IAS | INSTITUTE FOR ADVANCED STUDY

Report for the Academic Year 2016–2017

Cover: The School of Mathematics's inaugural Summer Collaborators program invited to the Institute campus small groups of mathematicians to further their collaborative research projects.

Opposite: A view of the allée leading from Fuld Hall to Olden Farm, the residence of the Institute's Director since 1940

COVER PHOTO: ANDREA KANE
OPPOSITE PHOTO: DAN KOMODA

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Report of the Chair

Basic research, driven by fundamental inquiry, freedom, and curiosity, is crucial for all true understanding and the advancement and integrity of knowledge. Given this, I was extremely pleased to see the publication of *The Usefulness of Useless Knowledge* by Princeton University Press in March. It features founding Director Abraham Flexner's classic essay of the same title, first published in *Harper's* magazine in 1939, and a new companion essay by Robbert Dijkgraaf, current Director and Leon Levy Professor. The book conveys the importance of basic research as an essential precondition of innovation and the first step in social and cultural progress, and describes how it has informed the mission of the Institute for nearly ninety years, leading to transformative ideas in theory and practice.

I have heard that some justices or congressmen walk around with a copy of the U.S. Constitution in their pockets. Everyone who is interested in science philanthropy or public policy affecting science should have a copy of *The Usefulness of Useless Knowledge* in similar proximity.

The Institute's exceptional environment and revelatory long-term ideas and outcomes would not be possible without our benefactors, who contributed more than $25 million to the Institute's endowment and the IAS Fund, which supports annual operating costs. The independence inherent in the Institute's mission requires the dedication of many individuals and institutions: Trustees, Friends, former Members, foundations, corporations, government agencies, and philanthropists, who recognize basic research as a vital public good.

The Board was very pleased to welcome new Trustees Jeanette Lerman-Neubauer, trustee of the Neubauer Family Foundation and owner of a boutique communications practice; Christopher A. Cole, founder and Chairman of Ardea Partners; and Manjul Bhargava, R. Brandon Fradd Professor of Mathematics at Princeton University. Manjul succeeds Benedict Gross, George Vasmer Leverett Professor of Mathematics at Harvard University, as Academic Trustee for the School of Mathematics. The Board is immensely grateful for Dick's invaluable perspective and guidance. We were also deeply saddened by the death in December of Trustee Emeritus Sidney Drell, our dear colleague and friend.

At this very important moment, when scientific principles and thinking are being sidelined or dismissed, it is essential to recognize basic research, and the Institute's realization of it, as one of the most worthy and powerful causes at the root of all societal and technological advancement. Raising funding for and awareness of the Institute's mission and leadership within the field of basic research underscores the indispensable pursuit and value of truth, beauty, and knowledge.

Charles Simonyi
Chair of the Board

Report of the Director

It was a great privilege to revisit founding Director Abraham Flexner's essay "The Usefulness of Useless Knowledge" and contribute a contemporary argument for what Flexner called "the unobstructed pursuit of useless knowledge." It has been truly heartening to share and to experience the warm reception of its message around the world: that basic research must be a fundamental attribute of modern society if we are to make integral strides in knowledge and understanding.

The influence of the Institute's research continues to be recognized across the sciences and humanities: Jonathan Israel was awarded the 2017 Comenius Prize by the Foundation of the Comenius Museum in the Netherlands; Peter Paret received the 2017 Pritzker Military Museum & Library Literature Award for Lifetime Achievement in Military Writing; Jean Bourgain was acknowledged with the 2017 Breakthrough Prize in Mathematics; Nathan Seiberg was awarded the 2016 Dirac Medal and Prize from the International Centre for Theoretical Physics; and Joan Wallach Scott, who was named a Chevalier de la Légion d'Honneur of France, was recognized with the 2016 Talcott Parsons Prize of the American Academy of Arts and Sciences for her distinguished contributions to the social sciences.

Thomas Spencer transitioned as of July to Professor Emeritus, having served on the Faculty of the School of Mathematics since 1986. We are deeply grateful for Tom's many contributions and his continued involvement in the IAS community.

We welcomed our new Chief Development Officer and Associate Director for Development and Communications, Elizabeth Boluch Wood, formerly Vice President for Development at Princeton University, and our new Chief Operating Officer and Associate Director for Finance and Administration, Janine Purcaro, formerly Chief Financial Officer for the Division of Intercollegiate Athletics at Rutgers University. Janine succeeds John Masten to whom the Institute is immensely grateful for his eleven years of dedicated service.

Pulitzer Prize-winning composer David Lang also joined the Institute as its newest Artist-in-Residence, succeeding Sebastian Currier and producing a wonderful series of concerts and special events for the Institute community.

Communicating the importance of curiosity, freedom, and imagination in the advancement of knowledge and innovation is critically important, but to see these principles in action on the campus of the Institute is thrilling. Every day IAS researchers boldly follow their own intuition, risk failure, and experience astounding successes that are shared freely throughout the world and improve society's perspective and possibilities. I am deeply grateful to our increasing number of supporters who make these endeavors and rewards possible.

Robbert Dijkgraaf
Director and Leon Levy Professor

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Top: Charles Simonyi, Chair of the Board of Trustees, addresses Faculty and Trustees at the Board meeting in October. *Below*: Robbert Dijkgraaf, Director of the Institute and Leon Levy Professor, gives a talk on *The Usefulness of Useless Knowledge* at the Princeton Public Library.

Sir Jacob Epstein's bronze bust of Albert Einstein, sculpted from life in 1933, in Fuld Hall

THOMAS CLARKE

The Institute for Advanced Study

It was founding Director Abraham Flexner's belief that if the Institute "eschews the chase for the useful, the minds of its scholars will be liberated, they will be free to take advantage of surprises, and someday an unexpected discovery, apparently leading nowhere, will be found to be an indispensable link in a long and complex chain that may open new worlds in theory and practice."

FROM THE DEVELOPMENT of programmable computers and the uncovering of the deep symmetries of nature to advances in societal understanding and historical practice, long and complex chains of knowledge have developed for nearly ninety years through research originating at the Institute for Advanced Study.

Albert Einstein was one of the first in a continuous line of distinguished Institute scientists and scholars who have produced a deeper understanding of the physical world and of humanity. Yet the Institute's remarkable history does not seem to weigh heavily on current scholars and scientists. Instead, the atmosphere focuses on the present, where every twist and hairpin bend changes our view. What do we know? What do we yet need to understand? How should we try to comprehend it?

Work at the Institute takes place across historical studies, mathematics, natural sciences, and social science. Currently, a permanent Faculty each year award fellowships to some two hundred visiting Members, from about one hundred universities and research institutions throughout the world. The Institute's reach has been multiplied many times over through the more than eight thousand Members who have influenced entire fields of study as well as the work and minds of colleagues and students. Thirty-three Nobel Laureates, forty-one of the fifty-six Fields Medalists, and sixteen of the eighteen Abel Prize Laureates, as well as many winners of the Wolf and MacArthur prizes, have been affiliated with the Institute.

At the Institute, everything is designed to encourage scholars to take their research to the next level. This includes creating and sustaining an environment where Members live in an academic village of apartments, originally designed by Marcel Breuer in 1957, at the edge of the Institute's eight hundred acres of campus, woodland, and farmland. Members eat in the same dining hall, share common rooms and libraries, and carry out their work in an institutional setting where human scale has been carefully maintained to encourage the sharing of ideas, mutual understanding, and friendship.

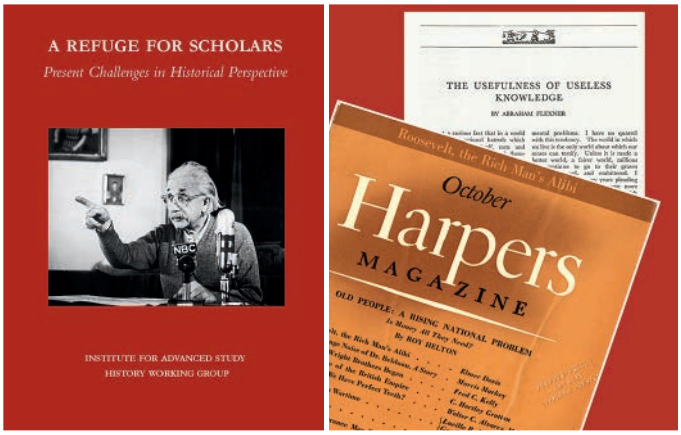
Each year a new intellectual mix is created by the Members, ranging from young postdoctoral fellows to distinguished senior professors, who typically stay a year but may stay up to five years and return for subsequent visits throughout their careers. A period spent as a Member is often a life-changing experience. Young scholars meet the contemporaries who, with them, will be leading figures in their field in the future. Senior Members have the time and freedom to initiate new lines of research. Freed from teaching and administration, Members are afforded opportunities for discussing their work with scholars and scientists from other fields. Here they are given the time to take advantage of serendipitous encounters at lunch, teatime, or at After Hours Conversations, an interdisciplinary program to encourage wide-ranging conversations in an informal environment.

Throughout the year, the Institute hosts a broad array of concerts, lectures, and programs for the Institute community and the public. In addition, the Institute offers numerous and varied activities for Members, Visitors, and their families—from family science talks and children's activities to play readings, jazz evenings, tennis lessons, and trips to museums and other cultural sites.

Fundamental research at the Institute furthers our grasp of a world of diverse facts, structures, ideas, and cultures. This is due in large part to the precious freedom that Faculty and Members at the Institute experience—an independence enabled by the generosity of the Institute's founders and subsequent benefactors. We share the conviction of our founders that such unrestricted deep thinking will change this world but where and how is always a surprise.

CLOCKWISE FROM TOP: ANDREA KANE, KELLY O'CONNOR, ANDREA KANE, ANDREA KANE, ANDREA KANE, DAN KOMODA

A Member-organized History Working Group mobilized in response to the executive order of January 27, 2017, which initially banned travel and immigration to the United States from seven predominantly Muslim countries. Three articles in the Spring 2017 *Institute Letter* were authored by Fadi Bardawil, Member in the School of Social Science; Thomas Dodman (top right), Member in the School of Historical Studies; Ian Jauslin, Member in the School of Mathematics; Pascal Marichalar, Visitor in the School of Social Science; Klaus Oschema, Gerda Henkel Stiftung Member in the School of Historical Studies; and Peter Redfield, Member in the School of Social Science. An exhibit (above) was curated by the History Working Group as a companion to the newsletter articles, and a booklet (right) was published. These materials appear at www.ias.edu/idea-tags/history-working-group.



The Usefulness of Useless Knowledge, published in early 2017 by Princeton University Press, features Institute for Advanced Study founding Director Abraham Flexner's classic essay of the same title, first published in *Harper's* magazine in 1939, alongside a new companion essay by current Director and Leon Levy Professor Robbert Dijkgraaf. *Below left:* At the Institute, Dijkgraaf moderated a panel discussion with special guests (from left) Peter Dougherty, Director of Princeton University Press; Shirley Tilghman, Institute Trustee and Professor of Molecular Biology and Public Affairs and President Emerita of Princeton University; and Vartan Gregorian, Institute Trustee Emeritus and President of Carnegie Corporation. *Below right:* In March, Dijkgraaf conversed with William P. Kelly (right), Andrew W. Mellon Director of the Research Libraries of the New York Public Library, on the vitality of Flexner's ideas and the importance of basic research today. Read more at www.ias.edu/about/usefulness-useless-knowledge.

ALL PHOTOS DAN KOMODA

From left: Conversing at teatime, School of Historical Studies Members Muriel Debié, Klaus Oschema, Raoul Birnbaum, Klaus Larres, and Fabien Montcher, whose research spans Syriac studies and international relations to medieval culture and political history

DAN KOMODA

School of Historical Studies

The School of Historical Studies, established in 1949 with the merging of the School of Economics and Politics and the School of Humanistic Studies, actively promotes interdisciplinary research and cross-fertilization of ideas, thereby encouraging the creation of new historical enterprises.

THE SCHOOL OF HISTORICAL STUDIES bears no resemblance to a traditional academic history department, but rather supports all learning for which historical methods are appropriate. Its Faculty and Members embrace a historical approach to research throughout the humanistic disciplines, from socioeconomic developments, political theory, and modern international relations to the history of art, science, philosophy, music, and literature. In geographical terms, the School concentrates primarily on the history of Western, Near Eastern, and Far Eastern civilizations, with emphasis on Greek and Roman civilization, the history of Europe (medieval, early modern, and modern), the Islamic world, and East Asia. Support has been extended to the history of other regions, including Central Asia, India, and Africa.

The Faculty and Members of the School do not adhere to any one point of view but practice a range of methods of inquiry and scholarly styles, both traditional and innovative. Uniquely positioned to sponsor work that crosses conventional departmental and professional boundaries, the School actively promotes interdisciplinary research and cross-fertilization of ideas, thereby encouraging the creation of new historical enterprises.

Professor **Yve-Alain Bois**'s long-term project, the catalogue raisonné of the paintings, reliefs, and sculpture of Ellsworth Kelly—whose first volume appeared at the end of 2015—has taken most of his time in 2016–17 and this is likely to go on until the end of 2019. However, he took several "vacations" from it during the past year, contributing essays in exhibition catalogues dedicated to other artists (R. H. Quaytman at the Los Angeles Museum of Contemporary Art; Robert Rauschenberg at the Museum of Modern Art, New York; Soviet Constructivism at the Chicago Art Institute; Amy Sillman at Portikus, Frankfurt; and Ed Ruscha at the Gagosian Gallery, London). Other publications include his contribution

FACULTY

Yve-Alain Bois

Angelos Chaniotis

Nicola Di Cosmo
Luce Foundation Professor in East Asian Studies

Patrick J. Geary
Andrew W. Mellon Professor

Jonathan Haslam
George F. Kennan Professor

Sabine Schmidtke

PROFESSORS EMERITI

Glen W. Bowersock

Caroline Walker Bynum

Giles Constable

Christian Habicht

Jonathan Israel

Irving Lavin

Peter Paret

Heinrich von Staden

to a monograph by the San Francisco artist, critic, and curator Jordan Kantor; the edition of his correspondence with Franz-Erhard Walther for the catalogue of this German artist's retrospective at the Reina Sofía Museum in Madrid; and, in the journal *October*, the presentation and discussion of three historical texts on political lies (one from 1809 by Heinrich von Kleist, another from 1934 by Bertolt Brecht, and a third from 1943 by Alexandre Koyré—the latter a historian of science who spent many years at IAS). He also revised and expanded his 1990 collection of essays, *Painting as Model*, for its French translation, which appeared in the spring of 2017. (Immediately after the publication of this book, he participated in roundtables about it in Geneva, Paris, and Brussels). He also gave the keynote lecture in the symposium "Looking at Matisse Today" at the Barnes Foundation, an international gathering of Matisse scholars in celebration of the multi-volume book, *Matisse in the Barnes Foundation*, which he had edited. (He later gave slightly revised versions of this talk at IAS, at the Institut National d'Histoire de l'Art in Paris, and at the University of Virginia in Charlottesville). He also participated in a public discussion with Carol Mancusi-Ungaro on conservation of works of contemporary art (at the Whitney Museum); in a three-day symposium dedicated to the art historian Leo Steinberg (at the Sapienza and the American Academy in Rome); and he gave a lecture on Picasso at the Stzuki Museum in Lodz (Poland).

FACULTY & EMERITI AWARDS

Jonathan Israel was awarded the 2017 Comenius Prize by the Foundation of the Comenius Museum in the Netherlands.

Peter Paret received the 2017 Pritzker Military Museum & Library Literature Award for Lifetime Achievement in Military Writing.

The research topics of the Members participating in the art history seminar were even more diverse than usual, with one extraordinary exception, however, which helped to unite the seminar: both Emine Fetvaci and Yu-chih Lai were working on an album commissioned by a ruler (a seventeenth-century Ottoman sultan for Fetvaci and an eighteenth-century Chinese emperor for Yu-chih Lai) in order to document the multiethnic population of his vast empire. The fact that these two albums produced in entirely different contexts were using the same formal strategies led to many theoretical discussions concerning the troubling art historical issue of the "look alike," an issue of great interest to the other participants of the seminar as well, even though their current work was not directly concerned with it. Those were Malcom Bull (eighteenth-century Neapolitan painting), Roland Betancourt (Byzantium illustrated manuscripts), Despina Stratigakos (Nazi urbanism during WWII in Norway), and Daniel Sherman (archaeological forgery in nineteenth-century France), all of whom gave multiple presentations on their research in progress. Guest speakers in the seminar were Beatrice Kitzinger, from Princeton University's Department of Art History and Archaeology, who presented her current work on Carolingian manuscript illustration; Jane Sharp, from the Department of Art History of Rutgers University, who guided us through the exhibition of Moscow Conceptual art of the '60s and '70s that she curated at the Zimmerli Museum; and Suzanne Blier, a specialist in African art from Harvard, who spoke about her forthcoming book on Picasso's *Demoiselles d'Avignon* and its debt to African art.

