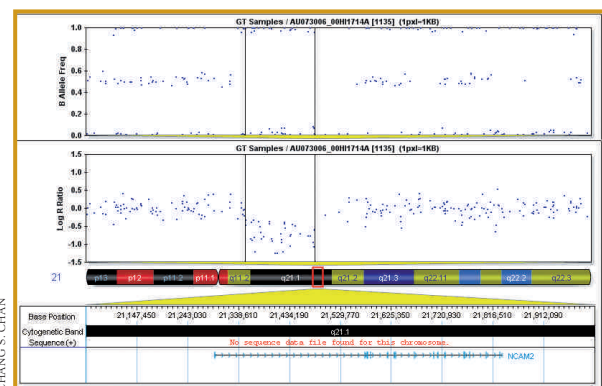
Ancient Greek paradigms reveal two important aspects: the parallel existence and overlapping of identities and their continual evolution. Let us take the case of Classical and Hellenistic Crete. The elementary identity of a member of a Cretan community was his civic identity—for instance as a citizen of Knossos. This identity was shaped from the earliest childhood on. Listening to narratives of the deeds of the forefathers, a child was introduced to the values, and social and gender roles accepted by his community. Local songs taught him heroic

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## Identifying Novel Genes Associated With Autism

BY CHANG S. CHAN,  
SUZANNE CHRISTEN,  
AND ASAD NAQVI

**A**utism is a common childhood neurodevelopmental disorder affecting one in 180 children. It is characterized by impaired social interaction and communication, and by restricted interests and repetitive behavior. Autism is a complex disease exhibiting strong genetic liability with a twenty-five-fold increased risk for individuals having



This plot of genetic data from an individual with autism shows a deletion in the gene NCAM2, one of four genes that researchers in the Simons Center for Systems Biology found to be associated with autism.

affected first-degree relatives. Moreover, the concordance for developing autism is over 90 percent in identical twins, but only 5–10 percent for fraternal twins. Recent advances in genetics show that autism is associated with many diverse genes, with each gene accounting only for a few percent of cases, as well as complicated multigenic effects.

Researchers at the Simons Center for Systems Biology have been studying autism for the past two years. We have identified novel genes associated with autism. Our approach is to use single nucleotide polymorphism (SNP) genotyping chips that measure differences between individuals and can uncover candidate genes or regulatory elements

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## Matter for Debate: A Workshop on Relics and Related Devotional Objects

BY CAROLINE WALKER BYNUM

**M**aterial objects play a role in all religions. Jewish women light candles for the Sabbath; Christians sprinkle or douse bodies with water to baptize; Hindus offer coconuts and clarified butter to images of the gods and goddesses; the ancient Incas preserved mummies of their ancestors in caves, and Quechua-speaking peoples in the Andes still feel uneasy about these remains. Such objects—coconuts and images, candles and mummies—carry with them a community’s past, making it present and at the same time underlining its location in the past. They convey holiness from place to place, focus prayer and meditation, enforce or undermine hierarchy. But religions do not all venerate or fear

the same objects or use them in the same ways. Over the past hundred years, historians of religion have been particularly interested in a subset of devotional objects that have been designated by worshippers with a word that can be translated as “relics” or “remains”: holy bodies or parts of bodies, or physical objects that have been in contact with them or their

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Medieval reliquaries such as this one from a church in Cologne were among the devotional objects examined in the conference “Matter for Debate.” The conference was made possible with support from the Fritz Thyssen Stiftung.



# News of the Institute Community

**D**IDIER FASSIN, James D. Wolfensohn Professor in the School of Social Science, has published *La Raison Humanitaire: Une Histoire Morale du Temps Présent* (Hautes Études-Gallimard-Seuil, 2010). Based on fieldwork in France, Venezuela, and South Africa and on participant observation of nongovernmental organizations' interventions in Iraq and Palestine, the book explores political and moral issues raised by the deployment of a humanitarian government on disasters, wars, and misfortune. Fassin's book *The Empire of Trauma: An Inquiry into the Condition of Victimhood* (with Richard Rechtman, Princeton University Press, 2009) has been awarded the 2010 Douglass Book Prize by the Society for the Anthropology of Europe for best book published in the anthropology of Europe during 2009.

**J**ONATHAN ISRAEL, Professor in the School of Historical Studies, has been awarded the 2010 Benjamin Franklin Medal by the Royal Society for the Encouragement of Arts, Manufactures and Commerce (RSA) in London for his contribution to Enlightenment scholarship.

**S**TEPHEN L. ADLER became Professor Emeritus in the School of Natural Sciences in July. He has served on the Faculty of the Institute since 1969, a tenure of forty-one years that equals that of Freeman Dyson, Professor Emeritus in the School.

**O**LEG GRABAR, Professor Emeritus in the School of Historical Studies, has been awarded the Chairman's Award by the Aga Khan Award for Architecture at ceremonies held in the Museum of Islamic Art in Doha, Qatar. Grabar was honored for the contributions he has made to the study of the Islamic world's architectural evolution, from the early Islamic period up to the present.

**H**Einrich von Staden, who became Professor Emeritus in the School of Historical Studies in July, has been awarded the degree of Doctor Honoris Causa from the University of Lausanne. He was nominated by the Faculty of Arts and the Faculty of Biology and Medicine, which marks the first time the two faculties have joined together to make such an award. Von Staden has served on the Faculty of the Institute since 1998.

**A** Global Life: My Journey among Rich and Poor, from Sydney to Wall Street to the World Bank, the autobiography of JAMES D. WOLFENSOHN, Chairman Emeritus of the Institute's Board of Trustees, has been published by PublicAffairs.

**A** book in honor of STEPHEN V. TRACY, current Visitor in the School of Historical Studies, has been published, *Studies in Greek Epigraphy and History in Honor of Stephen V. Tracy*, edited by Gary Reger, F. X. Ryan, and Timothy F. Winters (Ausonius, 2010).

**I**NGRID DAUBECHIES, former Member (1999) in the School of Mathematics and an organizer of the Women and Mathematics program at the Institute, was elected President of the International Mathematical Union. Daubechies, who will be the first woman to hold this position, is William R. Kenan, Jr. Professor of Mathematics and Applied Computational Mathematics at Princeton University and will become Professor at Duke University in January 2011.

**K**RISTEN GHODSEE, former Member (2006–07) in the School of Social Science, has been awarded the 2010 Heldt Prize by the Association for Women in Slavic Studies for her book *Muslim Lives in Eastern Europe: Gender, Ethnicity, and the Transformation of Islam in Postsocialist Bulgaria* (Princeton University Press, 2009). The prize was awarded for the best book in Slavic/Eastern European/Eurasian women's studies. Ghodsee, who worked on the book during her time at the Institute, is Associate Professor of Gender and Women's Studies at Bowdoin College.

**F**RED INGLIS, former Member (1988–89) in the School of Social Science, has edited *Life among the Anthros and Other Essays* by CLIFFORD GEERTZ, a Professor in the School of Social Science from 1970 until his death in 2006 (Princeton University Press, 2010). Inglis is Emeritus Professor of Cultural Studies at the University of Sheffield.

**L**ORENZ M. LÜTHI, former Member (2007) in the School of Historical Studies, was awarded the 2010 Marshall Shulman Book Prize of the Association for Slavic, East European, and Eurasian Studies for his book *The Sino-Soviet Split: Cold War in the Communist World* (Princeton University Press, 2008). Lüthi is Associate Professor of History and Classical Studies at McGill University.

**D**AVID B. MUMFORD, former Member (1962–63, 1981–82) in the School of Mathematics, has been awarded the National Medal of Science for contributions to the mathematical, engineering, and neurobiological sciences. Mumford is Professor Emeritus at Brown University.

**A**t the International Congress of Mathematicians (ICM) in Hyderabad, India, the four recipients of the Fields Medal were former Members in the School of Mathematics. BAO CHÂU NGÔ (2006, 2007–10), currently Professor of Mathematics at the University of Chicago, was recognized for his proof of the fundamental lemma. ELON LINDENSTRAUSS (2000–01, 2007), currently Professor of Mathematics at the Einstein Institute of Mathematics at the

Hebrew University of Jerusalem, was honored for his results on measure rigidity in ergodic theory and their applications to number theory. STANISLAV SMIRNOV (1998, 2003), currently Professor of Mathematics at the Université de Genève, was recognized for the proof of conformal invariance of percolation and the planar Ising model in statistical physics. CÉDRIC VILLANI (2009), currently Director of the Institut Henri Poincaré of the Université Pierre et Marie Curie, was selected for his proofs of nonlinear Landau damping and convergence to equilibrium for the Boltzmann equation. Also at the ICM, LOUIS NIRENBERG, a former Visitor (1979–80) in the School of Mathematics, was awarded the Chern Medal in recognition of lifelong achievement in mathematics. Nirenberg is Professor Emeritus at New York University's Courant Institute of Mathematical Sciences. The Chern Medal was created in honor of SHIING-SHEN CHERN (1911–2004), a former Member of the Institute's School of Mathematics (1943–46, 1954–55, 1964).

**N**ANCY RIES, former Member (2007–08) in the School of Social Science, has been awarded the Cultural Horizons Prize by the Society for Cultural Anthropology for an article she wrote while at the Institute, "Potato Ontology: Surviving Postsocialism in Russia." Ries is currently Associate Professor of Anthropology and Peace & Conflict Studies at Colgate University.

**M**ARY ELISE SAROTTE, former Member (2006–07) in the School of Historical Studies, received the 2010 Robert H. Ferrell Book Prize of the Society for Historians of American Foreign Relations and the 2010 Marshall Shulman Book Prize of the Association for Slavic, East European, and Eurasian Studies for her book *1989: The Struggle to Create Post-Cold War Europe* (Princeton University Press, 2009). The book was also recognized with the 2009 Prize for Distinguished Scholarship in German and European Studies from the German Academic Exchange Service. Sarotte is Professor of International Relations at the University of Southern California.

**D**AVID SPERGEL, former Member (1985–88) in the School of Natural Sciences, shared the 2010 Shaw Prize in Astronomy for his work on the Wilkinson Microwave Anisotropy Probe. Spergel is Charles A. Young Professor of Astronomy on the Class of 1897 Foundation and Chair of the Department of Astrophysical Sciences at Princeton University.

## Bruce Kovner Appointed to Institute Board



Bruce Kovner

The Institute for Advanced Study has appointed Bruce Kovner, Founder and Chairman of Caxton Associates LP, to the Board of Trustees, effective October 30. Kovner received a B.A. from Harvard University in 1966. In 1983, after an early career as a trader with Commodities Corporation, a financial services company based in Princeton, N.J., he founded Caxton Associates LLC, a diversified trading company that manages hedge funds active in currency, interest rate, commodity, and equity markets.

Kovner is Chairman of the Board of the Juilliard School, Vice Chair of the Board of Directors of Lincoln Center for the Performing Arts, and serves on the boards of the Metropolitan Opera and Synta Pharmaceuticals Corp. He is a Trustee and the former Chairman of the American Enterprise Institute. ■

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

Issues of the *Institute Letter* and other Institute publications are available online at [www.ias.edu/about/publications](http://www.ias.edu/about/publications).



# Rashid Sunyaev Appointed the Maureen and John Hendricks Visiting Professor

Rashid A. Sunyaev, one of the world's most distinguished astrophysicists, has been appointed the Maureen and John Hendricks Visiting Professor in the School of Natural Sciences at the Institute for three years beginning in 2010–11. Sunyaev is Director of the Max Planck Institute for Astrophysics in Munich, Germany, and also serves as Chief Scientist of the Russian Academy of Sciences' Space Research Institute. A leading theoretician who developed the standard model of how black holes devour matter and who has made fundamental contributions to our understanding of the structure of the cosmological background radiation, Sunyaev will be in residence for two months in each of the coming three years to work with Faculty and Members in the School.

Sunyaev's Visiting Professor Membership is made possible through the generosity of John and Maureen Hendricks. John Hendricks, Founder and Chairman of Discovery Communications, is a Trustee of the Institute, who with his wife Maureen provides funding for science research and higher education through the John and Maureen Hendricks Charitable Foundation.

"One of the primary goals of the Institute's programs in astrophysics is to broaden and develop the research skills of the most promising young astrophysicists, and Rashid is uniquely qualified to do this," said Scott Tremaine, Richard Black Professor in the School of Natural Sciences. "He is interested in and knowledgeable about almost every aspect of theoretical astrophysics, he is extraordinarily energetic and interactive, and he loves to talk about science with young people."