Professor **Angelos Chaniotis** curated, together with Dr. Nikos Kaltsas (Athens) and Professor Ioannis Mylonopoulos (Columbia), the exhibition "A World of Emotions: Ancient Greece 700 B.C.–200 A.D.," funded by the Onassis Foundation, and edited the exhibition catalogue. This exhibition, originating in Chaniotis's research project "The Social and Cultural Construction of Emotions: The Greek Paradigm," funded by the European Research Council (2009–13), was on view at the Onassis Cultural Center in New York from March 9 to June 24. It will be on view at the Acropolis Museum in Athens from July 17 to November 19. In connection with his research on emotions, Chaniotis is currently putting together a collective volume ("Unveiling Emotions III: Display and Arousal of Emotions in the Greek World").

The focus of his research remains the study of inscriptions and the information they provide for Greek social, cultural, and religious history. He coedited *Supplementum Epigraphicum Graecum LXII* (Brill, 2016) and worked on his book "Epigraphic Research at Aphrodisias, 1995–2014." With the support of the Anneliese Maier Research Award of the Alexander von Humboldt Foundation (Berlin), he collaborated with graduate students and postdoctoral researchers from the Universities of Munich, Heidelberg, Freiburg, and Münster on various epigraphic projects; he also supported the work of the Inscriptiones Graecae in Berlin and cofunded two colloquia in Munich ("Epigraphy and Law," February 2017; "Ancient Graffiti," April 2017). Subjects related to this area as well as papyrology and ancient oratory were treated by him, Members, and Visitors in the Ancient Studies Seminar (October 2016–April 2017) and the annual Epigraphic Friday (March 3, 2017). He also organized an "Epigraphy Reading Group" at IAS; the participants were graduate students from Princeton University, the City University of New York, and the Institute for the Study of the Ancient World at New York University (November 2016–May 2017).

Chaniotis lectured in the United States, Germany, Greece, the Netherlands, and Switzerland. In May 2017, he gave a lecture in the European Parliament on the subject "Is Greek Antiquity Relevant for Current Political Phenomena?" Many of his lectures, including a lecture at CERN in Geneva, focused on his new research on the

transformations of nightlife from the fourth century B.C.E. to the fourth century C.E.; he is the convener of a conference on this subject that will take place in the Fondation Hardt (Geneva) in August 2017. Chaniotis also continued his Massive Open Online Courses on Greek history (in Greek language), offered for free on a platform organized by Crete University Press.

In the 2016–17 academic year, **Nicola Di Cosmo**, Luce Foundation Professor in East Asian Studies, continued to work on the interaction between natural and human systems, especially in relation to Inner Asian history, with two projects concerning the historical implications of volcanic cooling in 627–629 (north China) and a mega-drought in 790–850 (Mongolia). These studies on the interplay between climatic and historical factors contribute to a critique of reductionist and deterministic approaches to the investigation of natural events in human history. In spring 2017, he organized the IAS workshop "Climate Change in the Eurasian Late Antiquity (Fourth–Eighth Century)," which brought together historians, climatologists, and archaeologists to discuss integrated approaches to the study of climatic factors in history. The workshop benefitted from a collaboration with Princeton University's "Climate Change and History Research Initiative," with which Di Cosmo is associated. During the summer, he conducted research in Italy on the relations between Venice and the Mongol empire in preparation of a monograph. This work grows out of a long-term engagement by Di Cosmo with the history of cultural and political encounters during the Mongol empire. His publications included historical and scientific papers. Among the historical ones: "Nurhaci's Gambit: The Concept and Praxis of Sovereignty in the Rise of Manchu Power" in *The Scaffolding of Sovereignty: Global and Aesthetic Perspectives on the History of a Concept* (Columbia University Press, 2017); "The Extension of Ch'ing Rule over Mongolia, Sinkiang, and Tibet, 1630–1800" in *The Cambridge History of China 9.2* (Cambridge University Press, 2016); "关于草原帝国历史分析的理论思考"("Theoretical Reflections on the Historical Analysis of Steppe Empires"), in 断裂与转型:帝国之后的欧亚历史与史学 (*Between Empires: Rupture, Transformation, and Transmission*) (Shanghai Ancient Classics Press, 2017). On the scientific front, he coauthored the following papers: Büntgen et al. "Cooling and Societal Change during the Late Antique Little Ice Age from 536 to around 660 A.D." *Nature Geoscience* 9.3 (2016); Oppenheimer et al. "Multi-proxy Dating the 'Millennium Eruption' of Changbaishan to late 946 C.E." *Quaternary Science Reviews* 158 (2017); Büntgen et al. "Multi-proxy Dating of Iceland's Major Pre-settlement Katla Eruption to 822–823 C.E." *Geology* 45.9 (2017). Within the Institute, the activities of the East Asian Studies seminar, which Di Cosmo runs, included twelve talks and lectures presented by Members and invited speakers. Topics ranged widely from Soviet advisers in Mao's China to government bonds in Qing China and Meiji Japan, from theories of money in Tokugawa Japan to epistolary culture in early modern Korea, and from magic in medieval China to European botanical studies at Qianlong's imperial court.

Patrick J. Geary, Andrew W. Mellon Professor in the School of Historical Studies, is working with his colleagues in Europe and the U.S. to evaluate the results of their ancient DNA analyses of sixth-century cemeteries in Hungary and Italy. They find two genetically distinct populations in both regions, populations that are divided by their biological origins, by the kinship connections that his team's algorithms have uncovered, and by their cultural practices, and yet they are buried together in the same communal cemeteries. The riddle of what these patterns mean for understanding the population movements and social and cultural transformations that changed Europe at the end of antiquity dominate his research agenda. He has lectured on this project and its findings at conferences in Taiwan, Poland, Germany, and the United Kingdom.

In addition, in Berlin he helped

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Yu-chih Lai (left), Zurich Financial Services Member in the School of Historical Studies, and Professor Yve-Alain Bois (right) during an art history seminar held at the Institute in March

organize and sponsor the inaugural conference of a new, international research project exploring the myriad of ways in which the cultural productions of the Carolingian Empire (eighth to tenth century) were remembered, reused, and transformed in the Europe of the eleventh and twelfth centuries. In November of 2016, he presented the keynote lecture at a conference in Zurich that explored how the history of memory has developed in the two decades since the publication of his 1994 *Phantoms of Remembrance*. He served on the selection committee for the European Research Council consolidator grant program and has been named Chair of the Scientific Advisory Board of the Max Planck Institute for the Science of Human History in Jena.

In last year's report, George F. Kennan Professor **Jonathan Haslam** described the general direction of his current and future research: explaining the course of international relations through the first half of the twentieth century by focusing on the role of ideas and assumptions in the making of foreign policy.

One of the strongest *idées forces* in this context is nationalism. As prelude, and under the impact of recent events (Brexit and the Trump electoral victory), Haslam's attention has been drawn specifically to the imperviousness of nationalism in the face of sustained attempts to suppress it through supranational structures.

The intensity with which nationalist sentiment was subjugated over the decades since World War II reached an explosive level once the Cold War ended and the carapace had been removed. This was rapidly apparent after the collapse of the Warsaw Pact in East-Central Europe in 1989, followed by the collapse of the Soviet Union in 1992. But somehow this was viewed as atypical; even though the implosion of Yugoslavia in the second half of the decade under the impact of Serbian fanaticism indicated that something fundamental was afoot.

The Panglossian view expressed in the cosmopolitan liberalism of Adam Smith and David Ricardo that free trade would break down the division between nation states underestimated the power of nationalist sentiment as much as did Karl Marx's vision of a universalist socialism. On these views, the destructive power of the twentieth-century ideologies—such as fascism—was aberrant, and rationalism was normal. Both visions were equally teleological and equally mistaken.

Clearly the impressive and alarming power of the pushback against repeated attempts to circumvent and overcome nationalist division indicates that there are deeper and potentially violent forces at work, which do not fit neatly into the rationalist framework that has long guided good-thinking liberals and socialists.

The literature on nationalism and the nation state by liberals and socialists has, however, hitherto been dominated by a mechanistic social science that treats the nation as artifact rather than organism. The explanation of it as artifact carries with it the pleasing assumption that it is ultimately open to reconstruction or dissolution. The assumption that it might instead be an organism—Rudolf Kjellén's idea of *staten som lifsform*—introduces a level of complexity not acknowledged in recent work on the subject.

This is the conundrum Haslam intends to work on for the foreseeable future, taking in the evolution of the nation state from the late medieval era through to the present.

His book on Soviet intelligence, *Near and Distant Neighbors: A New History of Soviet Intelligence*, appeared in Spanish and Romanian editions. No further work on this subject is planned, but Haslam has started the blog "Through Russian Eyes." It began appearing weekly in May. The blog analyzes extracts from Russian press coverage of international affairs, past and present, that are available nowhere else in English other than through subscription to edited CIA/NSA translations. This initiative was prompted by irritation at the woeful inadequacy of

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Member Raoul Birnbaum (left) worked on a granular study of the life of Hong-Yi, a significant cultural figure of modern China who became a Buddhist monk at mid-life.

ANDREA KANE

Left: Member Nina Glibetic (center) spent the year investigating Byzantine and medieval Slavic ritual practices connected to childbirth, using sources such as liturgical manuscripts and objects of visual and material culture. *Right:* Jeffrey Davidow (left), former U.S. Ambassador to Mexico, Venezuela, and Zambia, gives a talk on U.S. involvement in Latin America as part of the World Disorder Lecture Series, organized by George F. Kennan Professor Jonathan Haslam (right).

reporting in the mainstream media; most notably, but not only, the fact that U.S. Intelligence broke into high-level Kremlin communications at the very time the hysteria about Trump and Russia was dominating the public debate on these shores. That entire story was unobtainable to those who could not read Russian. It is a timely reminder that international relations has to be analyzed and presented from both sides.

In terms of public events, Haslam set up two World Disorder lectures, open to the entire Princeton community. Bill Browder (founder and CEO of Hermitage Capital) presented "Putin's Russia and the Imperfect Market" on December 2, 2016. Browder had suffered personally at the hands of the Putin régime, losing a vast fortune as a result of his extraordinary success in exploiting the inefficiency with which the privatization of industry was conducted in the 1990s to the point where his own attorney, Sergei Magnitsky, was tortured and killed in a Russian prison. Legislation to punish those responsible was passed on the Hill in December 2012 (the Magnitsky Act) and followed in Britain (by amendment to the Criminal Finances Act) and given royal assent in April 2017.

The second speaker was Jeffrey Davidow (the Cohen Group), formerly Assistant Secretary of State for the Western Hemisphere and prior to that ambassador to Mexico and Venezuela. Davidow spoke eloquently on "Latin America: Walls or Bridges" on March 1, 2017. Davidow, who as a young diplomat served at the U.S. embassy in Santiago, Chile, under Allende, drew on his vast experience in the Western Hemisphere, as well as on his subsequent role as an adviser on investment in the subcontinent, to highlight the importance of transcending the differences that cloud relations with Mexico in particular.

Both events were very topical. At the first, Browder spoke on Russia just after Donald Trump's controversial electoral victory, in which the hand of the Kremlin formed a visible backdrop. And the second confronted the thorny issues of a proposed border wall to keep illegal immigrants out of the United States and the no less awkward matter of the imbalance of trade to U.S. disadvantage resulting from NAFTA.

In 2016–17, Professor **Sabine Schmidtke** continued to focus on the Shii (Zaydi) tradition of Yemen and Northern Iran. In addition to various publications and lectures on the subject, she entered a partnership with Hill Museum & Manuscript Library (HMML) at St. John's University in Collegeville, Minnesota, to build up a repository which will eventually contain digital surrogates of all manuscripts pertaining to the Zaydi literary tradition—regardless of whether the original manuscripts are housed by the libraries of Europe, North America, or the Middle East, and especially Yemen. The project was officially launched on April 21, 2017, at the residence of the German Ambassador to the United Nations, Dr. Harald Braun, an event that was cohosted by IAS Trustee Afsaneh Beschloss. In the field of Islamic intellectual history, Schmidtke published (with former Member Wilferd Madelung) a critical edition of two theological summae by the tenth-century Buyid vizier al-Ṣāḥib b. ʿAbbād, *Al-Ṣāḥib Ibn ʿAbbād Promoter of Rational Theology: Two Muʿtazilī Kalām Texts from the Cairo Geniza* (Brill, 2016) and completed (with Member Hassan Ansari) another monograph titled *Studies in Medieval Islamic Intellectual Traditions* (Lockwood Press, to be published in 2017). She also published two additional issues of her journal *Intellectual History of the Islamicate World* on the topics "Histories of Books: Part I" (coedited with former Member Maribel Fierro and Sarah Stroumsa) and "Medical Traditions: Part I" (eds. Leigh Chipman, Peter E. Pormann, and Miri Schefer-Mossensohn), and she is currently preparing the next issues on "Medical Traditions: Part II" and "Allographic Traditions" (to be published in April and September 2018, respectively). In the field of the Arabic Bible, she published a study on an Arabic translation of the Pentateuch in the library of the Twelver Shīʿī scholar Raḍī al-Dīn ʿAlī b. Saʿd Ibn Ṭāwūs (d. 664/1266), and she continued working on a

collaborative project, a critical edition of the translation of the Bible into Arabic by Ḥārith b. Sinān. In addition, she cohosted a conference (April 26–28, 2017) in Cordoba, Spain, on the Arabic Bible. In the field of Shii studies, Schmidtke published the first volume of the new peer-reviewed journal *Shii Studies Review*, published by Brill (www.brill.com/ssr).

Over the course of the year, Schmidtke organized three major events at the Institute. The first was a one-day workshop (with Muriel Debié, Member in the School of Historical Studies), "Why Syriac Matters: A Workshop" (February 24, 2017). The second, in collaboration with former Member Geoffrey Khan (Cambridge University) and Sarah Stroumsa (The Hebrew University of Jerusalem), was the two-day conference "The Arabic Literary Genizot Beyond Denominational Borders" (April 20–21, 2017). The third, in collaboration with Guy Stroumsa, was an Advanced School in the Humanities workshop, "Judaism, Christianity, and Islam: Religious Communities and Communities of Knowledge" (June 12–14, 2017), an event that was jointly sponsored by the Israel Institute for Advanced Studies, Jerusalem, and IAS.

Schmidtke also spent much of her time at the Institute with a large and diverse group of Members studying subjects related to the Near and Middle East, though not necessarily to Islam. The group was highly international, with Members from France, Italy, the United States, and Iran. Over the course of the year, the Members regularly met in a lively biweekly seminar (in addition to a great deal of socializing), which was also frequented by Members from the School of Social Science, Princeton University graduate students and faculty, former Members of IAS, as well as occasional visitors. The main subjects studied by the group and presented in the seminars related to Islamic law (Hassan Ansari), Syriac studies (Muriel Debié, Columba Stewart), early Islamic history, historiography, and astrology (Antoine Borrut), Ottoman studies (Jane Hathaway, Anastasios Papademetriou), the beginnings of Arabic studies in Europe (Roberto Tottoli), and Islamic art history (Emine Fetvaci).

Professor Emeritus **Glen W. Bowersock** completed ten years of service on both advisory and search committees for New York University's Institute for the Study of the Ancient World. IAS Trustee Shelby White founded this Institute in 2006 to implement a concept that she and her late husband Leon Levy, a former IAS Trustee, had developed for the interdisciplinary study of ancient civilizations from the Mediterranean to the Pacific. Former IAS Member Alexander Jones has now succeeded Roger Bagnall, the first director, who turned the vision of Shelby White and Leon Levy into reality.

In October 2016, Bowersock made his first visit to Portugal, where he spent time in Lisbon with the antiquities and inscriptions in its museums, above all at São Jeronimo. He traveled to Evora to examine the Roman temple and other remains of the ancient city. Upon his return to the Institute, he prepared a paper on a new bilingual inscription from Yemen in both the Nabataean and Sabaic languages, revealing for the first time that the Nabataean Arabs had ruled southwest Arabia in the final decade of the emperor Augustus. He is offering this paper to honor former Member Jean-Louis Ferrary, with whom Bowersock has long been working closely as joint administrators of the Paris archive of the great French epigraphist Louis Robert.

In Paris in March 2017, he gave the final address at the Académie des Inscriptions et Belles-Lettres for a colloquium in memory of the late Byzantinist Gilbert Dagron. In recognition of Dagron's seminal work on Constantinople, he spoke about the city as a "New Rome" in late antiquity. During the spring term at IAS, the work of several Members led to fruitful discussions, above all on a new inscription from ancient Laodicea in Turkey, for which Member Francesco Guizzi was preparing a publication. Bowersock profited from talks with Muriel Debié on early Syriac historiography.

In the late spring, Harvard University Press published his book *The Crucible of Islam*. It is a distillation and extension of previous work of his that examined the transition to Islam from paganism, Judaism, and Christianity in the Arabian peninsula and in Palestine. He published a brief paper on two lines from Sophocles' *Oedipus at Colonus* to honor his former Harvard colleague Albert Henrichs. The *New York Review of Books* published an article on St. Luke and St. Paul, which was Bowersock's last review for its legendary editor, Robert Silvers, just before his death at the end of March.

During the early part of the academic year, Professor Emeritus **Jonathan Israel** finalized the proofs and index for his latest book, *The Expanding Blaze: How the American Revolution Ignited the World, 1775–1848*, which will appear with Princeton University Press in August 2017. He published several articles on the legacies of Rousseau and d'Holbach and on other aspects of the Western Enlightenment. He delivered public lectures and conference papers at Albuquerque and Santa Fe (New Mexico), at Yale University, University College London, Basle, Blagoevgrad (Bulgaria), Paris, and Moscow.

At a conference held at the Kunsthistorisches Institut in Florenz–Max-Planck-Institut in October 2016, on "Self-Representation of Translocated Cultural Figures," Professor Emeritus **Irving Lavin** spoke on the unique way Erwin Panofsky wrote about his experience in the context of German art historian immigrants who came to America. On the occasion of the Symposium at the Louis Vuitton Foundation in Paris that accompanied the major exhibition, *Icones de l'Art Moderne: La Collection Chtchoukine* (a pre-Revolution collection of early modern art, never before seen outside Russia), Lavin presented an interview with Frank O. Gehry, the architect of the building. The interview was captured over the internet live, in Princeton and Los Angeles, and presented as a video at the symposium. Following the viewing of their conversation, Lavin analyzed the many museum installations, in his own buildings and

those of others, done by Gehry throughout his career. In May 2017, Lavin was appointed Socio Onorario (Honorary Associate) of the Università dei Marmorari (Confraternity of Sculptors) di Roma.

In addition to these public events, Lavin prepared for publication the presentation of two previously unknown marble portrait busts by Gianlorenzo Bernini, carved by the artist before his twentieth year. He prepared a paper on Bernini's heroic statue of David in the Borghese Gallery in Rome, putting forward a completely new interpretation of the figure's action and meaning. This article will appear in the publication of a colloquium on "Silence in Art," sponsored by the Vatican. Lavin also continued his long-range project of updating and reprinting his oeuvre, four volumes of which are already published, with two more projected. This material is also online on the Institute's website at https://publications.ias.edu/il.

In the past academic year Professor Emeritus **Peter Paret** continued to explore the interaction between cultural and military factors in Prussia during the Napoleonic era. A main project was the conversion of his volume of essays *Clausewitz in His Time* (Berghahn Books, 2014) into a larger German edition, which will appear later this year with an additional essay and a much-expanded study of the thematic relationship between Clausewitz's works and those of his contemporary, Heinrich von Kleist, a major figure in German literature. Both the theorist and the dramatist saw war as a reflection of life, and believed that the conduct of war as of life required not obedience to a strict doctrine but the free exercise of one's own judgment. In two related articles —"Clausewitz's Life and Work as a Subject of Historical Interpretation," *The Journal of Military History*, July 2017, and "Das Verständnis von Clausewitz' Leben als Beispiel der Möglichkeiten und Grenzen der Biographie," a lecture at a meeting of the Forschungsgemeinschaft Clausewitz in Burg on the occasion of being elected an Honorary Member of the Society, which will appear in the *Burger Clausewitz Jahrbuch* (Burg, 2017)—Paret discussed the differences between a narrowly military and a widely encompassing approach to the history of war as exemplified by several generations of German historians from Ranke to Droysen and Colmar von der Goltz, articles that also propose a new interpretation of Clausewitz's historical methodology. Paret wrote an introduction to a not yet published work by a former student, Donald Abenheim, *Rettet den Staatsbürger in Uniform*, and published reviews in the *American Historical Review* and *The Journal of Military History*. In May, he attended the annual meeting of the Academic Advisory Committee of the Max Liebermann Gesellschaft at the Berlin Akademie der Künste. In June, Paret received the Pritzker Military Museum and Library 2017 Lifetime Achievement Award in the historical study of military conflicts.

In 2016–17, Professor Emeritus **Heinrich von Staden** continued doing research for three projects. One is an extensive study of the respective roles of individual scientists and of scientific collectivities (often called "schools," a highly problematic label) in the development of ancient Greek and Roman science and medicine. A case study at the center of this research concerns an informal, multigenerational "school" of medicine that had at least two geographic centers. Its history can be traced over at least four centuries, starting in the third century B.C.E., a period during which numerous medical scientists who were unaffiliated with any "school" also made significant contributions to the development of medicine. A second project nearing completion is a critical edition, with translation and commentary, of a remarkable but largely neglected Greek treatise on the pulse, probably written in the first century. In addition to its detailed definitions and classifications of a variety of pulse types, it provides unparalleled information on efforts to use technology to measure the pulse and to establish quantitative correlations between pulse rates and different types of fevers. Aware of the rich Hellenistic history of ancient theories of the pulse, the author also provides invaluable evidence of Hellenistic approaches to human physiology. The third project explores ancient Greek and Roman views—and debates—about the beginning and the end of human life. There were sharp disagreements among ancient philosophers, biologists, and physicians about these issues, and divergent views were also reflected in popular beliefs. The first part of this project is devoted to an exploration of ancient biological and medical views about when and how human life begins and ends. In addition to these three research projects, von Staden is also preparing for publication a selection of his articles and essays (provisionally titled "Medicine, Language, and Culture in Ancient Greece"). This undertaking was kindly suggested and has been actively supported by former IAS Member Philip van der Eijk.

DAN KOMODA

Professor Emeritus Jonathan Israel discusses the rise of democracy in the West in the public lecture "Contesting American Values," available at www.ias.edu/ideas/2016/israel-contesting-american-values.

2016–17 MEMBERS AND VISITORS

f First Term ✦ *s* Second Term ✦ *v* Visitor

Hassan Farhang Ansari
Islamic Law and Theology ✦ Institute for Advanced Study
Elizabeth and J. Richardson Dilworth Fellow

Alexander Bauer
Archaeology of the Black Sea ✦ Queens College, The City University of New York ✦ *s*
Funding provided by the Hetty Goldman Membership Fund

Roland Betancourt
Art History, Byzantine Studies ✦ University of California, Irvine
Elizabeth and J. Richardson Dilworth Fellow

Raoul Birnbaum
Buddhist Studies ✦ University of California, Santa Cruz ✦ *f*
Funding provided by the Patrons' Endowment Fund

Antoine Borrut
Early Islamic History and Historiography ✦ University of Maryland, College Park
Patricia Crone Member

Malcolm Bull
Art History, Eighteenth-Century Studies ✦ University of Oxford ✦ *f*
Funding provided by the Patrons' Endowment Fund

Alejandro Cañeque
Colonial Latin America, Spanish Empire ✦ University of Maryland, College Park
Hans Kohn Member

Edward Champlin
Ancient History, Roman Cultural History ✦ Princeton University

Andrew Chittick
Early Medieval China ✦ Eckerd College
Roger E. Covey Member in East Asian Studies

Hwisang Cho
Korean History ✦ Xavier University
The Andrew W. Mellon Foundation Fellowships for Assistant Professors

Jennifer Davis
Early Medieval History ✦ The Catholic University of America ✦ *s*
Funding provided by the Herodotus Fund

Muriel Debié
Syriac Studies, Late Antiquity ✦ École Pratique des Hautes Études, Paris
Funding provided by the Florence Gould Foundation Fund

Jacco Dieleman
Egyptology, Papyrology, Religious Studies ✦ University of California, Los Angeles ✦ *f*
Funding provided by the Herodotus Fund

Thomas Dodman
Eighteenth-Century Cultural History ✦ Boston College
The Andrew W. Mellon Foundation Fellowships for Assistant Professors

Emine Fetvaci
Islamic Art, Ottoman Art ✦ Boston University
Funding provided by the Hetty Goldman Membership Fund

Ildar Garipzanov
Early Medieval History ✦ University of Oslo ✦ *f*

Nina Glibetic
Byzantine Studies ✦ The Hebrew University of Jerusalem
Funding provided by the Herodotus Fund

Robert Goulding
History of Early Modern Optics ✦ University of Notre Dame
William D. Loughlin Member

Andrea Guidi
Military History, Machiavelli ✦ Birkbeck, University of London ✦ *s*
Felix Gilbert Member

Francesco Guizzi
Ancient History, Greek Epigraphy ✦ Università degli Studi di Roma, La Sapienza ✦ *s*

Susanne Hakenbeck
Early Medieval Archaeology ✦ University of Cambridge ✦ *f*
Funding provided by the Hetty Goldman Membership Fund

Jane Hathaway
Ottoman History ✦ The Ohio State University ✦ *f*
The Gladys Krieble Delmas Foundation Member

Elisabeth Kaske
Late Imperial China ✦ Carnegie Mellon University
The Starr Foundation East Asian Studies Endowment Fund Member

David Kennedy
Roman Archaeology ✦ University of Western Australia ✦ *v, s*

THOMAS CLARKE

DAN KOMODA

Left: Member Hwisang Cho's research focused on how developments in early modern Korean letter writing triggered philosophical, social, and political changes. *Right:* Member Muriel Debié convened the one-day workshop "Why Syriac Matters" to highlight why and how Syriac is relevant to many fields of research today.

Christos Kremmydas
Classics, Attic Oratory ✦ Royal Holloway, University of London ✦ *s*
Elizabeth and J. Richardson Dilworth Fellow

Yu-chih Lai
Chinese Art History and Visual Culture ✦ Academia Sinica
Zurich Financial Services Member

Klaus Larres
History of International Relations ✦ The University of North Carolina at Chapel Hill
Friends of the Institute for Advanced Study Member

Christian Lentz
History of Modern Southeast Asia ✦ The University of North Carolina at Chapel Hill ✦ *s*
The Andrew W. Mellon Foundation Fellowships for Assistant Professors

Rebecca Maloy
Medieval Music ✦ University of Colorado
Edward T. Cone Member in Music Studies

Federico Marcon
History of Early Modern Japan ✦ Princeton University
Friends Founders' Circle Member

Rudolph Matthee
Early Modern Iran ✦ University of Delaware ✦ *s*
Agnes Gund and Daniel Shapiro Member

Fabien Montcher
Intellectual and Political History ✦ Saint Louis University
John Elliott Member

Giuliano Mori
Early Modern Intellectual History ✦ Institute for Advanced Study
Willis F. Doney Member

Ohad Nachtomy
History of Philosophy and Science ✦ Bar-Ilan University ✦ *s*

Patrick O'Banion
Religious Life in Early Modern Spain ✦ Lindenwood University ✦ *s*
Felix Gilbert Member

Klaus Oschema
Late Medieval Culture and Society ✦ Universität Heidelberg
Gerda Henkel Stiftung Member

Anastasios (Tom) Papademetriou
Ottoman History ✦ Stockton University ✦ *s*
Edwin C. and Elizabeth A. Whitehead Fellow

Fabian Reiter
Ancient History, Papyrology ✦ Universität Trier ✦ *f*

Frank Rexroth
Medieval Intellectual History ✦ Georg-August-Universität Göttingen
Elinor Lunder Founders' Circle Member

Priscilla Roberts
History of International Relations ✦ The University of Hong Kong ✦ *f*
Funding provided by the Fund for Historical Studies

Nicolaas Rupke
History of Biology ✦ Washington and Lee University
Funding provided by The Andrew W. Mellon Foundation

Daniel J. Sherman
Art History, Modern French Cultural History ✦ The University of North Carolina at Chapel Hill ✦ *f*
Funding provided by the Hetty Goldman Membership Fund

Nancy Sinkoff
Jewish History ✦ Rutgers, The State University of New Jersey
Elizabeth and J. Richardson Dilworth Fellow

Columba Stewart
Early Medieval History ✦ St. John's University
George William Cottrell, Jr. Member

Antonio Stramaglia
Classical Philology ✦ Università degli Studi di Cassino e del Lazio Meridionale ✦ *f*
Infosys Member

Cameron B. Strang
History of Science in North America ✦ University of Nevada, Reno
Martin L. and Sarah F. Leibowitz Member

Despina Stratigakos
German and Norwegian Architecture ✦ University at Buffalo, The State University of New York
Louise and John Steffens Founders' Circle Member

Daniela Summa
Greek Epigraphy ✦ Berlin-Brandenburgische Akademie der Wissenschaften ✦ *v, f*

Mark Tauger
Soviet Agriculture ✦ West Virginia University
Funding provided by The Andrew W. Mellon Foundation

Roberto Tottoli
Early Islam, Islamic Literature ✦ Università degli Studi di Napoli L'Orientale
AMIAS Member

Karina Urbach
Modern International Relations, Jewish Family History ✦ University of London ✦ *v*

Matthew Waters
Achaemenid Persia, Ancient Near East ✦ University of Wisconsin–Eau Claire ✦ *s*
Willis F. Doney Member

Xin Yu
Medieval Chinese History ✦ Fudan University
The Starr Foundation East Asian Studies Endowment Fund Member

Helmut Zander
History of Religion ✦ Université de Fribourg ✦ *v, f*

DAN KOMODA

Left: Professor Angelos Chaniotis participates in a lunchtime colloquium in February. *Right:* John Elliott Member Fabien Montcher presents a lunchtime colloquium on early modern Iberian bibliopolitics.

SABINE SCHMIDTKE

Outside the Maktabat al-awqaf (Library of Endowments) in Sana'a, Yemen

Sabine Schmidtke on the Zaydi Manuscript Tradition

The Zaydi Manuscript Tradition (ZMT): A Digital Portal, a joint project initiated by the Institute for Advanced Study in partnership with the Hill Museum & Manuscript Library, aims to provide open access to an estimated fifteen thousand digitized manuscripts over the course of the next three years and will help to salvage the rich Yemeni heritage, which is on the verge of destruction. These measures will also effectively democratize access to the Zaydi Manuscript Tradition, which is expected to result in an upsurge of this important field of study and will serve as a model for other fields within Islamic studies where scholars face similar challenges. At the same time, the ZMT project will help to bring more of the enormous richness and intellectual diversity of Islamic culture to the forefront and make it accessible for everyone. Read more at www.ias.edu/idea/2017/schmidtke-zaydi-manuscript-tradition.

COURTESY OF KYLE MERKER

Patrick Geary on Genetics and Identity

We are probably all familiar with the AncestryDNA advertisement for its genetic testing service in which a man states that he and his family had always thought that they were German. He goes on to explain that he danced in a German dance group and wore lederhosen, until, thanks to AncestryDNA, he found out that, in his words, "We're not German at all!" 52 percent of his DNA came from Ireland, Wales, and Scotland. Thus, he explains, "I traded in my lederhosen for a kilt." The ad is amusing and memorable, but it also reflects a disturbing trend in identity politics, namely the assumption that our genetic identity informs our ethnic identity, that it is somehow the essence of who we really are. The implication is that our cultural, social, religious, and political identities are secondary, dependent on our primary genetic identity, and we must bring them into harmony with our "real" selves, which is knowable only through our DNA. Read more at www.ias.edu/ideas/2017/geary-genetics-and-identity.

HERAKLION ARCHAEOLOGICAL MUSEUM, 1367

Marble Relief with the Amorous Embrace of Leda and the Swan (Zeus) from Knossos (Crete), first-second century A.D.

Angelos Chaniotis on A World of Emotions: The Making of an Exhibition

Is there anything special about the ancient Greeks and their emotions? How could one avoid triviality in addressing this subject? Did the death of a beloved person not cause grief among the Greeks as in any other culture? Was economic inequality not the source of envy and hatred, a perceived danger the cause of fear, the birth of a child reason to rejoice, and disappointed love a source of sorrow?

As far as we can see, the basic emotions that we know from our era existed in the Greek world as well: fear and courage, joy and grief, hope and pride, affection and hatred, love and jealousy, desire and disgust, gratitude and envy, contempt, anger, and indignation. An interesting, almost unique, feature of Greek culture is the fact that the Greeks not only personified emotions, but that they worshiped them. Read more at www.ias.edu/ideas/2017/chaniotis-world-of-emotions.