On his appointment, Sunyaev noted, "The first time I heard about the Institute for Advanced Study was in the late 1950s, when I was a high school student in Tashkent, a large and multinational city in Soviet Central Asia. I was very impressed by the constellation of brilliant scientists working at the Institute at that time. It is a great honor to be associated with IAS, and I am pleased to serve as the first Maureen and John Hendricks Visiting Professor to pursue my scientific interests alongside the Institute's Faculty and Members."

An annual visitor to the School since 2004, Sunyaev shared the 2008 Crafoord Prize of the Royal Swedish Academy of Sciences with Edward Witten, Charles Simonyi Professor in the School of Natural Sciences, and Maxim Kontsevich, former Member



Rashid Sunyaev participated in a seminar on gamma-ray structures in the inner galaxy led by Tracy Slatyer, a Member in the School of Natural Sciences, in November.

(1992–93) in the School of Mathematics. The citation for Sunyaev noted his "decisive contributions to high-energy astrophysics and cosmology, in particular processes and dynamics around black holes and neutron stars and demonstration of the diagnostic power of structures in the background radiation." This radiation provides critical information about the Big Bang, and it has enabled astrophysicists to determine the size, age, and geometry of the universe to an accuracy of a few percent. Sunyaev's work with Nikolai Shakura showed that matter accreted by a black hole formed a thin, rapidly rotating disk known as an accretion disk. The Shakura-Sunyaev disk is the keystone of our understanding of how quasars shine, and their 1973 paper is the most cited theoretical paper in astrophysics. With Yakov Zel'dovich, he predicted the Sunyaev-Zel'dovich effect, which describes how the ionized gas in giant clusters of galaxies scatters the cosmic microwave background radiation; the "SZ-

effect" is now being exploited by an armada of telescopes—in space, in Chile's Atacama Desert, and even at the South Pole—to explore the evolution of structure in the universe and the formation of galaxies over the entire history of the universe.

Born in Tashkent, Uzbekistan, in 1943, Sunyaev earned his Ph.D. (1968) and Doctor of Sciences degree (1973) from Moscow State University. From 1974–82, Sunyaev was Head of the Laboratory of Theoretical Astrophysics at the Space Research Institute in Moscow. He was Professor at the Moscow Institute of Physics and Technology from 1975–2001, while serving as Head of the High Energy Astrophysics Department at the Space Research Institute from 1982–2002. Chief Scientist at the Space Research Institute since 1992, Sunyaev has been Director of the Max Planck Institute for Astrophysics since 1996. In addition to the Crafoord Prize, Sunyaev has received a range of awards including the King Faisal International Prize for Science (2009), the Gruber Cosmology Prize (2003), the Heineman Prize in Astrophysics (2003), and the Gold Medal of the Royal Astronomical Society (1995). He holds memberships in academies around the world, including the Russian Academy of Sciences, the Royal Society of London, the Royal Netherlands Academy of Arts and Sciences, the German Academy of Natural Sciences Leopoldina, and the U.S. National Academy of Sciences. ■

## Decadal Review Completed

The Institute for Advanced Study was founded for the purpose of fostering curiosity-driven research into fundamental questions by leading scholars from around the world. Its first Director, Abraham Flexner (see article, page 10), emphasized the importance of reflecting periodically on that mission, and the institutional characteristics that should exist to support it, "so that we will not be drawn or drift out of our course."

This process of "recapitulation," as Flexner termed it, has been accomplished through a series of extensive studies conducted by the Board of Trustees at roughly ten-year intervals since the mid 1950s. In the most recent iteration of this process, the 2007–09 Decadal Review sought to examine the Institute's current work, reflect on the appropriateness of its activities, and recommend changes that should be considered for the future.

Over this two-year period, information was gathered from Faculty, Members, Trustees, Staff, and external experts and consultants, about all aspects of life and work at the Institute. Separate constituent reports were produced on each of the Schools, on governance, on computing and information technology, on consultation with Institute employees, on the Institute's facilities, and on development and public affairs activities. Surveys of current and former Members were conducted to gauge the quality of their experiences, and an extensive file of operational data was compiled.

The resulting report drew three overarching conclusions: that the Institute's mission of advancing disinterested fundamental research remains highly relevant; that much of the Institute's strength and effectiveness derives from the fact that it has remained organizationally small and flexible; and that the Institute's endowment should be strengthened substantially to ensure long-term financial stability and independence. A set of about twenty recommendations outlines the elements of a broad-based strategy for suggested improvements in several areas. A large number of specific action items resulting from the various constituent reports complement these recommendations. An expanded summary account of the 2007–09 Decadal Review may be viewed at [www.ias.edu/about/mission-and-history/decadal-review](http://www.ias.edu/about/mission-and-history/decadal-review). A copy of the Final Report may be obtained from the Director's Office by sending a request to [decreview@ias.edu](mailto:decreview@ias.edu). ■

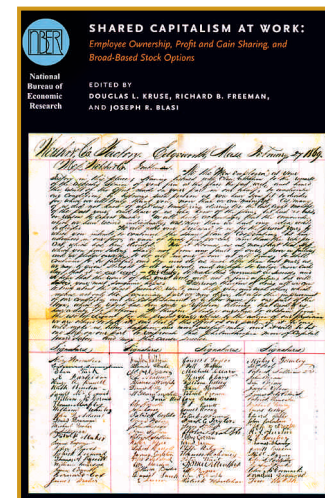
## Inspiring a Fellowship Program to Study Capitalism

By JOSEPH R. BLASI

When I came to the Institute as a Member of the School of Historical Studies in September 2007, I planned to spend the year working on the American economic and social history of the corporation. I had just coordinated a ten-year National Bureau for Economic Research study on "shared capitalism." In my work, I have been exploring whether the extreme concentration of wealth and the resultant inequality in our society is a set fact of life or whether a somewhat more equitable and democratic form of capitalism is feasible. I did not realize that my Institute visit would inspire an entirely new program of fellowships that would involve many others in this endeavor. This is the story of how this came about.

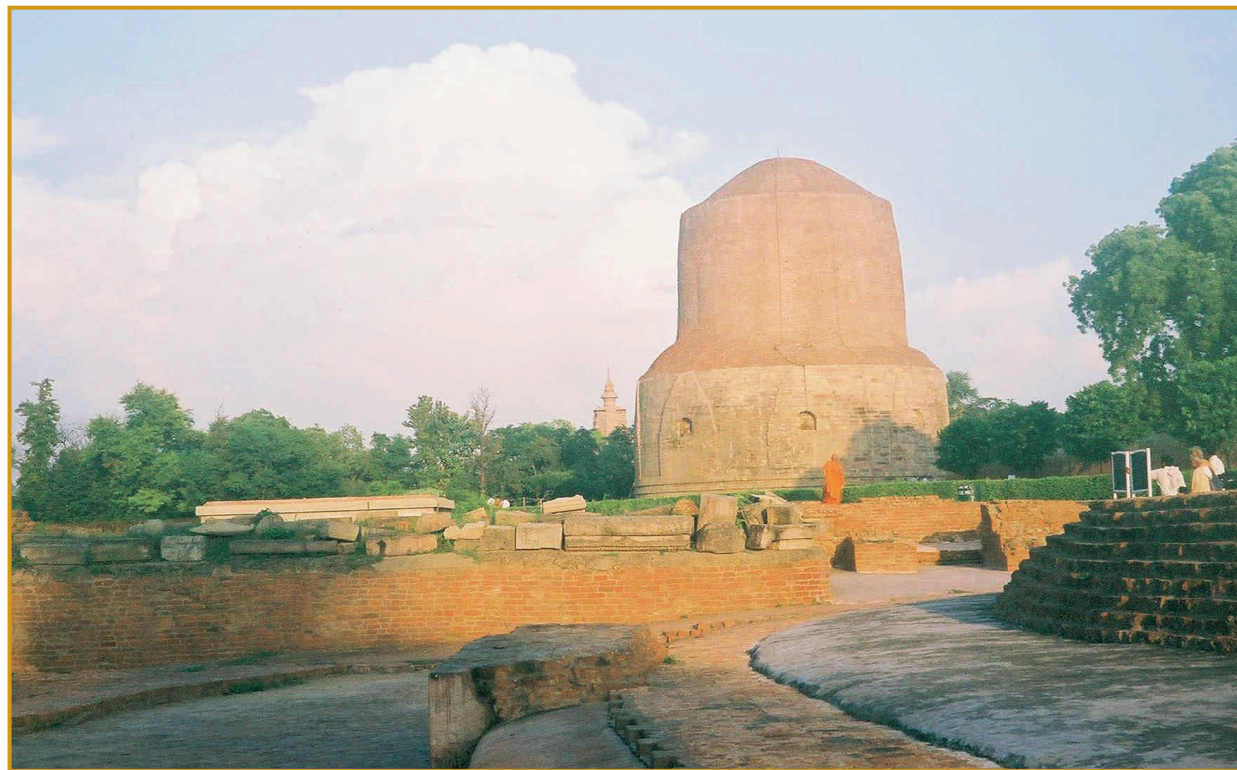
As a sociologist, I look at the relationship between the distribution of rewards, power, and status in corporations and their economic performance. I began my career in the early seventies with an examination of early American utopian experiments, which led to a several-year examination of the contemporary Israeli kibbutz and its social history. Both types of communities took a fairly radical view on issues of equality and democracy with mixed results. Since the late seventies, I have been conducting research in the United States on the growing phenomenon of multinationals, large and medium-size corporations, and small businesses that have meaningful broad-based employee ownership and profit sharing, and stock options for not only top executives but other workers as well. These firms are in contrast to the dominant paradigm in our society, where most rewards are distributed to a few executives at the top of the company.

During my year at the Institute, I was studying documents in American history on the idea and evolution of "shared capitalism," specifically, the archives of William Cooper



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Buddhists build monumental stupas for the ashes of the Buddha, considered so powerful that even their shadows convey healing or harm.

burial sites. Given this definition, relics are not found in all religions. Jews, for example, do sometimes venerate gravesites (although rabbis have been very dubious about this practice) but they do not revere dead bodies as holy. Hindus return the ashes of the dead to the Ganges rather than preserving them, but Buddhists build monumental containers or stupas for the ashes of the Buddha, and these stupas are considered so powerful that even their shadows convey healing or harm. Moreover, traditions vary over both space and time in how far such objects are crucial. Protestant Christians in the sixteenth century rejected the relic cult of Catholic Christians as superstition or idolatry. So it might seem as if it would be an interesting exercise in comparative religion to explore why some religions have relic cult and some do not. That is what Julia M. H. Smith of the University of Glasgow (see article, page 5) and I thought we were setting out to explore when we began to plan a workshop titled “Matter for Debate: Relics and Related Devotional Objects,” to be held at the Institute in July 2010. But the topic ended up being far more amorphous and far more challenging than that.

Most of the work on “relics” done by scholars in the first two-thirds of the last century took Catholic Christian practice as a paradigm and focused more on what leaders and theologians believed than on what ordinary people did. For example, the famous eleventh edition of the *Encyclopedia Britannica* (1910–11) dealt only with Christian practices under the rubric “relics,” although the article purported to be general. By the end of the twentieth century, the study of religion had become more genuinely comparative and less Eurocentric. By 1987, the *Encyclopedia Britannica* had added Buddhist relics to its entry, and Mark Taylor’s 1998 handbook *Critical Terms for Religious Studies*, which included “relic” as one among the twenty-two most important categories for the study of religion (along with gender, rationality, and experience), assigned the article on relics to a specialist on Buddhism. Influenced by such shifts in scholarly interest, Professor Smith and I decided to organize a workshop that would not be dominated by Christian categories and examples. We also decided to concentrate on what people actually revered and what they did when they revered objects, not on what theologians said the objects meant. So we asked fourteen scholars who worked on European Christianity, Buddhism in a variety of Asian locales, Islam, the Andes, and West Africa—all areas and traditions in which there seemed to be something like “relic cult”—to come together and each present a specific object

that might not so much answer as sharpen the question “what is a relic?” Although the participants learned much from our three days of conversation, it will not surprise anyone used to academic gatherings to hear that we ended up far less certain than before how to define “relic,” or that we began to doubt whether there is a clear difference between religious traditions with relics and those without.