Patrick J. O'Banion on Peace and Quiet in Castile

To outsiders, the contentiousness, divisiveness, and downright un-neighborliness evident in the small Spanish town of Deza by the autumn of 1607 might well have seemed a tempest in a teapot. Those living in the newer Upper Neighborhood had been squaring off against the inhabitants of the older, medieval Lower Neighborhood for years, and the conflict appeared to be reaching a climax. Tensions had been building since the 1590s as recriminations, threats, public brawls, armed uprisings, and fiery sermons gave way to lawsuits and backroom political maneuvering that culminated in arrests, torture, murder, and exile. Heady stuff for small-town folk. Read more at www.ias.edu/ideas/2017/obanion-castile.

Jonathan Haslam on the (Actual) Communist Agents Who Lurked Among Us

COURTESY OF ASSOCIATED PRESS

Julius and Ethel Rosenberg, convicted of sharing nuclear weapons secrets with the Soviet Union, were the first American civilians executed for espionage.

Russian spies held a morbid fascination in the minds of Americans dating back to the Red Scare in 1919, following the Bolshevik Revolution and the creation of the Communist International, of which the Communist Party of the USA became a constituent member, subject to extra-territorial discipline imposed from Moscow.

Global domination was indeed Moscow's declared aim. The issue, however, was whether this goal was at all practicable.

The Red Scare blended neatly with popular hostility to mass immigration in America, particularly against a surge of Jews fleeing the anti-Semitic heartlands of Eastern Europe. Responding to hostility, many Jews embraced the inclusive internationalist ideals of Communism rather than the outlandish idea of building a Jewish state in the deserts of British-controlled Arab Palestine. But they were a minority, drawn in by radical idealism and anti-fascism. And the American opposition to wider Jewish immigration from these areas was clearly colored by racism, especially the anti-Semitism of the time. Read more at www.ias.edu/news/haslam-communistagents-zocalo.

ST. CATHERINE'S MONASTERY, SINAI

Detail of a seventh-century Syriac manuscript depicting King David

Muriel Debié on a Different History of the Seventh Century C.E.

An arcane topic to most people, Syriac sources help shed a more complex light on the history of the Middle East from late antiquity to the Middle Ages. They reveal a non-imperial epoch and its rich contributions to the cultural and religious history of the region.

Although Greek and Latin are familiar to all, Syriac—that form of Aramaic used in Northern Mesopotamia (in Edessa/modern Urfa in southeastern Turkey) as the cultural and religious language of Aramaic speakers—is almost entirely unknown to most, although it was the third major language of Christians (as well as some Jews in Edessa, polytheists, and Manicheans) from the second to the fourteenth century. Read more at www.ias.edu/ideas/2017/debie-syriac.

ROBERTO TOTTOLI

MS Roma Ordine della Madre di Dio Marracci II (B69 ML VII), beginning of sura 18

Roberto Tottoli on Editing the Qur'ān in Sixteenth- and Seventeenth-Century Europe

As Alastair Hamilton stated in 2008 in *The Forbidden Fruit: The Koran in Early Modern Europe*, "few books were as feared and coveted, as abhorred and desired, as the Qur'ān in early modern Europe." Religious polemics, trading activities, and travelers' accounts, reflecting political and social confrontation, have marked Christian Europe's interest in Islam and its holy book. Along with the life of Muhammad, the Qur'ān is a fundamental piece in Europe's picture of Islam. European history has struggled through the centuries to relate to and study the Qur'ān, mostly in order to better refute it, but also to advance a growing knowledge of what the text actually states. Read more at www.ias.edu/ideas/2017/tottoli-quran.

Von Neumann Fellow Lauren Williams, whose research explores connections at the interface of algebra, combinatorics, and physics, leads a Members' seminar on the combinatorics of the amplituhedron in January.

THOMAS CLARKE

School of Mathematics

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

DURING THE ACADEMIC YEAR 2016–17, the School of Mathematics conducted a special program on homological mirror symmetry, which was led by Distinguished Visiting Professor Paul Seidel of the Massachusetts Institute of Technology. Homological mirror symmetry (HMS) started with Maxim Kontsevich's address at the International Congress of Mathematicians in 1994. By now, it is a mature area of mathematics in its own right but still one that can be approached from many different directions, which interact fruitfully even when they remain formally (in the theorem-and-proof sense) independent. More concretely, there is a group of core conjectures that remain open in general even though many special cases have been proved. These involve primarily symplectic geometry, algebraic geometry, and homological algebra. At the same time, there is a lot of activity involving new formulations and interpretations of HMS, sometimes involving entirely different mathematical tools, as well as applications of its core ideas to new areas of mathematics. This open-endedness is part of the appeal of the subject.

The program was fortunate to be able to recruit participants with expertise in a broad selection of the relevant fields. There was a large group working on the core conjectures of HMS and the structures that enter into them (Fukaya categories, derived categories of coherent sheaves). Some very important emerging interactions with other fields, such as log algebraic geometry and non-Archimedean analytic geometry, were also very well represented. On the other hand, enumerative geometry in a more standard sense (Gromov-Witten theory or Donaldson-Thomas theory) had a lower profile in the program, at least compared to the role it has played in the development of mirror symmetry as a whole.

At IAS and Princeton University, there are long-established research groups in symplectic geometry, string theory, algebraic geometry, and Heegaard Floer theory. The Simons collaboration in HMS has nodes in New York and Philadelphia. While there was a lot of informal interaction (which the scheduling was explicitly designed to encourage), the IAS

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Robert P. Langlands

program did not have formal joint activities with any of those groups. This represented a trade-off, which allowed the program to be flexible, and to develop spontaneously from the interests of its participants.

The senior participants (tenured in their home institution) were: Mohammed Abouzaid, Denis Auroux, Lev Borisov, Bohan Fang, Ludmil Katzarkov, Sean Keel, Dmitri Orlov, John Pardon, Tim Perutz, Paul Seidel, Jake Solomon, and David Treumann. Junior participants were: Hülya Argüz, Matt Ballard, Man Wai Cheung, Sheel Ganatra, Ailsa Keating, Heather Lee, Cheuk Yu Mak, James Pascaleff, Dhruv Ranganathan, Helge Ruddat, Zak Sylvan, Tony Yue Yu, Amitai Netser Zernik, and Jingyu Zhao.

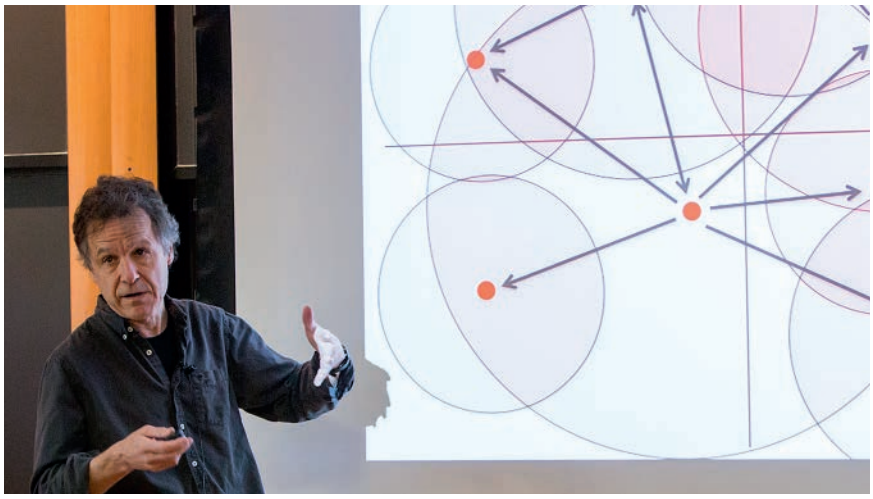
This list is necessarily only an approximation. Because IAS recruits Members broadly across all of mathematics, and more specifically in this case because of the interdisciplinary nature of the subject, the boundary between program participants and the wider School of Mathematics is somewhat blurry. For example, Josh Sabloff and Dmitry Vaintrob, while not having a primary interest in HMS, played a significant role in the program's activities. Many others did as well, including Mauricio Romo, Member in the School of Natural Sciences. The program further drew on the expertise of members of the Princeton University mathematics department, in areas ranging from number theory to low-dimensional topology.

The program ran two workshops on methods and structures (November 2016, organized by Seidel and Nick Sheridan), and emerging developments and applications (March 2017, organized by James Pascaleff and Seidel).

The regularly scheduled program activities were mini-courses and reading groups. The program did not have a weekly seminar, but many participants attended the PU-IAS Symplectic Geometry seminar or the PU Algebraic Geometry seminar. Mini-courses, designed to be broadly accessible and introduce participants to a variety of areas and ideas, included the following: Mohammed Abouzaid on non-Archimedean geometry for symplectic geometers; John Pardon on Liouville sectors and Fukaya categories, and quad of Stein manifolds; Helge Ruddat on logarithmic Gromov-Witten invariants; Sheel Ganatra on noncommutative geometry, smoothness, and Fukyaya categories; Jake Solomon on numerical invariants from bounding chains; David Treumann on constructible sheaves in symplectic topology; Dmitri Orlov on noncommutative algebraic varieties, their properties, and geometric realizations; Tony Yue Yu on mirror symmetry via Berkovich geometry; Sean Keel on canonical coordinates for Calabi-Yau manifolds; Denis Auroux on homological mirror symmetry for the pair-of-pants and for affine hypersurfaces; and Tony Pantev on mirror symmetry for moduli of flat bundles and non-abelian hodge theory.

Compared to the mini-courses, reading groups were more focused and went deeper into details. Each reading group was attended only by a subset of program participants. The typical length was one semester and involved the following: Sheel Ganatra on gamma-integral structures; Josh Sabloff on Legendrian knots and categories; Nick Sheridan on mirror symmetry for K3 surfaces; Hülya Argüz on logarithmic Gromov-Witten theory; Jingyu Zhao on Hodge-de-Rham spectral sequences; James Pascaleff on perturbative quantization and master equation; and John Pardon on Khovanov homology and Floer homology. There were also two activities of a more introductory nature: the "Auroux-watching seminar," watching and discussing (via video recordings) Auroux's ongoing Eilenberg Lectures at Columbia; and a "homological mirror symmetry by example" reading group organized by Heather Lee.

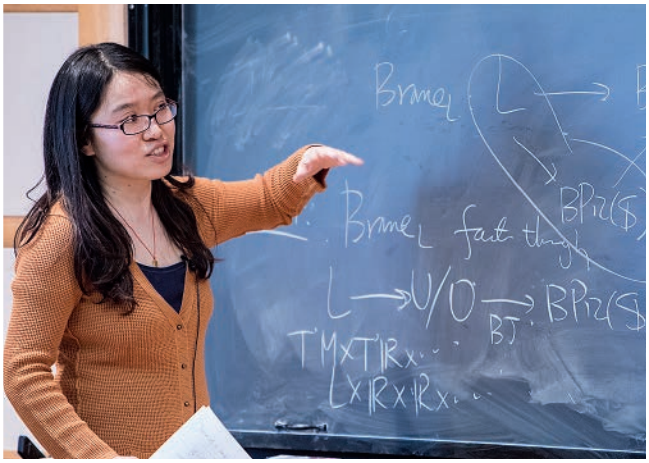
As one would expect, significant advances were made toward the core conjectures of homological mirror symmetry. Two examples are the preprints: "Homological Mirror Symmetry without Corrections" by Mohammed Abouzaid and "Speculations on Homological Mirror Symmetry for Hypersurfaces in $(C^*)^n$" by Denis Auroux. As an example of work done in the reading groups, participants made notable progress on the geometric understanding of gamma-integral structures (this is still a work in progress, hence the somewhat vague description). Particularly noteworthy is the start of new collaborations between junior program members, for instance, Amitai Netser Zernik and Jingyu Zhao on the interaction between symplectic cohomology and topological recursion relations for relative Gromov-Witten theory, and Cheuk Yu Mak and Helge Ruddat on the construction of Lagrangian lens spaces.



ANDREA KANE

Bernard Chazelle of Princeton University, former Member in the School of Natural Sciences, presents on the mathematics of natural algorithms during a Computer Science and Discrete Mathematics seminar in November.

ANDREA KANE



DAN KOMODA

Left: Distinguished Visiting Professor Paul Seidel (left) led the 2016–17 special program on homological mirror symmetry. Visitor Robert F. Williams (right), a topologist, continued work in tiling theory. *Right*: Xin Jin of Northwestern University discusses brane structures from the perspective of microlocal sheaf theory during a weeklong homological mirror symmetry workshop on emerging developments and applications.

Polyfold Project and Symplectic Field Theory

During the last fifteen years, Professor **Helmut Hofer** and his collaborators tackled foundational issues in symplectic geometry/topology. Many questions in this field, which has strong connections to dynamical systems, algebraic geometry, and mathematical physics around string theory, can be reformulated as questions about the solution sets of classes of nonlinear elliptic partial differential equations. More precisely, at the core, is the study of interacting families of such problems on varying domains up to a notion of isomorphism. In some sense, one needs to "count" solutions and to study the relationships between the solution counts of different families. The solution counts are complicated algebraic schemes, which can only be applied to suitably perturbed families. Perturbations depend on auxiliary choices, and the counting has to be adjusted by incorporating correction terms.

Although one can attempt to address such problems with ad hoc methods, Hofer and his collaborators, most notably former Members Krzyztof Wysocki and Eduard Zehnder, have spent the last fifteen years developing an abstract theory, which entails a mathematical language and many theorems that allow a conceptual approach to such problems. If one views algebraic geometry as the abstract theory of studying the solution sets of polynomial equations, then, in the above context, one needs a theory for the study of solution sets of isomorphism classes of interacting nonlinear elliptic equations on varying domains, which can change their topology. The polyfold theory by Hofer, Wysocki, and Zehnder is the starting point for the development of such a theory. The research monograph "Polyfold and Fredholm Theory" (jointly with Wysocki and Zehnder) was recently submitted.

In order to apply such theories to concrete problems, the three authors previously published papers concerned with important questions of how to bring specific problems efficiently into the abstract framework. With former Member Joel Fish, this theory will be used to construct (absolute) Symplectic Field Theory (SFT) in its generality. A new feature, which greatly enhances the applicability, is the construction of a "Lego-type" system, which allows the packaging of analytical constructions (the Legos) with certain properties, and adds the feature that a theory guarantees that plugging certain Lego pieces together results in a construction that has the desired functionality.

SFT is a theory predicted by former Distinguished Visiting Professor Yakov Eliashberg, Alexander Givental, and Hofer in 2000, in a hundred-page paper which described its anticipated properties. SFT consists of several interconnected theories: full-closed SFT, rational SFT, contact homology, as well as of several relative versions. This theory produces invariants based on counting holomorphic curves that precisely fit into the described scheme. It is also related to Gromov-Witten theory and string theory.

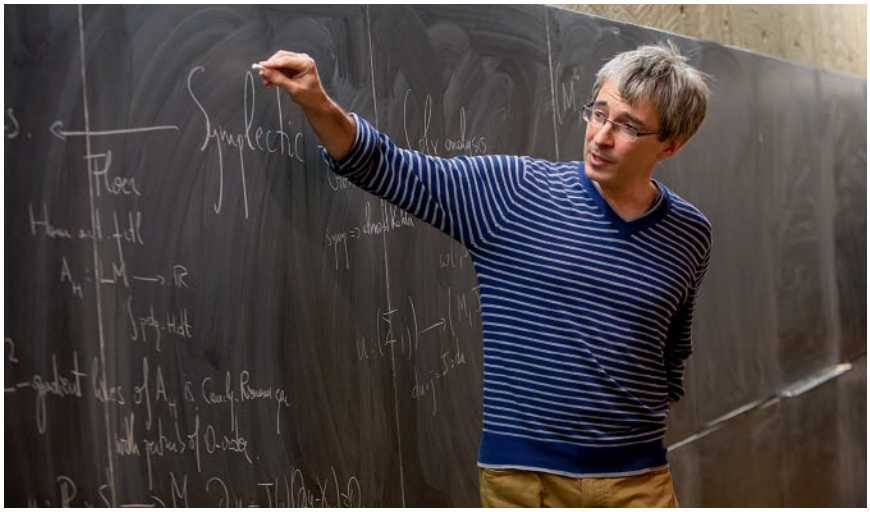
The special year at IAS 2001–02, led by Eliashberg, was devoted in large part to holomorphic curve theory. Hofer, Wysocki, and Zehnder were also part of this program. Even though SFT so far has not been constructed in generality, the ideas could be used and worked out in special cases. A noteworthy example

FACULTY & EMERITI AWARDS

Jean Bourgain received the 2017 Breakthrough Prize in Mathematics for multiple transformative contributions to analysis, combinatorics, partial differential equations, high-dimensional geometry, and number theory.

Peter Sarnak was awarded an honorary doctorate from the University of St. Andrews. Sarnak received the award in recognition of his groundbreaking work on analytic number theory.

Vladimir Voevodsky was awarded an honorary doctorate from the University of Gothenburg in Sweden. Voevodsky received the award for excellence in the field of mathematics and computer assisted mathematical reasoning.



ANDREA KANE

Member Alexandru Oancea gives a talk on string topology from the symplectic viewpoint as part of the Mathematical Conversations series.

is the construction of a complete knot invariant constructed by former Member Lenhard Ng, who also took part in the 2001–02 program, jointly with Tobias Ekholm and Vivek Shende, using a form of contact homology. The prediction of contact homology together with previous work by Clifford Taubes of Harvard University (IAS Marston Morse Lecturer, 1991) inspired former Member Michael Hutchings, also a participant in 2001–02, to predict later a variant of contact homology, which is only possible in dimension three and is called embedded contact homology (ECH). This theory, meanwhile, has been constructed and shown to be isomorphic to a completely different theory, called Seiberg-Witten-Floer theory, a theory for 3-manifolds that was constructed in detail by former Members Peter Kronheimer and Tomasz Mrowka. Among the many applications of ECH is a very surprising one. Kei Irie, a former student of former Member Kenji Fukaya (2002) who is now a professor at the Simons Center for Geometry and Physics at Stony Brook, used it to prove the so-called C-infinity closing lemma for three-dimensional Reeb flows and symplectic surface maps, a classical open question in the field of dynamical systems.

In August 2018, in Augsburg, Germany, the conference SFT 9 will be devoted to the polyfold theory and the construction of SFT.

Other School Activities

In collaboration with Semyon Dyatlov of the Massachusetts Institute of Technology, IBM von Neumann Professor **Jean Bourgain** studied the Selberg zeta functions and spectral measures associated to convex cocompact hyperbolic surfaces. They made two breakthroughs. The first is an essential zero-free strip strictly to the left of the 1/2 line (what you may call a quasi-Riemann result) in full generality. This answers, at least for surfaces, old conjectures in this field. The second progress is a Fourier decay bound for the spectral measures, again in the full range of the dimension delta.

A key input comes from harmonic analysis and fractal uncertainty principles, based on the work of past IAS Professor Arne Beurling and Paul Malliavin (partly performed at IAS in the mid-nineties). A major remaining challenge there is to generalize these results to higher dimension. This will be the subject of an upcoming "Emerging Topics Workshop" organized by Professor **Peter Sarnak**, Semyon Dyatlov, and Bourgain.

With postdoc Member Ilya Kachkovskiy, Bourgain has ongoing work on the two-body quasi-periodic Schrödinger equation, which is an important model in mathematical physics. Most interestingly, there seems to be no real consensus among physicists if this model displays transport or not. Bourgain and Kachkovskiy managed to produce various types of spectral behavior depending on the energy range and indicating possible mixed behavior.

Bourgain also collaborated with postdoc Member Mariusz Mirek and Elias M. Stein on dimension-free aspects of harmonic analysis.

Professor Helmut Hofer and Gang Tian of Princeton University continued their joint seminar on symplectic geometry. During the academic year more than thirty talks were organized, including a mini-course on the recent breakthrough concerning Zimmer's conjecture. As usual, a very broad view of the field was taken and the seminar had a very large attendance.

One-day topology workshops held at IAS in October and April were organized by Randall Kamien of the University of Pennsylvania, Hermann Weyl Professor **Robert MacPherson**, and Konstantin Mischaikow of Rutgers, The State University of New Jersey. Speakers in October were Robert Ghrist, University of Pennsylvania; Lia Bronsard, McMaster University; Thomas Machon, University of Pennsylvania; Steven Ferry, Rutgers University; and Yannis Kevrekidis, Princeton University. Speakers in April were Saugata Basu, Purdue University; Ciprian Borcea, Rider University; Lisa Tran, University of Pennsylvania; Jo Nelson, Columbia University; and Mauro Maggioni, Johns Hopkins University.

The Marston Morse Lecture Series was given in October by Jacob Fox of Stanford University and in February by Camillo De Lellis of the University of Zürich. Fox gave the talks "Regularity Methods in Combinatorics, Number Theory, and Computer Science," "Arithmetic Regularity, Removal, and Progressions," and "Dependent Random Choice." De Lellis gave three talks on "Folding Papers and Turbulent Flows."

The School of Mathematics introduced two new programs in the 2016–17 academic year, Emerging Topics Working Groups and Summer Collaborators.

Emerging Topics Working Groups were designed to bring approximately

eight to twelve mathematicians together for a week in the fall and spring terms to work on a topic they deemed ripe for significant progress and to help facilitate that progress. One of the guidelines for the working group was "to not look back at a great result but rather to look forward at what might happen next."

The working group in the fall, "Applications to Modularity of Recent Progress on the Cohomology of Shimura Varieties," organized by **Richard Taylor**, Robert and Luisa Fernholz Professor, and former Member Ana Caraiani of the University of Bonn, took place October 31–November 4, 2016. The group was designed to take advantage of work already in progress by Ana Caraiani and Peter Scholze on the vanishing below the middle degree of (much of) the cohomology of a Shimura variety to tackle questions on modularity, such as the (potential) modularity of elliptic curves over imaginary quadratic fields. During the workshop, one major breakthrough was obtained, namely a more general version of Taylor's Ihara avoidance argument. This argument had played a key part in Taylor's proof of the Sato-Tate conjecture for elliptic curves defined over Q, as it greatly amplifies the available modularity lifting results.

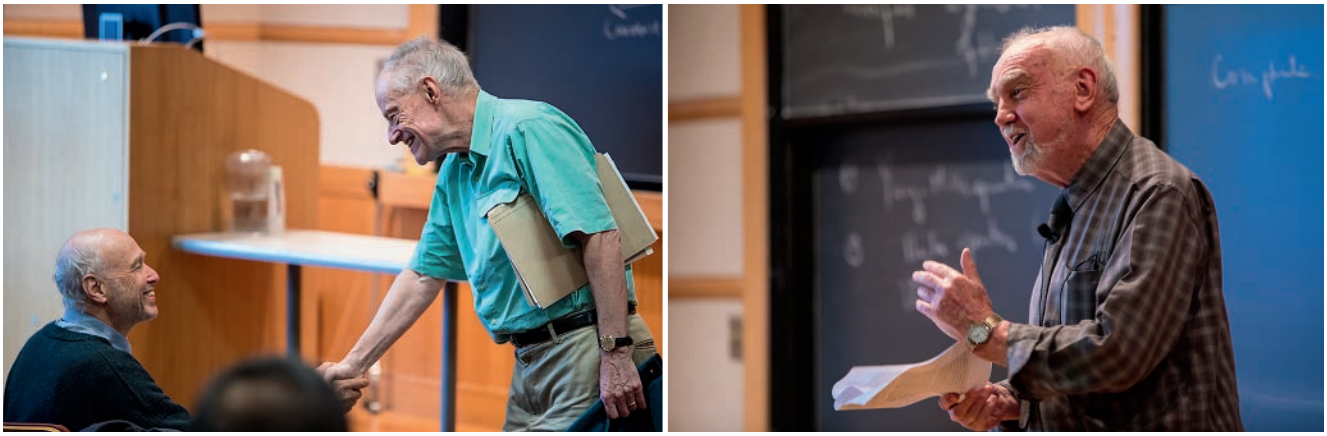
The spring working group, "Recent Progress on the Yau and Nadirashvili Conjecture Concerning the Volumes of the Zero Sets of Laplacian Eigenfunctions," organized by Eugenia Malinnikova of the Norwegian University of Science and Technology and Mikhail Sodin of Tel Aviv University, took place February 13–18, 2017. The working group focused on understanding the zero sets of Laplacian eigenfunctions and harmonic eigenfunctions, in particular on the recent progress on the Yau and Nadirashvili conjectures. Outcomes from the collaboration include: Fedor Nazarov succeeded to improve the upper bound obtained by Aleksandr Logunov, Malinnikova and Nikolai Nadirashvili to the optimal one. During Melissa Tacy's talk on small scale equidistribution for random waves, Professor Peter Sarnak suggested an alternate way of directly estimating variance. Discussion between Tacy, Sarnak, and Matthew de Courcy-Ireland determined that these direct methods should yield better results at least in dimension two and an interesting combinatorial-type conjecture about the local behavior of the doubling exponent. Any progress in this conjecture will allow making progress towards the upper bound in the Yau conjecture.

The inaugural Summer Collaborators program invited applications from small groups of mathematicians (between two and five people) who could benefit from IAS resources to further their collaborative research projects. Six groups were funded to visit IAS at various periods of two to four weeks throughout the summer, receiving travel funds, per diem, local housing, office space, and access to campus resources.

"Avi is 60! A Celebration of Mathematics and Computer Science" took place October 5–8, 2016, in celebration of the sixtieth birthday of **Avi Wigderson**, Herbert H. Maass Professor. The last day was joint with the 57th Annual Symposium on Foundations of Computer Science, one of the flagship conferences in theoretical computer science sponsored by the IEEE Computer Society Technical Committee on Mathematical Foundations of Computing. The conference featured twenty-two speakers, including winners of the Turing award and Nevanlinna and Gödel prizes. The conference was attended by a large fraction of the Theoretical Computer Science community, including many graduate students. All talks were videotaped for the benefit of the entire community. Some highlights include two public lectures delivered by Turing award winner Silvio Micali and by former Member Dorit Aharonov. The conference, with support provided by a grant from the Schwab Charitable Fund made possible by the generosity of Eric

ANDREA KANE

In October, the work, impact, and collaborations of Avi Wigderson (left), Herbert H. Maass Professor, were celebrated with a three-day conference organized in part by former Member Boaz Barak (right) of Harvard University. Videos of the talks are available at www.ias.edu/ideas/2016/avi-wigderson-60.



DAN KOMODA

"Beyond Endoscopy," a conference led by Professor Emeritus Robert Langlands (right), featured talks that probed the principle of functoriality beyond endoscopy and convened mathematical scholars including Professor Emeritus Pierre Deligne (left) and former Member James Arthur (standing). Videos of the talks are available at www.ias.edu/ideas/2016/langlands-beyond-endoscopy.

and Wendy Schmidt, covered many topics where Wigderson has had great influence, including pseudorandomness, circuit complexity, cryptography, algorithms, coding theory, quantum computing, and explicit constructions. The School's Computer Science and Discrete Mathematics program, led by Wigderson, maintains an online year-by-year archive available at www.math.ias.edu/csdm/16-17.

Professor Emeritus **Phillip A. Griffiths**'s activities in 2016–17 were concentrated in two areas. First, he continued work on a major mathematical research project, one in which two of his three collaborators were Members at IAS when this work was begun. In addition to teaching a summer school in Italy for graduate students and postdocs on this and related material, he gave invited lectures at Stony Brook University, the University of Miami, the National Autonomous University of Mexico, the University of Vienna, the Erwin Schrödinger International Institute, and a lecture series at the Korea Institute for Advanced Study in Seoul.

The second activity centered around a major initiative, Transforming Post-secondary Education in Mathematics (TPSE). This project has received major funding from the Carnegie Corporation, the Sloan Foundation, and the National Science Foundation. Among its activities were regional meetings held at Duke University, the University of Chicago, the University of Maryland, and the Carnegie Corporation. Information on TPSE may be found at www.tpsemath.org.

Finally, the Regional Initiative in Science and Education (RISE), which Griffiths led the creation of in 2008, came to successful completion last year (see page 57).

"Beyond Endoscopy," held September 30–October 1, centered on Professor Emeritus **Robert P. Langlands**'s proposal to focus on various aspects of functoriality beyond endoscopy. Speakers included Langlands and former Member Ngô Bảo Châu of the University of Chicago, Ali Altuğ of the Massachusetts Institute of Technology, and former Members Bill Casselman of the University of British Columbia, Tasho Kaletha of the University of Michigan, Freydoon Shahidi of Purdue University, Jasmin Matz of Universität Leipzig, and James Arthur of the University of Toronto.

2016–17 MEMBERS AND VISITORS

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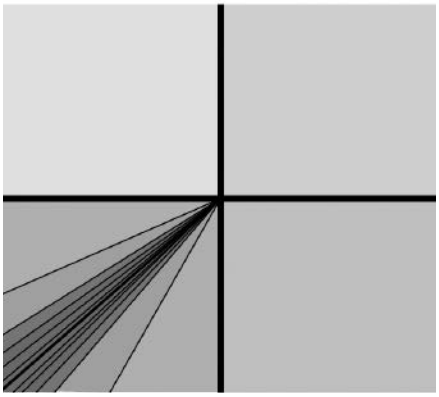


Paul Seidel on Mirror Symmetry

Geometry and physics have long gone hand in hand. All around us, physical processes play out in geometric terms, such as straight lines (rays of light), ellipses (planetary motion), or parallelograms (the combined effect of two forces). To earlier scientists, this meant that the universe was created to be comprehensible. Kepler went so far as to argue that God, in setting up the natural world, could use pentagons but never heptagons, since the heptagon can't be constructed with ruler and compass. Kepler's enthusiasm for geometry still resonates with modern mathematicians, even though we may not share his metaphysical certainties. Our views also differ in another important respect. For Kepler, the elements of geometry, as set out by Euclid, were immutable (after all, they constrained even God). Today it seems clear that, in order for geometric thinking to remain a source of new insights (in mathematics, physics, computer science . . .), geometry must continue to evolve. Read more at www.ias.edu/ideas/2017/seidel-mirror-symmetry.

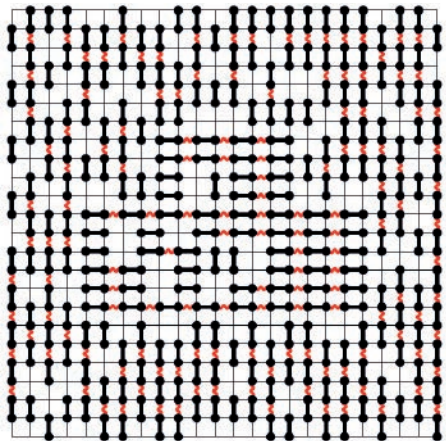


Fig. 4: A sample configuration in the Heilmann-Lieb model. The molecules are represented as rods. The forces between aligned neighboring rods are depicted as red wavy lines.

Ian Jauslin on Liquid Crystals and the Heilmann-Lieb Conjecture

Liquid crystals, discovered serendipitously by Friedrich Reinitzer in the late nineteenth century, have come to play an important role in the world of consumer electronics, specifically in the production of ever larger, thinner, and more energy-efficient displays. Starting with the small, black-and-white, monochrome displays found in many digital watches and pocket calculators, all the way to the large, colorful screens in computer monitors, flat-screen TVs, and smartphones, liquid crystals have come to form the backbone of many display technologies. As such, most of us have seen liquid crystals, used them, included them in our daily routines, let them into our homes, and allowed our children to play around with them. This beckons an important question: what is a liquid crystal? Read more at www.ias.edu/ideas/2017/jauslin-liquid-crystals.

JEAN SWEEP

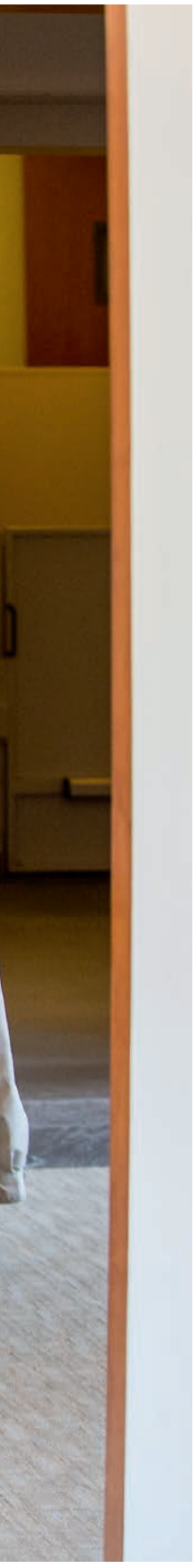
June Huh's Unusual Path to the Peak of the Math World

At the age of 34, June Huh is at the pinnacle of the math world. He is best known for his proof, with the mathematicians Eric Katz and Karim Adiprasito, of a longstanding problem called the Rota conjecture. Even more remarkable than the proof itself is the manner in which Huh and his collaborators achieved it—by finding a way to reinterpret ideas from one area of mathematics in another where they didn't seem to belong. Read more at www.ias.edu/huh-path-less-taken.