A quick look at a few of the cases presented by our participants makes this ambiguity clear. Cynthia Hahn of Hunter College discussed the thirteenth-century reliquary of St. Nicholas from Halberstadt, Germany, which



Medieval reliquaries made to house fragments of the True Cross (left) and the skull of St. Eustace (right)

displays a mummified finger through a crystal window in a golden arm-shaped container and was used to bless worshippers; Nancy Khalek of Brown University discussed bones or bone fragments from the head of John the Baptist enshrined in Damascus and later in Aleppo and probably the first corporeal relics revered in Islam; Alisa LaGamma, curator at the Metropolitan Museum in New York, spoke about nineteenth-century reliquaries of the Fang and Kota peoples in the area from southern Cameroon to the Republic of the Congo and emphasized not only the artistic quality of the sculptured heads but also the presence of bodies of significant ancestors in the drums underneath the figures. These cases are clear examples of “relic” as conventionally defined, although each of the presenting scholars stressed the performative and political aspects of these objects more than traditional approaches do. But a number of the cases discussed

at our workshop expanded the category of holy remains. David Germano of the University of Virginia spoke about several crystal spheres (called chests or reliquaries) with no visible openings that are understood by adherents to have descended from the sky to honor a contemporary guru and to have contained texts, fingers, and other holy objects. Nicholas Paul from Fordham University (and a 2009–10 Member at IAS) presented a twelfth-century ivory object in the form of the Greek letter tau, which is known only through textual references and which functioned ritually to reinforce and reinterpret social categories and carry aristocratic memory. Robert Sharf from the University of California in Berkeley spoke about four finger bones of the Buddha discovered in 1987 in Shaanxi province, China, which have been artfully and obviously fashioned by human hands. And Suzanne Blier from Harvard University argued that the hole cut into the earth as tomb or receptacle for liquid offerings and found in a number of African sites should be characterized as a relic. Any equation of relic with holy body or that which is in contact with holy body, or with something denominated by a word for “remains” or “left behind thing,” tended to dissolve as we explored the cases presented.

Nonetheless some common concerns—more methodological than substantive—emerged from our three days together. We tended to agree that whatever exactly relics are, they should be understood as possessing agency as well as meaning—that is, that they act religiously. We also saw such devotional objects as not merely the tool of elites (clerical or political) and the result of consecration by them but as created and deployed by ordinary worshippers and adherents as well. And we agreed that, whatever definition we adopt, relics are not completely private but must have some communal significance. A photograph of my grandmother or her rolling pin, however much they may mean to me, are not relics in the analytical sense we wished to employ (unless my grandmother was, for example, the iconic feminist figure Margaret Mead). Moreover, we became increasingly convinced as we talked that important questions about

the display in museums not only of human remains but of all religious objects as well are still unsettled—not just because of the need for sensitivity to the requirements of living traditions but also because the Western tendency to separate sharply museum context from religious context is far from universal. Finally, we came away from our days together convinced of the value of the format we had chosen—a format some had questioned when they received our initial invitation. In putting together our workshop, Professor Smith and I wanted to allow for the truly free-wheeling sort of discussion possible only if talks are not understood to be committed beforehand to publication. And we wanted to employ the format of the ten-minute presentation that has been so successful at IAS in the series After Hours Conversations. Both aspects seem to have succeeded admirably in making our three days of discussion open, collegial, and creative—even paradigm-breaking. We have already heard

that some participants will go forward both to publish new ideas and to craft talks considerably longer than ten minutes, empowered by the conversations in our workshop “Matter for Debate.” ■

Caroline Walker Bynum has been a Professor in the School of Historical Studies since 2003. Her work has created the paradigm for the study of women’s piety that dominates the field of medieval Christianity today and helped propel the history of the body into a major area of premodern European studies. Her recent work is a radical reinterpretation of the nature of Christianity on the eve of the reformations of the sixteenth century. She is currently working on medieval devotional objects in comparative perspective.



# Christianity in Miniature: A Look inside Medieval Reliquaries

BY JULIA M. H. SMITH

Reliquaries were designed as receptacles for tiny bundles of sacred stuff such as handfuls of dust, pebbles from Biblical sites in the Holy Land, tiny fragments of the hair, clothing, and even bone of those deemed to be saints and martyrs by the Christian church. Wrapped in cloth and carefully labeled, these paltry, nondescript objects were transformed into things of eye-catching beauty and great prestige by the containers crafted to house them—reliquaries. But, prior to about 1200 C.E., reliquaries did not make their contents visible to the viewer: instead, they were designed to conceal them. The specifics of the content were nevertheless important to medieval Christians, and hence their care to label and inventory their contents in minute detail.

Several medieval reliquaries, upon scientific investigation, have been shown to retain their original contents to this day. These collections of relics can be mapped to reveal the social and geographical networks of contacts that contributed to their formation. These anchored a church in its locality and region, but might also extend across much or all of Christendom. In this way, the items inside a reliquary represented the key events and notable places of the Christian story from the perspective of the particular patron who commissioned the craftsman to produce these stupendous works of art. The contents are as fascinating as the container; when we look inside a reliquary, we see “Christianity in miniature.”

*Julia M. H. Smith, Edwards Professor of Medieval History at the University of Glasgow, was the George William Cottrell, Jr. Member in the School of Historical Studies in 2008–09. In July, she gave a public lecture at the Institute, “Christianity in Miniature: A Look inside Medieval Reliquaries,” which was supported by the Dr. S. T. Lee Fund for Historical Studies and was part of the workshop organized by the Institute’s School of Historical Studies, “Matter for Debate: Relics and Related Devotional Objects.”*



*After presenting her lecture “Christianity in Miniature: A Look inside Medieval Reliquaries” at the Institute, Julia Smith was introduced to Elena Petronio, a member of the Chairman’s Circle of the Friends of the Institute, who had brought with her a couple of small silver display cases of eighteenth- or nineteenth-century date, in which carefully labeled relics had been sealed with an official ecclesiastical seal. Between them, the two containers (each no more than one inch in diameter) contained the relics of three saints, each relic a speck of matter far smaller than the tiny label that accompanied it.*

siastical institutions. In return for its prayer specialists exerting themselves in intercessory prayer on behalf of the fate of the souls of Christians in the afterlife, the Church accumulated material riches and political influence. Over the centuries, then, gifts of relics flowed into ecclesiastical treasuries, keeping benefactors in close touch with the institution that benefited, and bringing spiritual benefits and prestige to both parties in the transaction.

My work on relics in Christian tradition, which began two years ago while I was a Member at the Institute, is not driven by any predisposition to “believe” in them. Relics intrigue me for two reasons. They don’t fit into my secular, rational worldview, and I have to struggle to understand them. They also challenge me to develop new insights into how the men and women of Europe’s Christian Middle Ages lived their lives, why they did what they did, and what their own worldview was. ■

## AUTISM (Continued from page 1)

(which control gene activity) associated with the disease.

Most individuals differ very little from one another across the human genome. SNPs are the largest class of DNA sequence variation among individuals. A SNP occurs when one base out of the four bases used in DNA is exchanged for another base at the same locus, such that the minor allele frequency is at least 1 percent in a given population. SNPs are found at the rate of roughly one out of every 1,000 base pairs of the human genome. These SNPs provide the best chance of detecting genetic variation, both normal and otherwise, between people.

The data set provided by Autism Genetic Resource Exchange is a large collection of such SNP data from over eight hundred families who have two or more autistic children. The pedigree and phenotype of most individuals in the AGRE families, including parents and children, are provided. The genotyping, as assayed on these chips, is compared with similar tests carried out at Children’s Hospital of Philadelphia.

We computed copy number variations (losses or gains of DNA in our genomes, which can result in either a decrease or increase of the number of copies of a gene, partial genes, or multiple genes) and looked for associations with autism. We first identified the copy number variations that have the highest penetrance by looking at autistic and non-autistic siblings in the Autism Genetic Resource Exchange data set. We then tested those copy number variations for an association with autism. We had to collect a large set of data from non-autistic individuals to understand the normal population structure and to test the association.

The controls came from a group of healthy children from the Children’s Hospital of Philadelphia as well as controls used in a study on schizophrenia and type II

diabetes. Among the four best candidate genes we found, NRXN1 and CNTNAP2 previously had been found to be associated with autism. Both of these genes produce proteins found in neurons in the central nervous system. The other two genes, NCAM2 and PTPRD, which also encode proteins found in neurons, have not been previously associated with autism. Through experiments in the lab, we have been able to confirm deletions and map their endpoints in DNA samples from children.

This and other studies show that the question “Which genes cause autism?” likely has no simple answer. However, we can ask a different question to probe the mechanism behind this diversity: “Are parents of autistic children more prone to making errors when they copy their DNA to create eggs or sperm?” The errors (such as deletions or duplications of segments of the DNA) are presumably distributed randomly across the genome, exposing the children to all kinds of genetic disorders, including autism. The answer to this question appears to be yes.

The family of genes called p53, p63, and p73 (so named to refer to the relative sizes of the proteins they encode) is involved in ensuring the fidelity of transmission of genetic information when cells replicate their DNA. p53, a tumor suppressor gene, watches over the somatic cells (every cell in our body except eggs and sperm) for DNA damage and errors, protecting us from diseases such as cancer. The genes p63 and p73 protect the genome in eggs produced by females. We find that SNPs in the p63 and p73 genes are over-represented in mothers with autistic children, suggesting that these mothers create a higher rate of copy number variations and other errors in their eggs. This higher rate or frequency of SNPs is not observed in control groups that do not have a family history of autism. Furthermore, the p63

and p73 genes regulate the transcription of other genes that are involved in DNA repair. When the p63 or p73 gene contains a SNP or altered form of DNA, it can produce an altered protein that fails to function properly. This would result in mistakes (poor fidelity) in the DNA of an egg and, in some cases, autism in the offspring.

This is a new approach to studying the genetic causes of autism, because the disease-causing mutations arise spontaneously in the offspring and are not present in the parents or anyone else in the family. The mother or father of autistic offspring may have the SNP that increases the error rate in eggs or sperm that go on to create the affected offspring. And because nothing in this mechanism is special to autism, this concept may play a role in many different genetic disorders. For example, patient populations from in vitro fertility clinics can have problems conceiving due to poor egg quality. We find that the SNPs in p73 that are over-represented in mothers of autistic children are also over-represented in fertility clinic patients. The high error rate associated with this p73 SNP can result in several genetic disorders.

Identifying genes associated with autism gives us a guide to understanding the complex biology of this disorder. The mutations in these genes may someday serve as the basis for diagnostic tests. Ultimately, we hope that genetic studies will provide the basis for a rational and gene-based approach for the treatment or prevention of autism. ■

*Suzanne Christen is Executive Director of the Simons Center for Systems Biology in the Institute’s School of Natural Sciences. Chang S. Chan and Asad Naqvi, Members in the School of Natural Sciences, are using their research backgrounds in physics to study problems in systems biology.*



# The Squeeze Collection at the Institute for Advanced Study

## Squeezes—What are They and How are They Used?

BY STEPHEN V. TRACY

We do not know who made the first paper squeeze of an inscription. The practice is quite old; large numbers of them were made by Richard Lepsius on an expedition to Egypt (1842–45) and by Philippe Le Bas in Greece (1843). The invention of the squeeze must stem from the desire to acquire an accurate copy of the text of an inscription. Rubbings constitute a simpler, more rudimentary way of doing this. Photographs more recently provide an easy means of recording inscriptions, but each photograph is taken in a certain light. That lighting may not do justice to the inscription, or it may actually be misleading at places where the stone is difficult to decipher. A well-made squeeze provides the best and most accurate record of the state of the inscribed surface of an inscription. In the future, digital images may come to match them.

The term squeeze itself is not very elegant; the French *estampage* is more descriptively accurate of what they are. They are sort of papier-mâché impressions of inscriptions. They are made using acid-free chemists' filter paper. The paper is wetted thoroughly and placed on the inscribed surface; then it is beaten with a long-bristled, specially made brush from the center out so that any air bubbles trapped under the paper may be worked out to the edges and dispersed. (Air bubbles not removed cause soft spots, places where the letters are unclear.) The squeeze is then allowed to dry on the stone. When removed, it provides a very accurate image of what is preserved on the inscribed face. It must be read from the back, and so the image is in reverse. (Students of inscriptions become very adept at reading backward!)

Inscribed stones naturally are often large and extremely heavy and thus quite awkward to handle and study. By contrast, squeezes, even of very large inscriptions, are light and easy to handle. Moreover, to read an inscription one usually needs to maneuver it around in the available light to show the letters to best advantage; this is not an easy proposition with many stones. In contrast, squeezes can be easily moved about to catch the lighting from various angles. Although no one would want to publish an inscription without being able to work from the stone, a good squeeze can allow one to do an all but final text of the inscription.

The Institute collection, located in Building B to the right of Fuld Hall, is one of the largest in the world and has been a valuable resource for scholars from all over who come here to consult it. The squeezes are easily accessible and allow visitors to study them in comfortable conditions with all the library resources close at hand. M. B. Hatzopoulos, for example, the Director of the Research Center for Greek and Roman Antiquity (National Hellenic Research Foundation), studied at the Institute in 1984 and 1987 the Edson squeezes from Macedonia and has made constant use of them in numerous publications ever since.

*The Institute squeeze collection is one of the largest in the world and has been a valuable resource for scholars from all over who come here to consult it.*

Large collections of squeezes have another very important advantage. They allow the possibility to browse through large numbers of inscribed texts quickly and easily. One can see more inscriptions in a day of browsing in a squeeze collection than one could see in a month trying to consult the stones that are often scattered in different museums and in different cities and countries. As an example, to pursue my study of the inscribers of Athenian decrees, I needed to examine all of the inscriptions of Athens and Attica. It is not, in fact, physically possible to do this in Athens. The squeeze collection at the Institute, particularly rich in squeezes of Athenian inscriptions, enabled the work to go forward. The results to date have been three books on Athenian inscribers covering the years 340 to 86 B.C. I am currently working on Athenian cutters of the late fifth and early fourth centuries B.C. ■

## The Collection's Origin and Development

BY CHRISTIAN HABICHT

Soon after his appointment as a Professor at the Institute, Benjamin D. Meritt took the first steps to build a Repository of Squeezes, "which will be second only to that in Berlin," as he wrote to the Director, Abraham Flexner, on September 8, 1935. He intended to begin with the Epigraphical Museum in Athens and to have squeezes made of all its inscriptions, more than 13,000 at the time. He expected this to be done within a year for a sum of about \$500. He also planned to establish a Working Library for Greek Epigraphy with an initial outlay of \$2,000, plus \$200 annually to keep it up-to-date. Before the end of the year, the Director had allocated the requested sums for both projects. Meritt went to work. From December onward, three men were working in the Epigraphical Museum making squeezes, a fourth on the Acropolis, and a fifth at Eleusis, a large community with a famous sanctuary, and a fortress. Furthermore, Meritt contacted several museums that had large holdings of Greek inscriptions; he wanted them to contribute to the squeeze collection: the Ashmolean, the British Museum, the Louvre, and the Archaeological Museum at Izmir.

Today, the total number of squeezes from the Epigraphical Museum amounts to 8,532 pieces in the IAS collection. It is rivaled only by those from the Athenian Agora. American excavations had begun there in 1931. Meritt was put in charge of dealing with the inscriptions, which soon ran into the thousands. Copies of their file cards, photographs, and squeezes, as well as Meritt's transcriptions of their texts, came to the Institute, by August 1940 already amounting to six thousand. By August 1974, the number had risen to 7,184, of which the Institute has 7,135, plus 7,047 copies of their texts by Meritt. After Homer Thompson, another Institute Professor, retired as Field Director at the Agora and was replaced by Leslie Shear Jr. of Princeton University, the new materials went to Princeton University. After that, only a few

dozen squeezes reached the Institute from the Agora, the one with the highest number in the inventory being 7,642.

Various scholars donated over time smaller parcels of squeezes. W. H. Buckler in 1936 gave 271, including 199 from Sardeis, with the rest coming from various places in Asia Minor. D. M. Robinson sent in October 1950 six boxes with squeezes from the Chalcidice and Asia Minor. In 1978, Charles F. Edson donated the notebooks from his expedition to Macedonia in the years 1936 to 1938, undertaken under contract with the Academy at Berlin for *Inscriptiones Graecae*. He also gave to the Institute copies of some eight hundred squeezes he had made during those years.

A major gift to the collection came in 1992 from Jeanne Robert, the widow of Louis Robert—some eight hundred squeezes the Roberts had made during their long careers, mainly in Asia Minor, but also in Greece and on the Greek islands, as well as large quantities from the Archaeological Museums at Istanbul, Izmir, and others, and even some Greek inscriptions from Bactria (for more on the Robert squeezes see [www.hs.ias.edu/classics/squeezes.htm](http://www.hs.ias.edu/classics/squeezes.htm)). Even so, the bulk of their squeezes, no less than 3,497, remained in Paris, as part of the Fonds Louis Robert of the Académie des Inscriptions et Belles Lettres. In 1973, I gave eighty squeezes, mostly from Thessaly, some from Greece, and others from Asia Minor, to the collection. (I had given several hundred of my squeezes from Samos and Pergamon to the German Archaeological Institute.)

Other groups of squeezes are from inscriptions in the following museums: the Acropolis and National Museums at Athens, the Ashmolean Museum, including Chandler's *Marmora Oxoniensia*, and the Archaeological Museum at Izmir.

Other groups are from various sites, in Athens: Theater of Dionysus, Roman Agora, South Slope, Temple of Hephaistos, Library of Hadrian, and Kerameikos; in Attica: Eleusis and Peiraieus; in Greece: Argos, Nauplia, Mycene, Corinth, Megara, Olympia, Oropos, Thessaly, Delphi, Maroneia, and Samothrace. A number of squeezes are also found in boxes labeled Asia Minor and SEG. Some major gaps still exist: inscriptions from the Athenian Agora with numbers higher than 7,184 and nearly all Attic inscriptions prior to 403 B.C. These are 1,517 pieces included in *Inscriptiones Graecae* I<sup>3</sup>, the squeezes of which Meritt bequeathed at his retirement to the University of Texas at Austin. The total of the Institute's collection comes to some 25,000 squeezes and makes it in fact, "second only to that in Berlin." ■



Stephen Tracy (left) and Christian Habicht (right) examine a squeeze in the Institute's collection.

Stephen V. Tracy, Director of the American School of Classical Studies at Athens from 2002–07, is a current Visitor and former Member (1987–88, 1996–97) in the School of Historical Studies. He is involved in preparing for the Berlin Academy a new edition of the decrees of Athens and Attica that date to the years 229 to 168 B.C.

Christian Habicht has been a Professor in the School of Historical Studies since 1973, becoming Professor Emeritus in 1998. A leading historian of the Hellenistic period, he is an authority on Greek epigraphy and on the history of Athens in the centuries between the fall of the Athenian Empire and the establishment of the Roman Empire.



# Sixty Years of Scholarship in the History of Art

BY OLEG GRABAR

It has been nearly sixty years that I have been engaged in an active scholarly life. My first article came out fifty-eight years ago, and there are still now two or three studies in the process of being printed or ready to appear on the Internet. In between lie some twenty books, several of which were translated into at least seven languages, and over one hundred and twenty more or less significant articles.

This considerable production can easily be divided into three groups, whose chronology raises interesting conclusions about the path of research traveled by a historian of the arts of the Islamic world who came into academic existence in the middle of the twentieth century. Whether this path is unique or typical is for others to decide.

The first group consists of traditional research based on the publication of documents, the excavation of new documents, and the significance of these documents within relatively strict chronological and spatial limits. Scholarship of this type is for the most part restricted in its interest and usefulness to other scholars of the same vintage, and it dominates the first half of my creative years. The number of works of this type that would have been initiated by me has clearly diminished with time, even though their scientific quality (or weakness) tends to remain steady over the years.

The second group seeks a larger public, as it tries to interpret works or periods of Islamic art as historical, aesthetic, social, or cultural models whose meanings extend beyond their specific context; it deals with issues like new forms, ornament, and aesthetics. It is a smaller group than the first one and does not really flourish until the seventies of last century, but it attracted the attention of historians of art and other scholars in many different areas and helped to strengthen the notion that, when one deals with the arts, approaches and conclusions can be extended from one culture to other traditions. This position has led to a sort of globalization of the field of Islamic art, but it has also been criticized.



Oleg Grabar (back row, second from right) with the 1969 staff of his archaeological team in Syria excavating a site known as Qasr al-Hayr

articles collected over the years. This personal historiography has now led me to study the history of my family and ancestry in many different countries of Europe (some of which no longer exist) and thus come up with a personal history, which may never be made public but which will end up, in part at least, in the archives of the Institute.

Thus it is that, for better or for worse, the very nature of scholarship changes with age. ■

*Oleg Grabar has been a Professor in the School of Historical Studies since 1990, becoming Professor Emeritus in 1998. His research has had a profound and far-reaching influence on the study of Islamic art and architecture. His extensive archaeological expeditions and research trips have covered the vast expanse of the Islamic world in Africa, the Middle East, and Muslim Asia. In November 2010, he was awarded the Chairman's Award by the Aga Khan Award for Architecture for the contributions he has made to the study of Islamic architecture.*

## THE SHELBY WHITE AND LEON LEVY ARCHIVES CENTER Preserving and Sharing the Institute's History

BY CHRISTINE DI BELLA

The Shelby White and Leon Levy Archives Center documents the history of the Institute and the many distinguished persons associated with it. While the Institute has had archival holdings for many years, the program was formalized in 2009 thanks to a generous donation by the Leon Levy Foundation. The Archives Center now has two full-time staff members, improved facilities for serving researchers, and an expanded collecting mandate. This enables us to collect records from Institute offices and Faculty more systematically than in the past, and preserve and make them accessible to a degree not previously possible.

Our holdings represent the entire history of the Institute. Since the 1930s, the Institute Director has had a tradition of having all visitors sign his guestbook. We have the Director's signing books going back to the Institute's founding in 1930, featuring the signatures of such luminaries as Albert Einstein, Wolfgang Pauli, T. S. Eliot, Jean-Pierre Serre, and Noam Chomsky. Records from the Director's Office go back to the beginning as well, from the Institute's first Director, Abraham Flexner (see article, page 10), to the present. Some of our most frequently consulted files are those on Institute Faculty, Members, and Visitors, which often include original correspondence and applications. These records provide important insight into the professional and personal histories of many of these individuals.

While the bulk of the records currently in the Archives are from the Institute's administrative offices and Schools, we also hold personal and professional papers of some past Faculty and long-term Members, and we look to expand our collecting in this area in the future. Recent additions include a series of family letters by Hermann and Helene Weyl donated by their granddaughter, Annemarie Carr, and professional and personal papers of Atle Selberg. A finding aid for our largest Faculty collection, the John N. Bahcall Papers, is available online at <http://library.ias.edu/hs/bahcall.html>.

Researchers use the Institute's Archives for a range of purposes, consulting our records



In association with the Institute's eightieth anniversary celebrations, the Shelby White and Leon Levy Archives Center assembled a display of historic documents and images representing Member life at the Institute from the 1930s to the present.

both in person and at a distance. In the last year, researchers have come to the Archives Center to pore through records on the Electronic Computer Project developed by John von Neumann, biographical materials about J. Robert Oppenheimer and Shiing-Shen Chern, lectures by Ernst Kantorowicz, and notebooks of Otto Neugebauer, among others. Some of our most typical queries are those seeking information on past Faculty, Members, Visitors, Research Assistants, and even employees, but we also get many requests for information about past programs and activities at the Institute and in its Schools. Our photographs are often sought for use in publications and exhibits. And, of course, we often field questions about the Institute's most famous affiliate, Albert Einstein. (As Einstein's own papers are at the Hebrew University of Jerusalem, we often must refer such requests to that institution, but are able to answer some of the more Institute-specific queries ourselves.)

A topic of perennial interest is the nature of life at the Institute. In conjunction with the Institute's

eightieth anniversary, we encourage people to contribute photographs, documents, invitations, event flyers, and other materials related to their time at the Institute.

Our plans for the future include increased and improved storage for the growing archival collections, an expanded online presence, and additional programming and exhibits. We enjoy sharing the Institute's history with people inside and outside the Institute community, and we welcome reference and general inquiries via email at [archives@ias.edu](mailto:archives@ias.edu) and phone at (609) 734-8375. Our reading room, which offers space to work with the archival collections and features regular exhibits, is located in the Historical Studies–Social Science Library and open Monday through Friday by appointment. ■

*Christine Di Bella is the Archivist of the Shelby White and Leon Levy Archives Center. Please contact her at [cdibella@ias.edu](mailto:cdibella@ias.edu) or (609) 734-8368 if you have materials you would like to donate to the archives of the Institute. Both originals and digital fascimiles are welcome.*



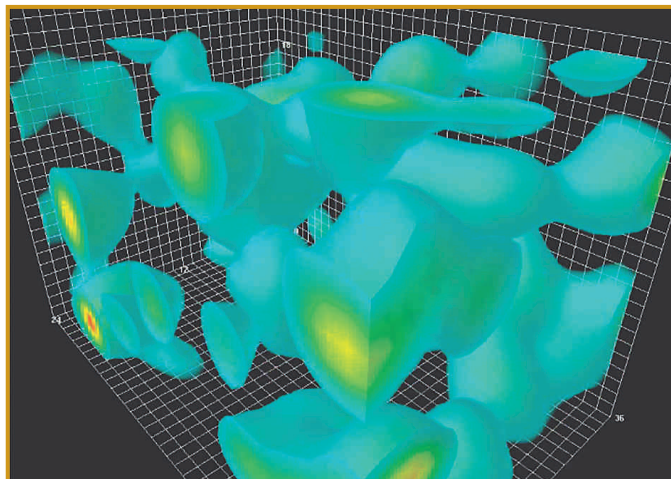
# Celebrating Eighty Years of History and Progress

What began with twenty-three Members invited to the School of Mathematics has grown to include more than six thousand historians, mathematicians, natural scientists, and social scientists who make up the Institute for Advanced Study community and who collectively have changed the world and our understanding of it. To celebrate eighty years of history and progress—a continuum of remarkable intellectual achievement and commitment—scientists and scholars who had undertaken research at the Institute throughout the decades were invited to return to Princeton this fall and interact with current Faculty, Members, and Visitors.