Jean Bourgain on Mathematical Breakthroughs

If you have a question which is generally perceived as unapproachable, it's often that you don't even quite know where you have to look to get a solution. . . . At the moment you get this insight, all of a sudden you'll escape the desert and things open up for you. These are the best moments. They make all the suffering with absolutely no progress worth it. Read more at www.ias.edu/bourgain-breakthrough.

Charles Simonyi Professor Edward Witten (right) converses with Member Jeff Murugan (left), who worked on understanding certain aspects of the topology of quantum states, including the role played by low-dimensional dualities in planar topological superconductors and insulators.



ANDREA KANE

School of Natural Sciences

The School of Natural Sciences, established in 1966, supports research in broad areas of astrophysics, systems biology, and theoretical physics. Areas of current interest include investigating the origin and composition of the universe; conducting research at the interface of molecular biology and the physical sciences; and elementary particle physics, string theory, quantum theory, and quantum gravity.

EACH YEAR THE SCHOOL OF NATURAL SCIENCES appoints about fifty Members, the majority of them postdoctoral fellows, who are typically at the Institute for three years, some for up to five years. Collaboration is encouraged among Members who work in the School's many scientific areas—from molecular biology to mathematical physics.

From its earliest days, the Institute has been a leading center for fundamental physics, contributing substantially to many of its central themes, which now interrelate with astrophysics and biology. Areas of current interest in theoretical physics include elementary particle physics, string theory, quantum theory, and quantum gravity, and their relationship to geometry, theoretical and observational astrophysics, and cosmology.

Research in the School's astrophysics group encompasses astronomical systems from nearby planets to distant galaxies, from black holes to the dark matter and dark energy that dominate the evolution of the universe. There is a growing cross-fertilization between astrophysics and elementary particle physics, and the work of many Members and Faculty crosses the boundary between these two disciplines. Members in the astrophysics research group employ an array of tools from theoretical physics, large-scale computer simulations, and ground- and space-based observational studies to investigate the origin and composition of the universe, and to use the universe as a laboratory to study fundamental physics. At the Simons Center for Systems Biology, the tools of modern physics and mathematics are being applied to biological investigation, on varying scales, from molecular to organismic, and in some cases focusing on understanding disease processes.

The School's collaborative and pioneering approach to the sciences, which extends to the Institute's School of Mathematics, Princeton University, and the larger scientific community, continues to transform research in these fields and to open opportunities for powerful and important discoveries.

FACULTY

Nima Arkani-Hamed

Stanislas Leibler

Juan Maldacena
Carl P. Feinberg Professor

Nathan Seiberg

Scott Tremaine
Richard Black Professor

Edward Witten
Charles Simonyi Professor

Matias Zaldarriaga

PROFESSORS EMERITI

Stephen L. Adler

Freeman J. Dyson

Peter Goddard

Peter Goldreich

Arnold J. Levine

Astrophysics

NASA's New Horizons spacecraft flew past Pluto on July 14, 2015, marking a major milestone in our exploration of the solar system: every known planet—leaving aside the question of whether Pluto should be called a planet—has now been visited, mapped, and measured by spacecraft. Of course, this remarkable accomplishment does not tell us whether additional planets remain to be discovered in the dark, cold outer reaches of the solar system beyond Pluto. Tantalizing hints that such planets might be present are provided by the discovery of a handful of bodies up to one thousand kilometers in size in orbits beyond Pluto, and by otherwise unexplained anomalies in the distribution of comet orbits. **Scott Tremaine**, Richard Black Professor of Astrophysics, has been working with Kedron Silsbee, a graduate student at Princeton University, to investigate whether models for planet formation naturally predict the presence of planets beyond Pluto. In particular, since the cores of the giant planets are believed to form by hierarchical growth of smaller solid bodies, it is likely that a few of these bodies, with masses between that of Mars and Earth, were gravitationally scattered to much larger distances from the Sun. In some cases, these may have survived to the present day at distances a few times that of Pluto. Future survey telescopes, in particular the Large Synoptic Survey Telescope that is now under construction in Chile, are likely to detect these planets if they exist.

Timothy David Brandt, who holds a NASA Carl Sagan Fellowship in the School of Natural Sciences, is also searching for new planets but using a very different approach. Over the last decade, over four thousand planets have been discovered orbiting other stars, mostly by NASA's Kepler spacecraft, which measures small periodic dips in the brightness of the host star as a planet crosses in front of it. A more direct approach is to image the planet directly; the challenge is that planets are millions or billions of times fainter than their host stars and so have long been hidden in the stellar glare. Brandt is a member of the team that built CHARIS, a new high-contrast planet finder that will be used with Japan's Subaru telescope in Hawaii. CHARIS employs three main techniques to separate the faint image of a planet from the glare of its host star: adaptive optics, in which the telescope mirror is continuously deformed on timescales of a fraction of a second to cancel out atmospheric turbulence; a coronagraph, which is a series of optical elements that cancel out the starlight with destructive interference while preserving the light from nearby planets; and an integral-field spectrograph, which measures the spectrum everywhere on the field of view, so the planet's spectrum can be detected by small differences between the pixels containing the planet image and the surrounding ones. CHARIS will detect water, methane, and carbon monoxide in the planetary atmospheres. By measuring an exoplanet's current spectrum, CHARIS can constrain its evolutionary history. The upcoming CHARIS survey will both discover and characterize planets around nearby, young stars. The algorithms and techniques Brandt and his collaborators develop for CHARIS will help enable future searches for Earth-like planets in reflected light using even more powerful telescopes still to be built.

DAN KOMODA

Laura Blecha of the University of Maryland discusses galaxy mergers, black holes, and active galactic nuclei during an astrophysics seminar.

During its early history, the universe was very hot. Stable particles produced during that period can survive until today; they are relics that can help us understand the universe's history. Furthermore, particles that we have not been able to produce in the laboratory could be left as relics. One such example is the so-called dark matter whose effect we can measure using many different types of astronomical observations. Another example of a relic are neutrinos. Although neutrinos have been measured in the laboratory, their small mass has yet eluded determination. The relic background of neutrinos could be used as a tool to determine the masses of the neutrinos because the gravitational force of the relic neutrinos on the rest of matter depends directly on the masses of the neutrinos, and it changes the way structures formed in our universe. Determining the mass of neutrinos and searching for yet-undiscovered relics are two of the main goals of a number of upcoming observatories. Professor **Matias Zaldarriaga** has been working to improve the theoretical predictions for these upcoming observations.

ANDREA KANE

In June, scholars convened at IAS for a two-day conference hosted by the Simons Center for Systems Biology, led by Professor Emeritus Arnold J. Levine (left) to explore mathematical methods in cancer evolution and heterogeneity.

Systems Biology

The enormous diversity of phenomena in biology implies that a large diversity of topics is being tackled in biological research. In the tradition of theoretical approaches in physics, Professor **Stanislas Leibler** and Members working at the Simons Center for Systems Biology are striving to find common mechanisms that could operate across different length and time scales and across different organizational levels of biological systems.

For instance, at all scales, from molecular machines to the whole brain, living systems exhibit overwhelming complexity; but what part of this complexity is relevant to function? In other words, what is the dimension of the phenotype space in which biological functions evolve? It seems that in some cases, the effective phenotypic space is a low-dimensional one. For example, BingKan Xue, Long-term Member at the Simons Center for Systems Biology, Leibler, and two visitors from Rockefeller University, Pablo Sartori and Michael Mitchell, have been investigating from a theoretical perspective how low-dimensional internal representations of external fluctuating environments may emerge as relevant entities in the space of possible (microbial) survival strategies. Mitchell, former Visitor in the School, together with Leibler, has also been analyzing the geometrical structure of the metabolic networks, in particular the effective dimensionality of their functional space.

Leibler is also interested in the so-called "multifarious self-assembly" of multiple and diverse biological components. In cellular systems, the interactions, which determine the dynamics of the assembly, are neither homogeneous (as in assembly of simple physical systems such as crystals) nor completely random (as in the assembly of vitreous materials); rather they are specific, with the specificity determined through evolution. Usual theoretical approaches used in condensed matter physics have to be modified in order to deal with such evolved and specific interactions. In addition, biological assembly is typically an out-of-equilibrium phenomenon, driven by biochemical reactions, such as ATP hydrolysis. Leibler, together with Sartori, are trying to include these ingredients in a statistical theory of (self-) assembly.

The underlying processes determining the success of cancer immunotherapies have been unclear. This year Professor Emeritus **Arnold J. Levine** collaborated with Marta Luksza, Janssen Fellow at the Simons Center for Systems Biology, former Long-term Member Benjamin Greenbaum (Icahn School of Medicine at Mount Sinai), and others, to develop a neoantigen fitness model to predict tumor response to checkpoint blockade immunotherapy. A companion study looked at long-term pancreatic cancer survivors.

Checkpoint blockade immunotherapies enable the host immune system to recognize tumor-antigens and destroy tumor cells. Their clinical activity has been correlated with activated T-cell recognition of neoantigens, which are tumor-specific, mutated peptides presented on the surface of cancer cells, but not normal tissue cells. The checkpoint blockade study shows a fitness model for tumors based on immune interactions of neoantigens predicting response to immunotherapy. Two factors determine a neoantigen's fitness cost. First, the cost depends on its presentation by the major histocompatibility complex (MHC), estimated as a function of that neoantigen's relative MHC binding affinity. Second, it depends on T-cell recognition of a neoantigen, which is modeled as a nonlinear function of its sequence similarity to known antigens. To describe the evolution of a heterogeneous tumor, fitness is evaluated as a weighted average over dominant neoantigens in the tumor's subclones. The model predicts survival in anti-CTLA-4-treated melanoma patients and in anti-PD-1-treated lung cancer patients. Importantly, low-fitness neoantigens identified by this method may be leveraged for developing novel immunotherapies. By using an immune fitness model to study immunotherapy, broad evolutionary similarities between cancers and fast-evolving pathogens are revealed.

Pancreatic adenocarcinoma is a lethal cancer with a less than 7 percent five-year survival. Activated T-cell immunity has been linked to long-term survival, yet the specific antigens remain unknown. In this second study, genetic, proteomic, and transcriptional

immunoprofiling, computational biophysics, and functional assays were used to identify T-cell antigens in survivors. A neoantigen quality model conferring greater immunogenicity to neoantigens with microbial homology identified survivors in two independent datasets. Pancreatic cancer survivors had tumor clones enriched in neoantigens of greater quality and neoantigens in the tumor antigen MUC16/CA125. Furthermore, survivors displayed lasting T-cell reactivity to neoantigens and homologous microbial epitopes and to MUC16 neoantigens. The results identified neoantigens with unique qualities as bonafide T-cell targets in pancreatic cancer. In a broader sense, it identified neoantigen quality as a biomarker for immunogenic tumors that may be used to facilitate rational patient and target selection for T-cell immunotherapies.

In collaboration with former Member Chang Chan, Levine explored the question of why certain "hot spot" mutations in p53 occur much more frequently than others in human cancers. They are studying the effect of genetic background and age on mutational patterns in a collection of tumors from germline p53 mutant mice, and studying the genetic mechanisms of resistance to PAK1 inhibitors.

Theoretical Physics

Theoretical physicists have long believed that spacetime is not fundamental and must emerge from more primitive building blocks, and a great deal of exciting theoretical activity over the past two decades has explored the way in which space, gravity, and strings can emerge from quantum-mechanical systems in toy universes. But a more radical set of ideas will likely be needed to address deeper questions in order to understand not just the emergence of space but of spacetime, and not for toy model universes but for the real world. Motivated by these questions, much of Professor **Nima Arkani-Hamed**'s research over the past decade has evolved around the search for a new set of physical and mathematical ideas from which the rules of both spacetime and quantum mechanics can be seen to emerge hand-in-hand. The first concrete example of such a structure was the "amplituhedron," a geometric shape generalizing triangles and polygons to more abstract spaces. A "canonical form" loosely related to the "volume" of this shape gives the amplitudes for quantum particle scattering processes in spacetime for a supersymmetric cousin of the real theory of strong interactions, with the rules of quantum mechanics and spacetime emerging in a simple way from the "positive geometry." The leading contributions to gluon scattering amplitudes—measured by experiments at the LHC—are associated with the simplest "tree" amplituhedra.

Over the past year, Arkani-Hamed has put the notion of "positive geometries" and their associated "canonical forms" on a firmer mathematical footing. He gave a more intrinsic and fundamentally combinatorial description of the amplituhedron as a "binary code," and also understood how these positive-geometric-combinatorial structures could be seen directly in the "kinematic space" associated with physical particles, rather than in auxiliary mathematical spaces. This last observation was the key to a significant set of new developments that has exposed "positive geometries" underlying a wide range of new physical observables. For instance, a universal aspect of the structure of cosmological correlations, encoded in the "wavefunction of the universe," and of relevance to inflationary cosmology, is captured by a new class of objects—"cosmological polytopes"—without making any reference to quantum evolution in cosmological time. And the leading scattering amplitudes for a very wide range of theories, including the description of self-interacting Higgs-like particles and of pions, also have their own "amplituhedron," which turns out to be a famous polytope studied by mathematicians since the 1960s known as the "associahedron." All of these structures are directly related to the physics of the real world, and it is likely that even more magic will be seen getting even closer to the real world. With this in mind, Arkani-Hamed has also introduced a new formalism for studying scattering processes not just for massless gluons and gravitons, but for particles of any mass and spin, amongst other things giving a new understanding of the Higgs mechanism from this perspective.

During the past year, **Juan Maldacena**, Carl P. Feinberg Professor, has been doing research related to the quantum mechanical description of black holes. There is a lot of evidence that black holes can be described as an ordinary quantum system when we view them from the outside. However, we do not yet understand the relation between this outside quantum mechanical description and the black hole interior. Maldacena has studied a couple of black hole properties that could help us understand this relation better. The standard wormhole solutions of general relativity, such as the maximally extended Schwarzschild black hole solution, are not traversable. However, it was pointed out by Ping Gao, Daniel Louis Jafferis, and Aron Wall, Member in the School of Natural Sciences, that these wormholes can be rendered traversable by adding certain interactions that momentarily connect the asymptotic values of some of the quantum fields that propagate in the geometry. The interesting aspect is that these interactions lead to a change in the spacetime geometry that also renders the wormhole traversable for other particles.

Together with Member Douglas Stanford and Zhenbin Yang, a student at Princeton University, Maldacena has analyzed this process in two-dimensional gravity theories. They have also studied it in a simple quantum mechanical model (the SYK model) that has properties similar to those of two-dimensional gravity theories. This model also displays a phenomenon that can be interpreted as wormhole traversability. In addition, Maldacena and his collaborators have studied the implication of these results for the information

ANDREA KANE

William D. Loughlin Member Jennifer Lin (left) gives a talk on algebraic entanglement entropy and holography to physicists including Juan Maldacena (right), Carl P. Feinberg Professor, during a physics group meeting.

cloning paradox of black holes.

In a related article with Ioanna Kourkoulou, a student at Princeton University, Maldacena has analyzed the evolution of particular pure states in the Sachdev-Ye-Kitaev (SYK) model. These pure states can be viewed as the result of doing a full microscopic measurement on one of the sides of the wormhole configurations mentioned above. Somewhat surprisingly, these states have correlation functions that are simply determined by the thermal ones. This indicates that the states are very close to thermal states. They have displayed gravity configurations that have similar properties, suggesting that these states have geometries with a smooth horizon. In this particular model, there is a set of states with these properties that is large enough to generate the whole Hilbert space.

Professor **Nathan Seiberg** continued his explorations of quantum field theory —a framework combining quantum theory with Einstein's special theory of relativity. Quantum field theory is important in many branches of physics, including particle physics, string theory, condensed matter physics, and cosmology, and it leads to many insights in mathematics. There is no doubt that we are still very far from a clear and complete understanding of it.

Even though our real world has three spatial dimensions, there is enormous interest in studying quantum field theory in other dimensions. The theory in one and two spatial dimensions is important in the study of wires and thin surfaces, or boundaries of materials in condensed matter physics. It is also important in describing the evolution of strings, which are one-dimensional objects.

In the past year, Seiberg studied quantum field theory in one, two, and three spatial dimensions. With former Member Ofer Aharony, Shlomo Razamat, and former Member Brian Willett, he clarified the confusing long-distance behavior of certain supersymmetric theories in one spatial dimension. In particular, these authors showed that the long-distance properties of some complicated theories is in fact quite simple; it is almost trivial. This understanding resolved a number of paradoxes in the literature. With Jaume Gomis, former Member Zohar Komargodski, former Visiting Professor Hirosi Ooguri, and former Member Yifan Wang, he uncovered new subtleties (known as anomalies) in some supersymmetric theories in one spatial dimension (with extended supersymmetry). This understanding explained a number of old puzzles and made the description of these theories more coherent.