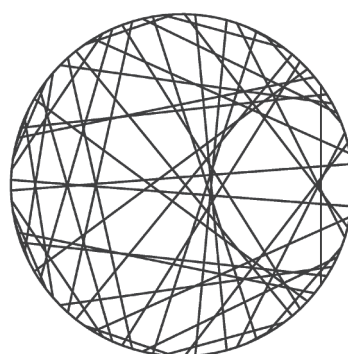
The first weekend, focusing on the work of the Schools of Mathematics and Natural Sciences, took place on September 24 and 25. (The activities of the second weekend, focusing on the Schools of Historical Studies and Social Science, will be included in the spring issue.) A series of talks and social activities were held (see photos, page 9), including a dinner with remarks by Freeman Dyson, Professor Emeritus in the School of Natural Sciences, and Robert Langlands, Professor Emeritus in the School of Mathematics. A breakfast was also provided, with a talk by Didier Fassin, James D. Wolfensohn Professor in the School of Social Science, who spoke about conspiracy theories in medicine.

Over two days, lectures and seminars were given by Nima Arkani-Hamed, Professor in the School of Natural Sciences; Jean Bourgain, Professor in the School of Mathematics; Stanislas Leibler, Professor, Simons Center for Systems Biology in the School of Natural Sciences; John Milnor, Co-Director of the Institute for Mathematical Sciences, Stony Brook University, and former Institute Professor (1970–90) and Member (1965–66); Frank Wilczek, Herman Feshbach Professor of Physics, Massachusetts Institute of Technology, and former Institute Professor (1988–2000) and Member (1977–78); Vladimir Voevodsky, Professor in the School of Mathematics; and Matias Zaldarriaga, Professor in the School of Natural Sciences.

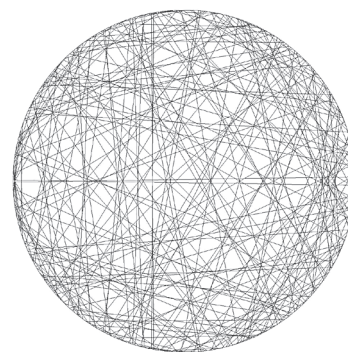
Fifty-five years ago, broadcast journalist Edward Murrow described the Institute as a place where scientists and scholars not only recognize mystery but welcome it and wrestle with it. From supersymmetry and the geometry of growth to the expanding universe, the quantitative potential of biology, and the possible inconsistency of the current foundations of mathematics, the weekend provided a sampling of the compelling mysteries (as represented by a selection of slides from the weekend's presentations, see below) that continue to enthral the Institute's scientific community. Videos of the talks are available at <http://video.ias.edu/80th>. ■



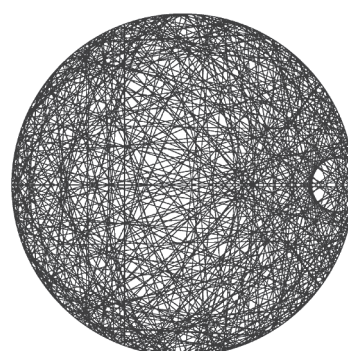
In his talk, "Quanta, Symmetry, and Topology," Frank Wilczek discussed how quantum theory radically transforms our fundamental understanding of physical reality. It reveals that the world contains a hidden richness of structure that we have barely begun to control and exploit. According to quantum theory, what we perceive as emptiness is actually a medium boiling with fluctuating concentrations of energy, that rapidly flicker in and out of existence over tiny volumes. The image above is a snapshot of fluctuations in the gluon fields, which are responsible for binding quarks together into protons. Numerical calculation of these fields has allowed us to account for the mass of protons and to predict the properties of many other particles successfully.



$p = 101_{19}$



$p = 499_{20}$



$p = 997_{21}$

## What are the choices?

- If we somehow "know" that the first order arithmetic is consistent then we should be able to transform this knowledge into a proof and then the second incompleteness theorem is false as stated.
- Admit a possibility of "transcendental," provably unprovable knowledge.
- Admit that the sensation of knowing in this case is an illusion and that the first order arithmetic is inconsistent.

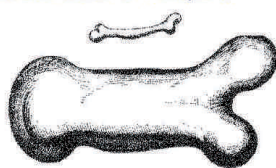
In his lecture, Vladimir Voevodsky considered the question "What if current foundations of mathematics are inconsistent?" In 1930, Kurt Gödel (late Institute Professor and Member) put forth his second incompleteness theorem, which proved that it is impossible to prove that the first order arithmetic is consistent. If first order arithmetic is inconsistent, Voevodsky explained that it would imply inconsistency of most other foundational systems, such as set theory, as well as inconsistency of constructive or "intuitionistic" arithmetic. Voevodsky proposed that what we need are foundations that can be used to construct reliable proofs despite being inconsistent and highlighted one possible candidate—constructive type theories—wherein a proof of a formula is not a sequence of deduction rules that connect this formula to the axioms but is, itself, a formula in the same language.

## Back to Biology

14.

**RECALL THE QUESTION:** To what extent is it true that individuals of closely related species can be transformed, one into the other, by a **conformal transformation** which carries every significant feature of one into the corresponding feature of the other?

One difficulty was well known to Thompson:



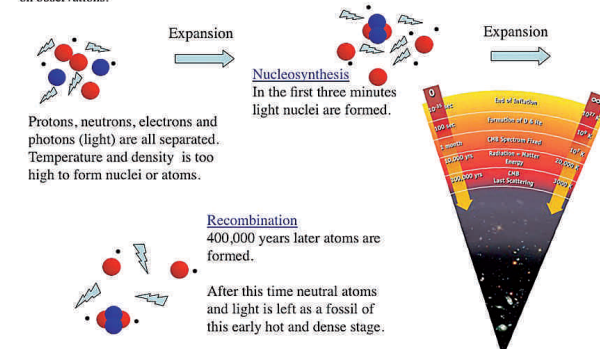
Comparison between bones of a small animal and a large animal (from Galileo's "Two New Sciences").

John Milnor commented on D'Arcy Thompson's On Growth and Form, first published in 1917, which studied how the shape of an organism changes as it grows and the way that shape changes in the course of evolution. Milnor discussed the hypothesis that these changes are roughly conformal; but found that it did not match the data. (One obvious difficulty is that a conformal transformation cannot transform the skinny bones of a small animal into the thick bones of a large one.) Yet he did find a real tendency for cross-ratios along many straight lines to be preserved under growth or under evolution. (If all cross-ratios were preserved, then the transformation would be projective, which is also not compatible with the data.) Milnor proposed three possible explanations, but was unable to decide between them: transformations that preserve cross-ratios confer some selective advantage and tend to be chosen by natural selection; the biochemical systems that regulate growth tend to yield transformations that preserve cross-ratios, even when other patterns of growth would work just as well or better; the approximately preserved cross-ratios are just numerical accidents, with no biological meaning at all.

The study of expander graphs has been a rapidly developing subject in discrete mathematics and computer science. Expander graphs are sparse graphs, meaning they have few edges, with strong connectivity properties. They have many applications, including in efficient communication networks, derandomization, error-correcting codes, quantum computation, group theory, geometry, and number theory. In his seminar on expansion in linear groups and applications, Jean Bourgain discussed the existence of expander graph families and their construction. How much does the expansion property depend on the generators? Is expansion a property of the group? Recent advances have produced a robust theory of expander graphs for groups  $SL_2(p)$  based on arithmetic combinatorics.

We have a detailed history of the aftermath of the Big Bang starting just seconds after the Bang based on observations.

## Chronology of the aftermath of the Bang



Modern cosmology started with the discovery of the expansion of the universe, specifically Edwin Hubble's landmark paper that was published in 1929, showing that distant galaxies were moving away from us and that the greater the distance, the faster they moved. Matias Zaldarriaga spoke about how this discovery led to understanding the different physical processes that have happened at different times during the universe's history. While the standard cosmological model that explains the aftermath of the Big Bang—a moment about 14 billion years ago when the universe was extremely hot and dense and expanding very rapidly—is extremely successful, it is still incomplete. Neither the origin of the initial condition nor the composition of the universe is fully understood. The universe is currently filled with dark matter and dark energy whose precise properties we do not yet know. More precise measurements of the cosmic microwave background (the universe's original radiation) and the expansion history of the universe are needed to further test the theory of cosmic inflation, a period of accelerated expansion that would explain the initial conditions of the universe.



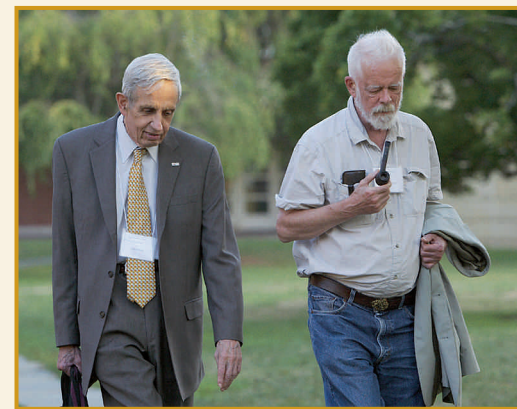
## 80th Anniversary Weekend: Schools of Mathematics and Natural Sciences



From left, Charles Simonyi, Frank Wilczek, and Edward Witten



A reception in the Common Room following a lecture



Former Members John F. Nash Jr. and Edward Nelson



Teatime, an Institute tradition, outside of Fuld Hall



Freeman Dyson speaking at the celebratory dinner

## Mathematical Advances: Lone or Massively Collaborative Endeavors?

The practice of mathematics is changing. While in the past mathematics was predominantly a solitary effort, now it has become increasingly collaborative. How does this growing inclination for teamwork translate on the Internet and what benefits and challenges does it bring?

In early 2009, Timothy Gowers, a Professor at the University of Cambridge, launched a “polymath project” on his blog (<http://gowers.wordpress.com>), an attempt to find solutions to mathematical problems through the collaboration of many individuals online. The problem Gowers posted sought an elementary proof of a special case of the density Hales–Jewett theorem. A little more than a month later, Gowers announced that the polymath participants—including Terence Tao, a Professor at the University of California, Los Angeles—had found an elementary proof of the special case that, surprisingly, could be generalized to prove the full theorem.

In October, Gowers spoke about the use of the Internet as a medium for solving mathematical problems and led a discussion that included Peter Sarnak, Professor in the Institute’s School of Mathematics, who presented a response to Gowers’s remarks. The occasion was the inaugural meeting of the Institute’s School of Mathematics Council, which has been formed to help disseminate the work of the School and extend the range of its supporters. Council Chair Neil Chriss, a former Member (1994–95) in the School and the founder of Hutchin Hill Capital, was the host of the meeting at the Core Club in New York City. In addition to Sarnak, Institute participants were Noga Alon, Visiting Professor; Pierre Deligne, Professor Emeritus; Robert MacPherson, Professor; Peter Goddard, Director; Robert Fernholz, Martin Leibowitz, and James Simons, Trustees; and Charles Simonyi, Chairman of the Board. Additional participants were former Member Gil Kalai, a Professor at the Einstein Institute of Mathematics at the Hebrew University of Jerusalem, and former Member John

### The polymath blog

September 30, 2010  
**Polymath3 (polynomial Hirsch conjecture) now officially open**  
Filed under: news — Terence Tao @ 4:38 pm  
Tags: polymath3

After some discussion and a lengthy hiatus, the Polymath3 project (on attacking the polynomial Hirsch conjecture via combinatorial means) has officially started with a [new research thread](#) on Gil Kalai’s blog (which, for now, can also double as the discussion thread, given that the activity level is still quite low), and a [Polymath wiki page](#).

[Leave a Comment](#)

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July 8, 2010  
**Minipolymath2 project: IMO 2010 Q5**  
Filed under: polymath proposals — Terence Tao @ 3:56 pm

This post marks the official opening of the mini-polymath2 project to solve a problem from the 2010 IMO. I have selected the [fifth question](#) (which appears to be slightly more challenging than the sixth, for a change) as the problem to focus on:

**Problem.** In each of six boxes  $B_1, B_2, B_3, B_4, B_5, B_6$  there is initially one coin. There are two types of operation allowed:

- Type 1:** Choose a nonempty box  $B_j$  with  $1 \leq j \leq 5$ . Remove one coin from  $B_j$  and add two coins to  $B_{j+1}$ .
- Type 2:** Choose a nonempty box  $B_k$  with  $1 \leq k \leq 4$ . Remove one coin from  $B_k$  and exchange the contents of (possibly empty) boxes  $B_{k+1}$  and  $B_{k+2}$ .

Determine whether there is a finite sequence of such operations that results in boxes  $B_1, B_2, B_3, B_4, B_5$  being empty and box  $B_6$  containing exactly  $2010^{2010}$  coins. (Note that  $a^{b^c} := (a^b)^c$ .)

#### Recent Comments

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The Polymath Blog (<http://polymathprojects.org>) conducts and reports attempts to find solutions to mathematical problems through online collaboration.

Morgan, Director of the Simons Center for Geometry and Physics at Stony Brook University. Guests included mathematicians who had pursued careers in finance or business.

Among the advantages of a collaborative online approach, said Gowers, are the speed with which problems can be solved—in the case of the Hales–Jewett theorem, a matter of six weeks rather than several years—and the blog’s working record of the mathematical process, showing how ideas grow, change, improve, or are discarded. In addition, different perspectives are encouraged and unanticipated connections are formed. Gowers cited authorship as a challenge—at least initially, polymath papers will be signed with the group pseudonym DHJ Polymath along with a link to the working record—but pointed out that individual contributions are transparent on the blog and that letters of recom-

mendation could aid in assessing achievements. Using as an example the lone and long labor of Andrew Wiles, a Visitor in the School and a Trustee of the Institute, that enabled his proof of Fermat’s Last Theorem, Gowers acknowledged that the polymath blog is a departure from the “romantic side of mathematics” wherein a single mathematician toils away in isolation.

Sarnak congratulated the efforts and results of Gowers’s polymath blog, but presented a skeptical view of online collaboration, questioning, “Is the aim of mathematics to solve as many problems in as short amount of time as possible?” Aside from favoring traditional “mom-and-pop” mathematics, Sarnak doubted whether a polymath method would lead to new and interesting theorems or the identification of central problems. Additionally, if the polymath model were to grow to dominate mathematics, Sarnak posited, younger mathematicians would be driven in the direction of online collaboration at the cost of traditional mathematics, which has produced the likes of Alexander Grothendieck, whose individual contributions to the field have been revolutionary.

After Sarnak spoke, the discussion was opened to a round table of participants and guests over dinner. A lively conversation ensued with Alon commenting that it will be interesting to see how Internet collaborations evolve and MacPherson expressing a belief that “the more approaches you have, the better it is for mathematics.” Kalai, who recently launched a polymath project to solve a problem about polytopes and linear programming that he’s been working on for two decades, opined that “there is no danger and no hope” that online collaboration will supersede lone endeavors and advocated the approach’s usefulness and altruistic nature. Referring to philosopher Avishai Margalit, the George F. Kennan Professor at the Institute, Kalai said, “Margalit taught us that science is the art of looking under the lamp. Polymath is a new such lamp.” ■



# A Diverse Community of Scholars

*"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."*

The above quote appeared in the letter of invitation, dated June 4, 1930, from the Institute's founders, Louis Bamberger and his sister Caroline Bamberger Fuld, to the Institute's first Board of Trustees. A similar statement of nondiscrimination had been included in the certificate of incorporation signed on May 20, 1930, marking the creation of the Institute for Advanced Study.

In his memoir of the Institute's founding, Herbert Maass, who served as an attorney and adviser to the Bambergers and as one of the Institute's first Trustees, wrote that this policy that has guided the Institute since its beginning, "exhibits all the facets of Mr. Bamberger's and Mrs. Fuld's minds, their generosity, their liberal views and their complete disregard of race, creed, or color."

This commitment has facilitated the advancement of knowledge by a diverse community of individuals. Moreover, from the start, it set the Institute on a course where fundamental research and the scholars who conduct it take precedence over racial, gender, and political boundaries as demonstrated by the following examples.

VISAS						
Name	Country of Origin	Classification	No.	Issued	Date of Issue	Expires
Reinhold Baer	Germany	Quota Immigration	297	Rotterdam	Nov. 12/35	*****
Peter G. Bergmann	Germany	Quota Immigration	317	Prague	July 20/36	*****
Louis P. Bouckaert	Belgium	Non-Quota Immigration Sect. 4(e)	24	Antwerp	Sep. 17/36	\$
\$ Admitted at New York City until Sep. 29/37						
Herbert Busemann	Germany	Quota Immigration	686	Copenhagen	July 20/36	*****
Péi-Yüan Chou	China	Travelers'	96	Tientsin, China	June 24/36	Dec. 24/36
\$ Admitted by Immigrant Inspector at New York City August 26/36 for 6 months						
Antonio I. Flores	Spain	Temporary Visitor's	11	Madrid	July 11/36	July 11/37
\$ Admitted by Immigrant Inspector at New York City Aug. 1/36 for 6 months						
Visa marked "Service No. 928" (applying to Consul?)						
Godfrey H. Hardy	England	Temporary Visitor	1807	London	Aug. 5/36	Aug. 5/37
\$ Admitted at New York City Aug. 30/36 for 3 months						
Witold Hurewicz	Poland	Visitor's	189	Amsterdam	Sep. 3/36	Sep. 3/37
\$ Admitted at New York City Sep. 27/36 for 10 months						
Leopold Infeld	Poland	Visitor's	3291	London	Sep. 4/36	Sep. 4/37
\$ Admitted by Immigrant Inspector at New York City Oct. 3/36 for 12 months						
Tsai-Han Kiang	China	Temporary Visitor's	20	Tientsin	Aug. 12/36	Aug. 12/37
\$ Admitted at Seattle Sep. 16/36 for 1 year						
Tullio Levi-Civita	Italy	Temporary Visitor's	188	Rome	May 23/36	May 23/37
\$ Admitted at New York City Aug. 21/36 for 6 months						
Maurice H. L. Pryce	England	Non-Quota Student's	107	London	Aug. 3/35	\$
(4.9) \$ Admitted at New York City Sep. 24/36 to stay till Sep. 24/37						
Otto F. O. Schilling	Germany	Non-preference Quota Immigration	696	Hamilton, Bermuda	July 14/36	*****

Throughout its history, the Institute has served as a haven for scholars around the world facing instability, persecution, or intellectual isolation, beginning with a stream of scholars from Europe during the 1930s and '40s. Several of the Institute's early Faculty members, including Hermann Weyl, Albert Einstein, and John von Neumann, came to the United States to escape growing anti-Semitism in Europe. In turn, these scholars and others at the Institute, particularly Oswald Veblen, a Faculty member in the School of Mathematics from 1932–60, became a lifeline in the migration of other European scholars to the United States. The Institute's efforts on behalf of international scholars continued throughout World War II, into the Cold War, and beyond.



## Hetty Goldman

School of Historical Studies, Professor 1936–47, Professor Emeritus 1947–72

A pioneer in the investigation of pre-Greek and earliest Greek peoples, Hetty Goldman was one of five founding Faculty members in what was initially known as the School of Humanistic Studies and later became the School of Historical Studies. As a leader of excavations in Greece and Asia Minor, Goldman advocated precision in fieldwork and boldness in analysis. "Better a theory if the data at all allows," she said, "for it will stimulate the imagination and awaken speculation in others who may well reach more acceptable results."



## Anna Stafford Henriques

School of Mathematics, Member 1933–35

As a graduate student at the University of Chicago, Anna Stafford's interest in topology drew her to Princeton University, where Oswald Veblen and James Alexander taught. "So I wrote to Princeton and said I wanted to study topology," she recalled years later, "and they sent me a postal card saying, 'We don't take girls.'" When she read in the *New York Times* that Veblen and Alexander would be among the Institute's first Faculty, she wrote to Veblen and was accepted as one of his seventeen postgraduate students in 1933. Stafford spent two years at the Institute, working at a secondary school in Mendham, New Jersey, in the mornings to support herself and attending IAS lectures in the afternoons. She found that she loved to teach, and went on to positions at the Universities of Nebraska and Utah and the College of Santa Fe, where she became a full Professor. At ninety-five, she reflected on her years at the Institute as "two years in Heaven."



## Shizuo Kakutani

School of Mathematics, Member 1940–42 and 1948–49

Shizuo Kakutani first came to the School of Mathematics as a Member in 1940 to work with Hermann Weyl, a member of the School's Faculty from 1933–55, who had noticed Kakutani's work as a postgraduate at Osaka University in Japan. Aided by seminars run by Weyl and John von Neumann, Kakutani developed what is known as the Kakutani fixed-point theorem, a generalization and extension of a fundamental result in topology proving the existence of fixed points for continuous functions defined on subsets of Euclidean spaces. Kakutani's theorem became an important tool in analyzing social systems, and it played a key role in the equilibrium concept for noncooperative games developed by John Nash, also a former Member in the School, for which Nash won the Nobel Prize in economics in 1994. After World War II, Kakutani was one of several Japanese scholars with whom the Institute struggled to reestablish contact. In a letter requesting permission for Kakutani to travel to the Institute, J. Robert Oppenheimer, Institute Director from 1947–66, wrote to General Douglas MacArthur, Supreme Commander of the Allied Powers in Japan, "In granting

permission to Dr. Kakutani to return to America much would be done to evidence our friendship for the democratic forces within Japan, and for the men of learning who remained loyal to us throughout. It need hardly be added that we ourselves will profit very much by the collaboration which Dr. Kakutani's visit would offer, and from learning at first hand of the work he and his colleagues have been carrying out."



## David Blackwell

School of Mathematics, Member 1941–42

In 1941, David Blackwell became the seventh African American to earn a Ph.D. in mathematics. He spent the following year at the Institute as a Member in the School of Mathematics, where he developed his doctoral thesis into his first published paper, about Markov chains in probability. This work later grew into a series of papers that provided a rigorous mathematical basis for the theory of dynamic programming. Blackwell's work in probability, statistics, game theory, and dynamic programming came to have wide-ranging influence, but he recalled in a 1984 interview that he didn't choose problems to work on because of their potential applicability. "I just picked directions that interested me and worked in them. And I have had fun," he said. "I guess that's the way scholars *should* work. Don't worry about the overall importance of the problem; work on it if it looks interesting. I think there's probably a sufficient correlation between interest and importance."



## Loo-Keng Hua

School of Mathematics, Member 1946–48, Visitor 1980–81

During the Japanese occupation of China, Loo-Keng Hua began corresponding with Weyl about mathematics and its role in China's future. "Science is extremely needed," Hua wrote. "Thus any help to the young scientists would mean a great help of the reconstruction of the country; and any influence to the young scientists would mean an influence to the history of science in China." Weyl invited Hua to become a Member for the 1943–44 academic year, but Hua was unable to come to the Institute until 1946. Travel from China was very difficult, and a number of administrators at the Institute worked with Chinese authorities to make the visit possible. Eventually, Hua was assigned the rank of general in his passport so that he could travel more easily. Hua went on to serve as the first Director of the Institute of Mathematics of the Chinese Academy of Sciences. ■

## The "Flexner Report" Turns 100

Abraham Flexner, the founding Director of the Institute for Advanced Study (1930–39), first came to national attention as an education reformer in 1910, when his report *Medical Education in the United States and Canada*, published by the Carnegie Foundation, exposed poor practices in the 155 existing medical schools and recommended closing more than three-quarters of them. The report, an excerpt of which is below, advocated reforms in pedagogical style, school organization, admissions, and public oversight that led to fundamental changes in medical education.

Society reaps at this moment but a small fraction of the advantage which current knowledge has the power to confer. That sick man is relatively rare for whom actually all is done that is at this day humanly feasible,—as feasible in the small hamlet as in the large city, in the public hospital as in the private sanatorium. We have indeed in America medical practitioners not inferior to the best elsewhere; but there is probably no other country in the world in which there is so great a distance and so fatal a difference between the best, the average, and the worst. . . . Taking, then, modern medicine as an attempt to fight the battle against disease most advantageously to the patient, what shall we require of those who propose to enlist in the service?