In his work on two spatial dimensions, Seiberg continued the exploration of duality—two different theories with the same long-distance physics. With Po-Shen Hsin he explored and stated more precisely the duality between different topological theories, which is known as level/rank duality. Using this understanding, they clarified and extended proposed dualities between non-topological theories. This understanding allowed them to resolve a number of puzzles with these dualities, to provide derivations of some of them, and to find new consistency conditions and relations between them. This work was extended in two additional papers. One of them, with Ofer Aharony, former Junior Visiting Professor Francesco Benini, and Po-Shen Hsin, generalized the previous discussion to many other theories based on other gauge theories. In the second paper, with Francesco Benini and Po-Shen Hsin, new diagnostics and new consistency checks of these dualities were presented and verified. The fact that the conjectured dualities passed these non-trivial tests gave additional evidence that they are indeed true.

FACULTY & EMERITI AWARDS

Nathan Seiberg received the 2016 Dirac Medal and Prize from the International Centre for Theoretical Physics for important contributions to a better understanding of field theories in the non-perturbative regime and, in particular, for exact results in supersymmetric field theories.

In his work on three spatial dimensions, Seiberg and former Members Davide Gaiotto, Anton Kapustin, and Zohar Komargodski studied the dynamics of theories similar to the theory of the strong force. Building on earlier work of Gaiotto, Kapustin, Seiberg, and Willett, they uncovered new subtleties (anomalies) in these theories. The anomalies allowed them to shed new light on possible phases of the theory. Specifically, they studied the phase diagram of the theory as a function of the temperature and a term in the theory, known as a theta term.

In 2016–17, Charles Simonyi Professor **Edward Witten** worked with IAS Members Douglas Stanford and Jeff Murugan to extend the understanding of the Sachdev-Ye-Kitaev (SYK) model of quantum holography. This is a simple quantum mechanical model that appears to describe a quantum black hole. Other such models are known but in this particular example, computations are accessible that are out of reach in other cases. Murugan, Stanford, and Witten extended the understanding of the SYK model in several directions, notably by developing a fuller understanding of supersymmetric and two-dimensional analogues of the model.

A longstanding mystery of mathematical physics is the existence of an astonishingly rich web of "integrable" or soluble models of many-body physics in low dimension—models in which one can solve problems that normally are just too hard. These models hang together in a miraculous-looking way; why they exist with the properties they do is a longstanding mystery. Some years ago, mathematician Kevin Costello of the Perimeter Institute in Canada proposed a new understanding of all this based on four-dimensional gauge theory. His proposal is a close cousin of work that Witten has done on the quantum mechanics of knots both in the 1980s and more recently. In 2016–17, Costello and Witten, with former IAS Member Masahito Yamazaki, substantially extended Costello's work and reformulated the arguments in a way that is much more accessible to physicists.

In fact, one aspect of Witten's work on quantum mechanics of knots has just been completed. In a recent paper with Rafe Mazzeo of Stanford, he has analyzed the mathematical foundations of what technically is called the Nahm pole boundary condition in the presence of a knot. This is an important ingredient in the reformulation of the Jones polynomial and Khovanov homology of knots that Witten developed in the last six or seven years. They hope that their paper will make the subject accessible mathematically.

Topological phases of matter are one of the most exciting topics in contemporary condensed matter physics. An example is a topological insulator, whose interior is an electrical insulator but whose surface conducts electricity. By adding another layer of atoms on the surface of a topological insulator in a clever way, could one arrange so that also the surface of the material becomes insulating? According to theory, this is possible but only if the material develops novel and unusual properties. With Xiao-Gang Wen of the Massachusetts Institute of Technology and Member Juven Wang, Witten developed a general theory of how this could happen for an important class of topological phases of matter.

Professor Emeritus **Stephen L. Adler** has three areas of research: particle physics, gravitation, and quantum foundations. In particle physics, he continued work on non-supersymmetric unification based on the gauge group SU(8), with a focus on the fermion spectrum. The work described in last year's report was extended to include an analysis of anomaly-matching constraints. Future work will focus on studying whether the dynamics of the model beyond tree approximation can give rise to the additional massless U(1) gauge field and the asymmetry in the two SU(2) running couplings, which are needed for the theory to make contact with the Standard Model particle spectrum. Adler is also returning to work on gauged spin-3/2 fields, which are an ingredient of the SU(8) model.

Work four years ago incorporating a classical metric into Adler's foundational ideas on emergent quantum theory led to the proposal that the observed "dark energy" that drives the expansion of the universe is associated with a frame-dependent action that is only a three-space general coordinate invariant, but is invariant under Weyl scaling of the metric. This spring, as a follow-up to his 2016 Gravity Research Foundation essay, Adler analyzed the implications of his dark energy proposal for perturbations on the Robertson-Walker cosmological metric. While not modifying gravitational wave propagation, the frame-dependent action leads to specific changes in the equations for scalar perturbations on the cosmological metric, which may have observational consequences for cosmology. Adler gave an invited talk on the implications of a frame-dependent dark energy action at a workshop on "Shape Dynamics," held in May at the Perimeter Institute in Waterloo, Ontario.

Professor Emeritus **Freeman Dyson** was mainly occupied with two activities during the year 2016–17: writing book reviews for the *New York Review of Books* and writing a book of his own to be published by Norton in 2018. A collection of his earlier book reviews was published by the *New York Review of Books* in 2015 with the title *Dreams of Earth and Sky*. The forthcoming book has the tentative title "History without Hindsight," and is a collection of personal letters from Dyson to his parents during the years 1941 to 1977. It displays the history of that period week by week as it was seen at the time, with commentaries describing how this story differs from the history that we remember half a century later with the benefit of hindsight. Hindsight illuminates but also distorts.

2016–17 MEMBERS AND VISITORS

f First Term ✦ *s* Second Term ✦ *m* Long-term Member ✦ *v* Visitor ✦ *dvp* Distinguished Visiting Professor ✦ *vp* Visiting Professor ✦ *jvp* Junior Visiting Professor ✦ *ra* Research Associate

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DAN KOMODA

In September, the science of Nathan Seiberg (left) was celebrated with a three-day conference on the occasion of his sixtieth birthday. Natifest featured lectures from IAS Faculty and Members, including Distinguished Visiting Professor and IBM Einstein Fellow Gregory Moore (right), as well as visiting scholars from institutions around the world. Videos of the talks are available at www.ias.edu/ideas/2016/natifest.

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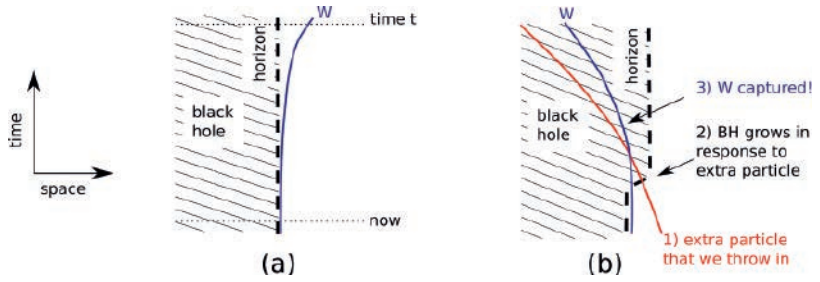
Ellis Ye Yuan
Theoretical Physics ✦ Institute for Advanced Study
Carl P. Feinberg Founders' Circle Member; additional funding provided by the U.S. Department of Energy

DAN KOMODA

ANDREA KANE

Left: Martin A. and Helen Chooljian Long-term Member Clay Cordova, whose work centers on quantum field theory and mathematical physics, discusses anomalies of 6d self-consistent field theories during a high energy theory seminar. *Right*: Conversing over lunch, School of Natural Sciences Members Douglas Stanford (center), Matthew Low (background left), and Dionysios Anninos (right), whose research spans dark matter and supersymmetry to black holes and quantum field theory



The butterfly effect, as implemented by a black hole: a small perturbation (red particle in b) can have a large impact on the fate of a particle (blue line) that otherwise would have escaped.

Douglas Stanford on Black Holes and the Butterfly Effect

One of the surprising things about chaos is that it took so long for physicists to appreciate how common it is. This is despite the fact that people seem to come naturally programmed with intuition for the basic phenomenon: that small changes to the state of a complicated system can lead to dramatic changes a short while later. This idea is often referred to as the butterfly effect, and it was on display in creative works like the movie *It's a Wonderful Life* (1946) and the science fiction short story "A Sound of Thunder" (1952) even before it became widely appreciated in physics.

Part of the reason for this historical blind spot is that chaotic systems tend to be difficult to analyze. So, even though non-chaotic systems (where small changes don't lead to large effects) are rare, there is a strong selection effect in favor of studying them. This changed in a fundamental way in the 1960s, with the help of computers. Computers are great at solving the equations of classical physics, and numerical study of many different systems has led to a beautiful and rich phenomenology of classical chaos. Read more at www.ias.edu/ideas/2017/stanford-black-holes-butterfly-effect.

COURTESY OF MPA

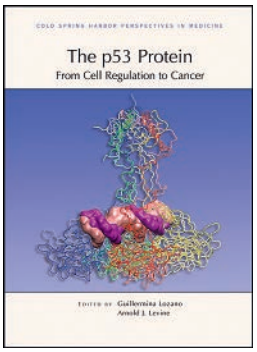
Rashid Sunyaev Awarded State Prize of Russia

Rashid Sunyaev, Maureen and John Hendricks Distinguished Visiting Professor in the School since 2010, received the State Prize of the Russian Federation in Science and Technology jointly with Nikolay Shakura of Moscow State University for their seminal 1973 paper "Black Holes in Binary Systems: Observational Appearance." Their theory of disk accretion onto black holes has become a classical description of the mass transfer and gravitational energy release in stellar binary systems. Read more at www.ias.edu/news/russian-prize-sunyaev.

ANDREA KANE

Adrian Hamers and Morgan MacLeod Awarded International Astronomical Union Prizes

Members Adrian Hamers (right) and Morgan MacLeod (left) were each awarded inaugural International Astronomical Union Ph.D. Prizes, which recognize outstanding scientific achievements in astronomy by Ph.D. students around the world. Hamers was honored for his thesis work on hierarchical systems and MacLeod for his thesis, "Social Stars: Modeling the Interactive Lives of Stars in Dense Clusters and Binary Systems in the Era of Time Domain Astronomy." Read more at www.ias.edu/news/hamers-macleod-iau-prize.



Arnold Levine on the Role of the p53 Protein in Stem-Cell Biology

Over a lifetime of an organism, stem-cell clones compete in a tissue niche for Darwinian replicative advantages and in doing so accumulate mutations that permit stem-cell replication. Mutations in the p53 gene give stem cells this advantage, increase the clonal stem-cell population, and lower the age at which cancers can occur. Li-Fraumeni patients that inherit p53 mutations develop tumors in a tissue-type-specific fashion at younger ages. Throughout the life of a Li-Fraumeni patient, the tumor types that arise occur in tissues where stem cells are active and cell division is most rapid. Thus, p53 mutations that are inherited or occur during developmental life act in stem cells of the mesenchymal and epithelial lineages, whereas p53 mutations that occur in progenitor or differentiated (somatic) cells later in life function in tissues of endodermal origins, indicating that p53 may function differently in different developmental lineages. —Excerpted from *The p53 Protein: From Cell Regulation to Cancer* coedited by Arnold J. Levine (Cold Spring Harbor Laboratory Press, 2016). Read more at http://bit.ly/2DOws10.

Visiting Professor Bernard Harcourt gives the After Hours talk "Randomizing Justice," which challenged actuarial methods that determine whom law enforcement officials target and punish.

ANDREA KANE

School of Social Science

Founded in 1973, the School of Social Science is devoted to a multidisciplinary and international approach to the analysis of societies, social change, and social problems. Every year, a theme is chosen to provide coherence to the collective work undertaken, although other areas of research are also welcome. In total, approximately twenty-five scholars benefit from a membership in the School. For 2016–17, the theme was "Law and the Social Sciences."

THE INTERFACE BETWEEN LAW AND SOCIAL INQUIRY has long been a domain of analysis explored by legal scholars and social scientists, but in recent decades, the emergence of contemporary critical legal thought, the rise of New Legal Realism and Global Legal Pluralism, the renewed interest in Islamic law and indigenous rights, and the debates regarding humanitarianism and human rights in international law have opened avenues for novel approaches. In parallel, the work of law enforcement, the evolution of criminal justice, the phenomenon of mass incarceration, the repression of undocumented immigrants, the adjudication of asylum seekers, the creation of international courts, the judicialization of political affairs, and the politicization of judicial decisions have led to an increasing production of empirical and theoretical research. It is this broad intersection between scientific inquiry and historical transformation, between new questioning and new problems, that has been collectively explored in the theme seminar led jointly by **Didier Fassin**, James D. Wolfensohn Professor, and Visiting Professor **Bernard E. Harcourt**, Isidor and Seville Sulzbacher Professor of Law and Political Science at Columbia University.

What are the place, meaning, and functions of the law, its institutions, and its professionals in contemporary society? How have values, norms, and doctrines embedded in legal theories and practices changed over time, and what legacies do they leave? How do legal systems vary across cultures, and what sort of arrangements are made when they are confronted with one another? How are new technologies, such as DNA testing, or new knowledge, such as neuroscience, transforming legal practices? How do law and social sciences relate methodologically, and how are the legal disciplines responding to the dialogue with, and critique from, the social sciences and humanities? These are some of the questions that were addressed in 2016–17 from the multiple perspectives of law, penology, and political theory, as well as history, sociology, anthropology,

FACULTY

Didier Fassin
James D. Wolfensohn Professor

PROFESSORS EMERITI

Joan Wallach Scott
Michael Walzer

ANDREA KANE

Wolfensohn Family Member and anthropologist Ayşe Parla participates in a seminar on Law and the Social Sciences, the School's 2016–17 theme, which explored the interface between law and social inquiry.

psychology, philosophy, economics, and political science. Various authors were discussed, notably Michel Foucault, Walter Benjamin, Hannah Arendt, Wendy Brown, and, more specifically in this field, H. L. A. Hart, David Kennedy, Sally Engle Merry, Susan Silbey, Janet Halley, and Loïc Wacquant, among others. The particular topics explored included the presence of law in everyday life; the race, class, and gender biases in legal practices; the punitive turn with its rationales and its consequences in the Western world; and the legal challenges posed by radical upheavals such as the Arab springs. Two guest speakers, Brinkley Messick, Professor of Anthropology at Columbia University, and David Garland, Professor of Sociology at New York University, enlightened aspects of the Islamic law in Yemen and of the politics of incarceration in the United States, respectively. But Members were also engaged in presenting their own empirical research and theoretical analysis. A film series with movies from around the world relating to the theme was screened and discussed with the public.

Apart from leading this program, **Didier Fassin** continued his inquiry into punishment based on the research he has conducted over the past ten years on policing, the justice system, and the correctional institution, expanding it through an ethnological, historical, and philological approach across places, times, and languages. The book he published with Le Seuil, *Punir: Une Passion Contemporaine* (2017), forthcoming in English as *The Will to Punish*, explores the contemporary punitive moment by asking three questions: What is punishment? Why do we punish? Who gets punished? Revisiting the definition, justification, and distribution of punishment studied by moral philosophers and legal theorists, Fassin shows that the combination of empirical and theoretical approaches challenges the self-evidence of normative readings. Indeed, the question shifts from "what ought to be" to "what actually is," opening the way to critical reflections that do not take for granted the standard definition, usual justifications, and unequal distribution of punishment. Aspects of this research have been presented in multiple venues: at Brown University, the New York Academy of Arts and Sciences, the Night of Philosophy in Brooklyn, and the London School of Economics and Political Science; for a graduate course in anthropology at Princeton University; as a keynote lecture at the annual conference of the Critical Criminology Association of Canada; before several professional institutions such as the National School of Justice in France; and on the occasion of special encounters with inmates and with guards in three French prisons.