Figure 2. Relief panel in the civil basilica at Aphrodisias depicting Bellerophon, the mythological founder of Aphrodisias, together with his horse Pegasus and Apollo (late first century C.E.)

legends; hymns, oaths, and prayers made him familiar with the local gods. Local cultural memory was ritually transmitted during commemorative anniversaries—usually the commemoration of victory and conquest. Identity meant belief in the superiority of one's community over others. This civic identity was overlaid by other forms of consciousness and solidarity, especially by social identities. For instance, the self-confident song attributed to a certain Hybrias expressed the social identity of the upper class of landowners and warriors:

*My great wealth are my spear, sword, and the fine shield, which guards my skin. With this I plough, with this I reap, with this I tread the sweet wine from the vine, with this I am called master of the serfs. Those who do not have the courage to hold a spear, a sword, and the fine shield which guards the skin, all of them fall to their knees and do obeisance and call me lord and great king.*

Here again identity means belief of the superiority of the group to which an individual belongs. Civil wars occurred when such social identities undermined the civic one.

In Crete, as in other Greek regions, groups of communities could also define separate regional identities—to a certain extent comparable with the process of European unification: Two or more civic communities could construct a new identity on the basis of a treaty that resulted in their unification. The cities in western Crete established such a federal state, to which they gave a name expressing a new identity: the Oreioi, “those of the mountains,” the “Highlanders.” “My fatherland are the Oreioi” was written on the tombstone of a soldier from this area who was buried in Sparta in the early third century B.C.E. Those who set up the epitaph for this man stressed an identity that stood between the narrower identity of the citizen of a *polis* and the wider identities of the Cretan and the Greek. When will a Dutchman, a Finn, or a German, buried abroad, have on his tomb written “here rests a European”?

As historical constructs, identities are subject to continual changes. They can be deleted and constructed anew. Aphrodisias, a city in Asia Minor, provides an instructive case in point. Founded by military settlers of mixed origin, primarily Greeks but also Iranians, Karians, and possibly Jews, at the site of Nineuda, near an important sanctuary of an Anatolian goddess, this city was programmatically given the name “the city of Aphrodite” (ca. 180 B.C.E.). The factors that shaped the identity of this community in the earlier period of its existence were war experience—Aphrodisias took the side of Rome against Mithridates VI and of Octavian/ Augustus during the Roman civil wars—and the commemoration of the part played by the founders’ families. Inscriptions, some of them inscribed on a wall of the city’s theater, kept the memory of Aphrodisias’s

sacrifices for Rome, for which the city was rewarded with freedom and tax exemption. The inscriptions for the members of the elite state that they were descendants of the men who had jointly built the fatherland.

After the establishment of Augustus’s monarchical rule, Aphrodite, Aeneas’s mother, was the ancestor of the imperial house. This kinship between the founder of Rome and the patron of Aphrodisias was naturally exploited by the Aphrodisians (Figure 1). Other cities of Asia Minor worshipped Aphrodite too, but a city that was named after Aphrodite, “the ancestor of the divine emperors,” clearly had an advantage over other competitors. But the memory of the military achievements started to blur and new challenges occurred. Under Roman rule many cities in the Greek East claimed for themselves mythical origins, and competed on the basis of such claims for privileges and honorary titles.

If the Aphrodisians had continued to commemorate the foundation of their city in the second or first century B.C.E., they would have given up any claim on priority. So, the Aphrodisians had to construct their own mythical past, claiming that the founder of their city was Ninos, the legendary consort of the Assyrian queen Semiramis (ca. eighth century B.C.E.). Presumably, the similarity of Aphrodisias’s early name (Nineuda) with the name of Ninos was responsible for the creation of this legend. But an origin after the Trojan War was not early enough. Another mythological founder was found in the person of Bellerophon (Figure 2). With him, the foundation of Aphrodisias was placed as early in time as one could possibly go. Aphrodisias could be counted among the earliest cities of Asia Minor—a true *metropolis*. These traditions originate in the circle of the elite. They reflect the constructed identity they wanted to present to Rome and to their neighbors in the “globalized” world of the Roman Empire, in which local identities could primarily be promoted through constructed

Angelos Chaniotis, who joined the Institute as a Professor in the School of Historical Studies in July, is 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. 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. This article is based on his study “European Identity: Learning from the Past?” in *Applied Classics: Constructs, Comparisons, Controversies*, edited by Chaniotis, Annika Kuhn, and Christina Kuhn (Franz Steiner Verlag, 2009). He is currently working on a book project: “From the City of Aphrodite to the City of the Cross: Constructing Identities at Aphrodisias.”

cultural memories. We do not know how this identity was perceived by other groups, especially by the non-Greek indigenous Karian population and the Jews. This more or less harmonious image of “the most illustrious people of the glorious city of the Aphrodisians, ally of the Romans, devoted to the emperor, free and autonomous according to the decrees of the most holy senate and the treaty and the imperial responses, inviolable” was shattered when the rise of Christianity to state religion brought the conflict of religious identities to the foreground. This conflict ended with the victory of Christianity in the early sixth century. By the mid-seventh century C.E., Aphrodisias had been renamed Stauropolis (“the city of the Cross”) and liberated from its pagan past (Figure 3).

As in Crete or Aphrodisias, identity in Europe is a construct, subject to continual transformations and adaptations to changing environments. But unlike ancient paradigms, typical features of a collective identity are absent in contemporary Europe: a joint European citizenship, a common language (other than bad English), a common religion, joint historical experiences, a common mythology, and a common system of social values. The Europeans have never experienced history together; they have never won (or lost) a war that they have fought together. The images on the reverse of the euro highlight particularities and local patriotisms. The attempts of Europeans (conservative) to found European identity on the alleged superiority of



Figure 3. Deleting an identity: Christians erased the pagan name Aphrodisias (line 4) in this inscription from the sixth or seventh century C.E.

its culture have been rightly criticized and rejected, and European economic supremacy proved ephemeral.

Certain European statesmen and intellectuals promote the idea of a joint cultural memory based on Christian traditions and the cultural roots of Graeco-Roman antiquity. Such a cultural memory is in fact cultural amnesia, the elimination of the memory of the cultural diversity that existed and still exists in Europe—the glamour of Arabic culture in medieval Spain, the power of the Ottoman Empire, European Jewry—and of the countless old and new minorities. There has never been a moment in history that the entire population of Europe spoke the same language, shared the same religion, lived within the borders of the same state, or were subject to a single legal system. There is no such thing as a homogeneous European culture, with which the Bosnian Muslims, the third-generation Turks in Germany, the Greeks, the Roma, the French Jews, the Basques, and the Laps—not to mention the Indians and Pakistanis living in London—can identify themselves. Not the belief in the superiority of a “European culture” will allow the Europeans, both in the continent and in the diaspora, to develop a distinct identity, but the belief in the superiority of joint values: democracy, sensitivity toward human rights and civil liberties, tolerance of diversity, commitment to unprejudiced advance in knowledge, and protection of the environment. ■



Procter of Procter & Gamble and George Eastman of Kodak, both of whom implemented these ideas in the late 1800s in their companies, along with early work on the subject by John Bates Clark, a founder of the American Economics Association, and a group of scholars with whom he worked at Johns Hopkins University in the 1880s. I also began to explore the role that broadened ownership played in the idea of democracy in the minds of many of the founders of the American republic and to investigate the writings and debates on the subject and the key developments in different periods of American history.

As the year at the Institute unfolded, it seemed ironic that I was observing fairly extensive intellectual debate on these concepts in the academic literature and popular newspapers and magazines in the late 1700s through the early 1900s in contrast with our own day. A fairly narrow view of the corporation and its possibilities appeared to have gained currency in the modern period and “spilled over” into many academic disciplines in the social sciences and humanities. There were few dissertations on the topic, particularly in the humanities, and many Ph.D.s did not stay with the subject or did not find secure university positions. Very few professors in business schools concerned themselves with alternative corporate structures in spite of the fact that about a third of the companies on Fortune magazine’s annual list of the one hundred best companies to work for in America have endorsed broad ownership or profit sharing, and the phenomenon appeared to be emerging “under the radar” in companies of all sizes and industries. A number of the signature corporations involved in computer technologies and the Internet and biotechnology have implemented some form of the “shared capitalism” model of the corporation.

One of the enlightening experiences during my year at the Institute was attending the After Hours Conversations organized by Professors Caroline Bynum and Piet Hut in order to encourage interdisciplinary discussion among scholars. After one of the After Hours Conversations, I was speaking with Director Peter Goddard about these questions. Peter articulated the importance of supporting young scholars aside from specific projects or grants or predetermined research objectives and stressed that the Institute’s aim was to provide its Members with abundant mentoring and freedom. He emphasized that many foundations were trying to define the goals of studies before they were started or finished and that there was shrinking support in academia for broad interdisciplinary exploration. This conversation inspired me to initiate a national fellowship program to encourage young scholars to look more critically at the role of the corporation in our society and to recreate, to the extent possible, the supportive, interdisciplinary environment of the Institute for a group of networked young scholars at different universities.

The fellowship program took shape in the year after I left the Institute. True to the advice I received, the focus is on identifying promising scholars with a broad interest in these questions and providing them general support. In my historical research, I observed that some of the most respected and well-known corporations departed from the established corporate format. So, I spoke with the founders, chief executive officers, or retired CEOs and surviving relatives of leaders of some major public companies, smaller corporations, and investment and merchant banking enterprises that had a long track record of designing and operating corporations with broad-based employee ownership and

profit sharing. J. Robert Beyster, a nuclear physicist and retired founder and CEO of a high technology company, and his daughter Mary Ann Beyster established the first group of fellowships, which were offered to young scholars, mainly economists and sociologists. An annual summer symposium and a midyear workshop at Rutgers were established in order to facilitate dialogue, networking, and mentoring between the fellows. Again, true to the original inspiration, the fellowships encouraged the scholars to pursue their own work without predefined goals. I asked my colleagues Douglas Kruse of Rutgers and Richard Freeman of Harvard who worked on the NBER study to join me as mentors as the group of fellows continued to grow. Most fellows remain at their home university although they may take up residency at Rutgers if they wish. Most are new postdocs, assistant professors, or doctoral candidates pursuing a thesis, with widely diverse backgrounds.

During the 2009–10 academic year, nineteen fellowships plus seven smaller grants were offered to scholars at Rutgers University’s School of Management and Labor Relations and other institutions, such as the Booth School of Business at the University of Chicago; Columbia University; Harvard University; the Massachusetts Institute of Technology; the University of California, Los Angeles; the University of Missouri; the University of North Carolina at Chapel Hill; and the University of Pennsylvania. For the 2010–11 academic year, between fifteen and twenty new fellowships will be offered, bringing the group of scholars looking at alternative conceptions of the corporation to about fifty scholars. Applying the Institute for Advanced Study concept of “Member,” the summer symposium and the midyear fellows workshop now bring all current and former fellows and mentors from around the country to these meetings twice a year with the support of a number of foundations. The biggest surprise for me is watching how these young women and men have created their own support network and have initiated countless collaborations, including one book collection, a special journal issue, joint use of quantitative datasets, and joint authorship of journal articles.

I could not have imagined that all of this would have emerged from my year at the Institute. The Institute offers a rare, free, open, and rich environment in which to explore new ideas and probe new realities. While the Institute’s year-long quiet and calm, wonderful luncheon conversations, and supportive Faculty cannot be reproduced by a national network, I found that perhaps at least a bit of its spirit and culture can be realized. I do not know what the longer term holds, but the fellowship program is certainly a way to encourage the study of issues that fall below the radar of the status quo and established thinking. ■

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Joseph Blasi is a Professor at the School of Management and Labor Relations at Rutgers, The State University of New Jersey, and a Research Associate at the National Bureau of Economic Research. From 1995–96, he was the Andrew W. Mellon Foundation Member in the School of Social Science, and from 2007–08, he was the William D. Loughlin Member in the School of Historical Studies. He is the editor with Douglas L. Kruse and Richard B. Freeman of *Shared Capitalism at Work: Employee Ownership, Profit and Gain Sharing, and Broad-based Stock Options* (The University of Chicago Press, 2010), which he finished during his year at the Institute.

## EDWARD T. CONE CONCERT SERIES

### String Quartets, Mallet Madness, and the End of Time

In his second season of curating the Edward T. Cone Concert Series, Artist-in-Residence Derek Bermel opened “The Harmonic Series” season with performances by the Borromeo String Quartet in November. The season will continue with Mallet Madness, an all-percussion performance on December 10 and 11, featuring Joe Locke on vibraphone, Lisa Pegher on marimba, and Bernard Woma on Dagara gyil (African xylophone) performing works by Paul Lansky, Locke, Woma, and more.

The second term will include performances by the string quartet Brooklyn Rider on February 4 and 5, which will trace more than a century of American concert music, with Dvorák’s *American Quartet* as its centerpiece. Also on the program will be Bermel’s *Amerikanizálódik*, Don Byron’s *Four Thoughts on Marvin Gaye*, John Cage’s *In a Landscape*, Philip Glass’s String Quartet No. 3 (Mishima), and Colin Jacobsen’s *Achille’s Heel*.

The End of Time will conclude the season on March 11 and 12, with Edward Arron on cello, Bermel on clarinet, Steven Copes on violin, Steven Gosling on piano, and Tara O’Connor on flute. They will perform Messiaen’s



In addition to curating the Edward T. Cone Concert, Derek Bermel, the Institute’s Artist-in-Residence, continues to organize a series of Writers Conversations, including a Poets Panel featuring (from left to right) Wendy S. Walters, Suji Kwok Kim, Tracy K. Smith, and Thomas Sayers Ellis.

*Quartet for the End of Time* and Béla Bartók’s *Contrasts*. Bermel continues to organize a series of pre- and post-concert talks to accompany the performances, including a discussion between members of the Borromeo String Quartet, Paul Neubauer, Fred Sherry, and Bermel, which took place in November.

For more details about the Artist-in-Residence program and the Edward T. Cone Concert Series, please visit [www.ias.edu/air](http://www.ias.edu/air). ■

Music from the Institute for Advanced Study, broadcast by local classical radio station WWFM and cohosted by Artist-in-Residence Derek Bermel, will now be heard on the last Monday of the month between 8:00 p.m. and 10:00 p.m. In addition to featuring current concerts in the Edward T. Cone Concert Series, the program features music from past Artist-in-Residence performances. A broadcast schedule may be found at [www.ias.edu/special/air/wwfm](http://www.ias.edu/special/air/wwfm). For more information on the radio show, or to listen online, please visit [www.wwfm.org](http://www.wwfm.org).



# Membership Funding and Planned Giving Support the School of Mathematics

## Gifts Provide Opportunities for Visiting Scholars

There is a range of ways to support the Institute for Advanced Study's mission of fostering fundamental research in the sciences and humanities—through annual gifts, funding for an endowment, and planned giving opportunities (see article, right). Funding for Memberships affords visiting scholars and scientists the opportunity to freely pursue their research, unencumbered by the time constraints or pressures often present in their academic lives. Members receive stipends—in addition to an office, administrative support, library and computing access, and subsidized housing and food—that ensure a full and productive stay that is potentially pivotal for scholars in both nascent and more developed stages of their careers.

Recent funding for the School of Mathematics has directly supported Memberships and a Visiting Professorship for both junior and senior scientists. In June, Robert Fernholz, a Trustee of the Institute, and his wife Luisa, made a multiyear pledge through the Fernholz Foundation to fund the Robert and Luisa Fernholz Visiting Professorship in the School. The pledge will establish an endowment and also provide operating support. The first Robert and Luisa Fernholz Visiting Professor will be designated in the academic year 2011–12. Through the Minerva Foundation, directed by Luisa Fernholz, the Fernholzes have supported Memberships in the School since 2007, with a preference for female senior mathematicians. In 2010–11, Sophie Morel and Christine Taylor of Harvard University are supported through Minerva.

Other important funding for Memberships comes from Neil Chriss, a former Member (1994–95) in the School of Mathematics, and his wife Natasha Herron Chriss, whose support is directed to the School in recognition of their dedication and involvement. This year, through their Founder's Circle membership in the Friends of the Institute, the Chrisses are funding the visit of Member Laurent Clozel of Université Paris-Sud 11. In addition, the Chrisses have extended a generous challenge to all former Members and Visitors—they will match, dollar for dollar, every new gift to the Institute, as well as any increase over a prior contribution, up to a total of \$50,000. The Chrisses are members of the Centennial Council, which recognizes the Institute's most generous donors. Neil Chriss is also Chair of the newly formed School of Mathematics Council, which aims to raise awareness of the work of the School and enlarge its base of support (see article, page 9). ■

For more information about supporting Memberships at the Institute, please contact Kamala Brush, Senior Development Officer, at [kbrush@ias.edu](mailto:kbrush@ias.edu) or (609) 734-8031.

## Ky Fan and Yu-Fen Fan Establish Endowment

The Ky Fan and Yu-Fen Fan Endowment has been established to support Members in the School of Mathematics, with a preference for those from Peking University. The endowment was established with the remainder from a trust established in 1999 by Ky Fan, an Emeritus Professor at the University of California, Santa Barbara, and former Member (1945–47) in the School of Mathematics, who spent some of his formative years at the Institute. Fan, who made fundamental contributions to operator and matrix theory, convex analysis and inequalities, linear and nonlinear programming, topology, and topological groups, died in March 2010 at the age of ninety-five.

A native of Hangzhou, China, Fan received his B.S. degree from Peking University in 1936, and his D.Sc. in Mathematics from the University of Paris in 1941, under the supervision of Maurice Fréchet. In addition to Fréchet, Fan was influenced by John von Neumann and Hermann Weyl, both early Faculty members at the Institute. Fan's work in fixed point theory, in addition to influencing nonlinear functional analysis, has found wide application in mathematical economics and game theory, potential theory, calculus of variations, and differential equations. ■

*A charitable remainder trust is an arrangement in which assets—usually cash, securities or real property—is irrevocably transferred to a trustee, removing these assets from your estate. A charitable remainder trust can be created and funded during your lifetime or can be a testamentary trust—a trust that is created in your will. The Institute may serve as trustee, or you may select a trustee of your choice. The beneficiaries of the trust will receive an income stream for the duration of the trust while the grantor, or the creator of the trust, will receive a charitable income-tax deduction in the year the trust was funded. A minimum of \$100,000 is needed to establish a charitable remainder trust managed by the Institute.*

For more information on charitable remainder trusts and other giving plans, please contact Catie Newcombe, Senior Development Officer, at (609) 951-4542 or [cnewcombe@ias.edu](mailto:cnewcombe@ias.edu). If you wish to calculate payments yourself, please access the Planned Giving Calculator at [www.ias.edu/support/planned-gifts](http://www.ias.edu/support/planned-gifts). All calculations are anonymous unless you indicate you wish to be contacted.

## Ambassadors for IAS: Friends of the Institute at Thirty

This year, as the Institute for Advanced Study celebrates the eightieth anniversary of its founding, the Friends of the Institute marks its thirtieth anniversary. The Friends were established in 1980, on the occasion of the Institute's fiftieth anniversary. A small circle of supporters—Edward T. Cone, Mary Keating, Anne Martindell—came together with then-Director Harry Woolf to create an organization that would further the interests of the Institute. The Friends grew steadily in that first decade and, in 1990, an Executive Committee was established to manage the organization's affairs. In its bylaws, the Executive Committee set out the purpose of the Friends, "...to further the interests of the Institute by increasing understanding and appreciation of the Institute and of its special role and needs and by assisting the Institute in obtaining support for its benefit." Guided by the Friends Executive Committee, and led by a succession of outstanding Chairs, the Friends of the Institute continues to fulfill that mission today.

As Peter Goddard, Director of the Institute, stated at a recent annual meeting of the Friends, the Institute is a true academic village with its annually changing population of Members and their families from around the world. While the environment of the Institute is geared toward providing the most favorable conditions for its Members to be able to pursue their own work without constraints or disturbance, it is also essential that they are not disconnected from the wider community. Here the Friends play an important role, linking the Institute to that broader community and acting as informed ambassadors for the work conducted at the Institute.

The Friends also play a significant role in maintaining the Institute's financial independence, which is inherent in sustaining its mission of fostering curiosity-driven research into fundamental problems. Annual gifts from Friends contribute greatly to the strength of this position, since the revenue stream provided by Friends funds is the



Members of the Friends Executive Committee with Director Peter Goddard (right) at the annual meeting of the Friends of the Institute for Advanced Study in May

largest source of unrestricted income the Institute receives. Last year, Friends contributed more than \$714,000 to the Institute, a sum that is equivalent to the return on a \$14 million endowment.

The value of Friends funds is considerable, particularly in the current economic environment, as the Director is able to allocate such funds to specific areas of need. This year, the generous contributions from Friends, together with the income from the Friends endowment, are providing support for a Member in each of the four Schools: Menachem Fisch, a historian and philosopher of science from Tel Aviv University; Russell Impagliazzo, a mathematician from the University of California, San Diego; Marilena LoVerde, a cosmologist and astrophysicist from Columbia University; and Winifred Fallers Sullivan, Director of the Law and Religion Program at the University at Buffalo, the State University of New York.

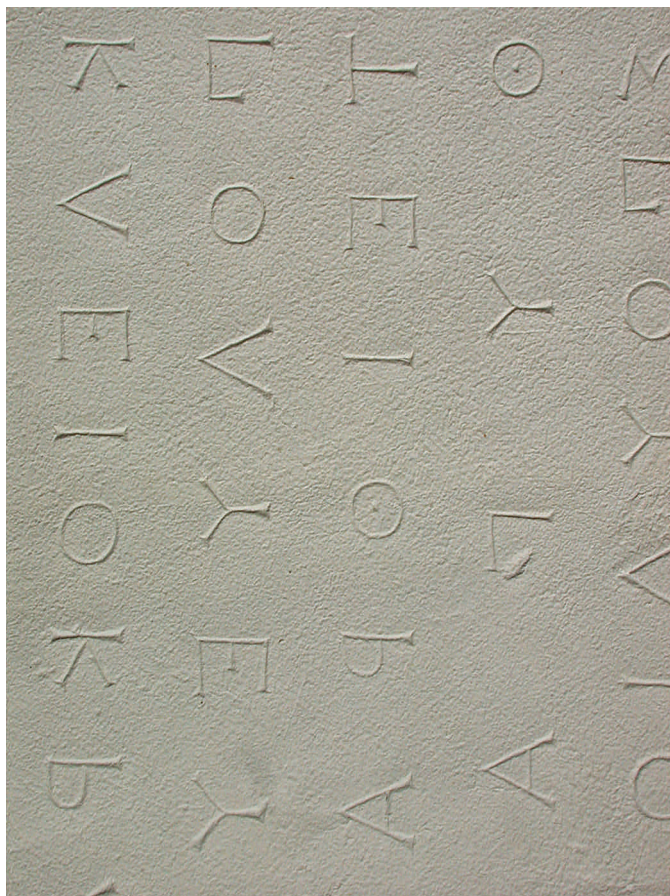
In addition to direct support for Members, Friends have matched a grant from the National Endowment for the Humanities for which IAS would not otherwise be eligible, and provided critical funding for important outreach programs including the IAS/Park City Mathematics Institute, Prospects in Theoretical Physics, and a Public Policy Lecture Series. Contributions from Friends have also supported the Institute's libraries, the Artist-in-Residence program, and a Director's Visitor—a photographer whose work will be featured in a book of essays by current and former Institute scientists and scholars that will be published next year in recognition of the Institute's eightieth anniversary. ■

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



# IAS The Institute Letter

Fall 2010



The study of Greek and Roman inscriptions has been a primary focus of historians at the Institute for Advanced Study since the appointment of Benjamin D. Meritt as the first Professor in the School of Humanistic Studies, a precursor to the current School of Historical Studies. Meritt, who served on the Institute's Faculty from 1935–89, becoming Emeritus in 1969, brought a number of prominent scholars of epigraphy to the Institute, a tradition carried forward by Christian Habicht, who was appointed to the School's Faculty in 1973 (see article, page 6) and Angelos Chaniotis, who joined the Faculty as of July (see article, page 1).

It is due to Meritt's efforts that the Institute now houses one of the world's largest collections of squeezes—impressions of inscriptions that allow scholars to more easily study them (see articles, page 6). The above image shows a portion of a squeeze made from lettering inscribed on the base of a statue by the Athenian sculptor Praxiteles in about 375 B.C. (The text appears in reverse due to the process of making the squeeze.) The statue base was originally discovered in 1936 in the Athenian Agora by a team led by Homer A. Thompson. Meritt had recommended Thompson for the Agora excavation project and was later instrumental in bringing him to the Faculty of the Institute, where Thompson served from 1947 until his death in 2000.

Thompson's team discovered the statue base in a wall dating from the first century B.C. made of reused blocks of marble and other building materials. Only the intact right-hand portion of the base seemed to bear text, a dedication to Demeter and Kore (Persephone). They surmised that the left-hand side may have been left blank due to a family quarrel among the statue's dedicators. But in results published in *Hesperia* in 1957, Meritt found a set of inscriptions on the left side of the base as well when he reconstructed it from fragments. The statue inscription is one of more than seven thousand squeezes from the Athenian Agora in the Institute's collection.



## The Institute Letter

Fall 2010

Peter Goddard, Director

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