At the same time, Fassin developed further the research on life that he had undertaken for the Adorno Lectures at the Goethe University in Frankfurt. Although everyone seems to know what life is, as John Locke famously observed, philosophers and social scientists have a difficult time apprehending it, being torn, as Georges Canguilhem phrases it, between the present participle and the past participle of the corresponding verb, the living and the lived, the organic matter and the individual experience. Is life about biology or about biography—or both? Using ethnographic studies conducted mostly in France and South Africa, as well as genealogical insights into past and remote worlds, Fassin proposes to link

FACULTY & EMERITI AWARDS

By presidential decree, **Joan Wallach Scott** was named a Chevalier de la Légion d'Honneur of France. She was also honored with the 2016 Talcott Parsons Prize of the American Academy of Arts and Sciences for her distinguished contributions to the social sciences.

the two dimensions by reformulating three major concepts: forms of life, ethics of life, and politics of life. In particular, he illuminates the aporia of contemporary Western societies, which abstractly consider life, in the singular, as the highest value, but concretely treat lives, in the plural, as having unequal worth. The book will first appear in German with Suhrkamp Verlag for the Frankfurt Book Fair, where Fassin has been invited, and a little later in French with Le Seuil and in English with Polity under the title *Life: A Critical User's Manual*, in reference to Georges Perec's famous novel. This research also served as the basis of a graduate course delivered at the École des Hautes Études en Sciences Sociales in Paris.

Finally, Fassin continues to pursue his work on the social sciences from the perspective of their relevance for contemporary societies. On the one hand, with Bernard Harcourt he organized a seminar for the Members of the School on the endurance of critique, a timely subject, as critical thinking has recently been under attack in the academic as well as political worlds. This collective endeavor will give rise to a publication. On the other hand, he analyzes the significance and challenges of ethnographic approaches based on long-term observation of a given place or institution, such as the police or the prison, which were the topics of his previous research. The book *Writing the World of Policing* (Duke University Press, 2017) shows how recent ethnographies have transformed our understanding of law enforcement and its predicament. The volume *If Truth Be Told* (University of Chicago Press, 2017) examines the issues raised by the publicization of research results on sensitive topics.

In addition to helping Didier Fassin run the theme seminar on Law and the Social Sciences, Visiting Professor **Bernard E. Harcourt** continued his research into how new digital technologies are transforming our political condition today. In his previous book, *Exposed: Desire and Disobedience in the Digital Age* (Harvard University Press, 2015), Harcourt explored what he called our new "expository society," the new digital world within which we live and expose ourselves willingly or hesitantly on our social media, emails, Google searches, and so on, to neighbors, commerce, and the state. In his research at IAS this past year, Harcourt pushed his work further to dissect the ways that total digital surveillance relates to other aspects of the new digital age, such as drones and targeted digital propaganda. He completed work on a forthcoming book, *The Counterrevolution*, which will be published by Basic Books in February 2018 and which explores the intersection of digital exposure and foreign policy. Harcourt argues that the new constellation of practices—total digital surveillance, drone warfare, and digital propaganda—are not aberrant or exceptional, but instead represent a new way of governing based on a model of counterinsurgency warfare. The United States, he proposes, has not entered a state of exception, but rather a new way of governing, originally developed for the colonial populations, that has now been turned back on the home population.

Harcourt also pursued two other research projects during the year. One involved a genealogy of cost-benefit reasoning. This research started from the observation that cost-benefit analysis (CBA) represents a dominant mode of political discourse in the American administrative state and that, at least since President Bill Clinton's executive orders on CBA, is now fully entwined with the theory of efficient markets. In his research, Harcourt traces CBA back to the rise of systems analysis and the RAND Corporation in the period following World War II. This genealogy helps unearth the underlying logics of CBA. Harcourt presented a portion of that ongoing research at the Princeton Law and Public Affairs colloquium.

In addition, Harcourt continued to work on his edition of Michel Foucault's writings and lectures on Nietzsche. The full thirteen years of Foucault's lectures at the Collège de France were finally published in their entirety in 2015, including two volumes edited by Harcourt. The editorial team is now moving on to earlier lectures that Foucault delivered at Lille, Clermont-Ferrand, Tunis, Vincennes, and São Paolo—so there will be five new volumes of earlier lectures, and Harcourt has been tasked with editing the Vincennes lectures on Nietzsche.

During the year, Harcourt was also actively engaged in pro bono legal representation. He represented Dr. Amer Al Homssi, a Syrian doctor prevented from returning to the United States because of President Trump's Muslim Ban. He also continued to represent an inmate on death row in Alabama, both at the United States Supreme Court and now at the Alabama Supreme Court, on the state's motion to set an execution date.

Harcourt delivered a number of lectures during his time at the Institute, including the Roger Hood Lecture at Oxford University, where he discussed death penalty litigation. He also spoke at the Harvard University Humanities Center on "History and Human Rights" with Homi Bhabha and Samuel Moyn, at a *New York Review of Books* conference in Oslo, Norway, at the Fritt Ord Foundation on his book *Exposed*, and on a panel in Paris at the Métallos Theatre for a discussion of Didier Fassin's new book *Punir.*

Professor Emerita **Joan Wallach Scott** finished several major projects during 2016–17. Her book *Sex and Secularism* is to be published by Princeton University Press. The book is aimed at the polemic about the "clash of civilizations" that posits secularism and the West as committed to the equality of women and men, and Islam as the source of women's subordination. An examination of the long history of secularist discourses has led her to conclude that the belief that equality between the sexes is inherent to the logic of secularism is false. Rather, it is gender *in*equality that has accompanied the organization of modern Western nation states, and secularism is the discourse that has served as its articulation.

In the fall of 2017, a French translation of Scott's *Politics of the Veil*

ANDREA KANE

Didier Fassin (left), James D. Wolfensohn Professor, with Member Vanja Hamzić (center), and Member Jaeeun Kim (right) during a Monday seminar

(Princeton University Press, 2007) was published by Editions Amsterdam in Paris. That book is a critical study of the passage of the law of 2004 that outlawed the wearing of Islamic headscarves in French public schools. The translation comes ten years later (and is, perhaps, even more relevant now) when the state's surveillance of its Muslim populations has intensified; these days the French idea of secularism (*laïcité*) has been redefined from a law that called for state neutrality in matters of religion to practices that require neutrality of citizens in all public space.

Columbia University is issuing a thirtieth anniversary edition of Scott's classic, *Gender and the Politics of History*. For it she wrote a new preface, bringing her own thinking on the question of gender up to date, and discussing the way in which psychoanalytic theory has influenced her recent work. She also included an essay, "The Conundrum of Equality," first published by the School of Social Science as an Occasional Paper: www.sss.ias.edu/files/papers/papertwo.pdf.

Scott also coedited a book with the French political scientist Bruno Perreau, *Les défis de la République, Genre, territoires, citoyenneté* (Presses Sciences Po, 2017).

Scott continues to write about matters of higher education in the United States. Her article, "On Free Speech and Academic Freedom," (the text of her talk given when she was awarded the Talcott Parsons prize of the American Academy of Arts and Sciences—the first woman ever to receive that prize) was published first in the *Bulletin* of the American Academy and has been republished in a number of other journals since. She is a member of the Committee on Academic Freedom and Tenure of the American Association of University Professors. Scott received a grant from the Ford Foundation to organize a network of concerned academics to address the questions of free speech and academic freedom on campuses in the United States.

In June 2017, she gave the keynote address at a conference on Academic Freedom at the Central European University in Budapest (Hungary), which is under attack by the right-wing government of Victor Orban. The talk will be published in a book of the conference papers in 2018.

Scott is a member of the Advisory Committee for Research at the New York Public Library. She is an affiliate member of the History Department of the Graduate Center of the City University of New York. She is a founding editor of the journal *History of the Present*.

During 2016–17, she lectured in Paris, Bern (Switzerland), Bogotá (Colombia), and at Stanford University, the University of California at Santa Cruz, and Concordia University (Montreal). She gave papers in conferences at Princeton and in Bogotá, at New York University, and at the Graduate Center of the City University of New York.

During the academic year 2016–17, Professor Emeritus **Michael Walzer** spoke to the Council on Foreign Relations and to the Carnegie Council on Ethics and International Affairs in New York. On the seventieth anniversary of the first verdicts at the Nuremberg Trials, he gave a lecture in the Nuremberg courtroom on the legacy of the trials. He also lectured at the Israel National Library in Jerusalem and at the University of Pennsylvania. He continued to work on a book on foreign policy and on the third volume of *The Jewish Political Tradition*, both forthcoming in 2018.

FOR THE SECOND YEAR in a row, the School of Social Science has supported a scholar at risk through the international program Scholars Rescue Fund. The legal scholar and human rights activist Teng Biao, a former law professor of the University of Beijing and the cofounder of the Open Constitution Initiative, who fled China after having been arrested, imprisoned, and tortured, spent a year conducting his research on the development of civil society and the mobilization of lawyers in his country, and actively contributing to the theme of the year.

ANDREA KANE

DAN KOMODA

Left: Visitor Pascal Marichalar, whose research deals with industrial disease, began fieldwork in an industrial community in New Jersey. *Right:* AMIAS Member Ruha Benjamin continued studying the relationship between science, law, and society, examining how genomic knowledge circulates across government initiatives, private enterprises, and subaltern mobilization.

2016–17 MEMBERS AND VISITORS

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

Lori A. Allen
Anthropology ✦ School of Oriental and African Studies, University of London

Lalaie Ameeriar
Anthropology ✦ University of California, Santa Barbara

Fadi A. Bardawil
Anthropology ✦ The University of North Carolina at Chapel Hill

Ruha Benjamin
Science and Technology Studies, Critical Race Studies ✦ Princeton University
AMIAS Member

Céline Bessière
Sociology ✦ Université Paris-Dauphine
Funding provided by the Florence Gould Foundation Fund

Amy Borovoy
Anthropology ✦ Princeton University ✦ *v*

Linda Bosniak
Law, Legal Theory ✦ Rutgers, The State University of New Jersey ✦ *v*

Nick Cheesman
Politics ✦ The Australian National University

Anne-Claire Defossez
Sociology ✦ Institute for Advanced Study ✦ *v*

Marcello Di Bello
Philosophy ✦ Lehman College, The City University of New York
Infosys Member

Andrew Dilts
Political Science ✦ Loyola Marymount University

Karen Engle
Law ✦ The University of Texas at Austin
Deborah Lunder and Alan Ezekowitz Founders' Circle Member

Lee Ann Fujii
Political Science ✦ University of Toronto

Vanja Hamzić
Law, History, Anthropology ✦ School of Oriental and African Studies, University of London

Bernard E. Harcourt
Contemporary Critical Thought, Legal and Political Theory ✦ Columbia University and École des Hautes Études en Sciences Sociales, Paris ✦ *vp*

David Kazanjian
American Studies, Latin American Studies ✦ University of Pennsylvania

Jaeeun Kim
Sociology, Religion ✦ University of Michigan

Donald W. Light
Law ✦ Rowan University ✦ *v, f*

Sida Liu
Sociology ✦ University of Toronto

Pascal Marichalar
Sociology ✦ Institut de Recherche Interdisciplinaire sur les Enjeux Sociaux, École des Hautes Études en Sciences Sociales, Paris ✦ *v*

Allegra M. McLeod
Law, Political Theory ✦ Georgetown University

Elizabeth Mertz
Anthropology, Language, Law ✦ American Bar Foundation ✦ *v, f*

Sophie Meunier
International Affairs, European Politics ✦ Princeton University ✦ *v*

Reuben Jonathan Miller
Sociology of Punishment, Social Welfare ✦ University of Michigan
Friends of the Institute for Advanced Study Member

Jonathan Morduch
Economics ✦ New York University
Roger W. Ferguson, Jr. and Annette L. Nazareth Member

Sherally K. Munshi
Law ✦ Georgetown University ✦ *v*

Juan Obarrio
Anthropology ✦ Johns Hopkins University

Ayşe Parla
Anthropology ✦ Sabanci University
Wolfensohn Family Member

Peter Redfield
Anthropology ✦ The University of North Carolina at Chapel Hill

Yüksel Sezgin
Political Science, Law ✦ Syracuse University ✦ *v, s*

Amr Shalakany
Law ✦ American University in Cairo

Teng Biao
Criminal Justice, Human Rights, Democratization ✦ Institute for Advanced Study ✦ *v*

Massimiliano Tomba
Philosophy, Political Theory ✦ Università degli Studi di Padova

Emily Zackin
Political Science ✦ Johns Hopkins University
Richard B. Fisher Member

Linda M. G. Zerilli
Political Science ✦ The University of Chicago

The efficacy of preventative cervical cancer vaccines remains questionable. Oversimplified marketing campaigns like the one above neglect these unknowns and disregard present and future risk factors to individuals and the larger population.

Donald Light on Preventing Cervical Cancer

When two vaccines appeared on international markets in 2006–07 to protect adults from selected infections that can lead to cervical and related cancers, they were seen as tools of cancer prevention and soon taken up by many countries (Bruni et al. 2016). Their prices also set records, about $120–$190 a dose in the United States. Even with substantial discounts, many lower- and middle-income countries found them unaffordable. Yet more than 85 percent of the 528,000 new cases of cervical cancer and 266,000 deaths per year worldwide occur in these countries to women in their 30s and 40s (Globocan 2015). High prices continue to be a serious barrier to access, prevention, and reducing global health inequality. Could they be lower and still be profitable? Beyond wider access, how effective are they, and why do they remain controversial? Read more at www.ias.edu/ideas/2017/light-cervical-cancer.

Anne-Claire Defossez on Women in French Politics

ELENA STENNICOVA

The Power Ladder, a poster that was part of a public campaign on equal rights for women and men in France

In today's France, a woman running for the highest political office does not seem to make news any more. It is indeed the case that, after centuries of political ostracism, women have recently become more present in French political life: from less than 20 percent in state and local governments until 2000, their proportion rose to 41 percent in 2016.

But the presence of a few prominent female figures and seemingly favorable statistics do not tell the whole story. Although 40 percent of municipal counselors are women, only 16 percent of them are mayors; and if women do represent 48 and 50 percent of departmental and regional counselors, respectively, only 10 percent are president of a department and not more than 17 percent preside over a region. Read more at www.ias.edu/ideas/2017/defossez-women-politics.

J. MICHAEL

Lee Ann Fujii on the Prehistory of the Muslim Ban

However odious, Trump's actions are neither novel nor new. America's history is rife with cases of mass banishment, exile, and even killing. Following Japan's attack on Pearl Harbor, President Roosevelt signed a much more drastic order than Trump's. Executive Order 9066 authorized the forced removal of all Japanese-American citizens from the West Coast and their imprisonment during the war. In the century before Roosevelt, the U.S. government supported westward expansion through a policy of forced removal and extermination of any Indian tribe living on land that white settlers coveted. Read more at www.ias.edu/in-the-media/2017/fujii-prehistory-muslim-ban.

Bernard Harcourt's Fight Against E.O. 59447v.8

Soon after the executive order of January 27, 2017 was signed, Amer Al Homssi, a Syrian doctor with a U.S. medical residency visa, was barred from boarding his return flight from Abu Dhabi to Illinois. According to the lawsuit filed by Bernard Harcourt, Visiting Professor in the School of Social Science, and legal colleagues: "When Dr. Al Homssi looked at his passport, he noticed that the J-1 visa page had been marked diagonally with a fat black marker pen drawn through it, and in blue pen along that black mark, it was written: 'Cancelled E.O. 59447v.8.'" Read more at www.ias.edu/news/in-the-media/2017/harcourt-eo-59447v8.

GRÉGOIRE KORGANOW

James D. Wolfensohn Professor Didier Fassin conducted an ethnography in a French short-stay prison over a four-year period.

Didier Fassin on a World of Prisons

Presented by its promoters two and a half centuries ago as a moral progress in the administration of punishment, prison has become over the past decades one of the most vexing and unsettling issues in Western societies for both the spectacular increase of its population and the grim reality of its facilities. But while imprisonment is today in most countries the ultimate horizon of the penal system, until recently little was known about the correctional system and its personnel, and even less about the prisoners' experience. This is the matter of *Prison Worlds: An Ethnology of the Carceral Condition*. Read more at www.ias.edu/ideas/2017/fassin-world-prisons.

Teng Biao on Human Rights and Democracy in China

From the Chinese Revolution of 1911 to the May 19 Movement of 1957, from the Xidan Democracy Wall of 1978 to the Democracy Movement in 1989, Chinese people have never ceased in their struggle for democracy. When the Tiananmen Massacre shocked the world, I was a brainwashed high school student. It was only several years later that I realized I was a survivor of the massacre. In a speech that I gave at the June 4th Vigil in Hong Kong's Victoria Park, I reflected: "If I had been born two years earlier, I could have been the one overrun by tanks and my mother could have been one of the mothers who had shed all her tears but had been forbidden to speak the truth or to simply commemorate." Read more at www.ias.edu/ideas/2017/biao-human-rights-china.

Human rights lawyers Gao Zhisheng, Li Heping, and Teng Biao surrounded by armed police in 2005

ULLSTEIN BILD

Joan Wallach Scott on France's Regulation of What Women Wear

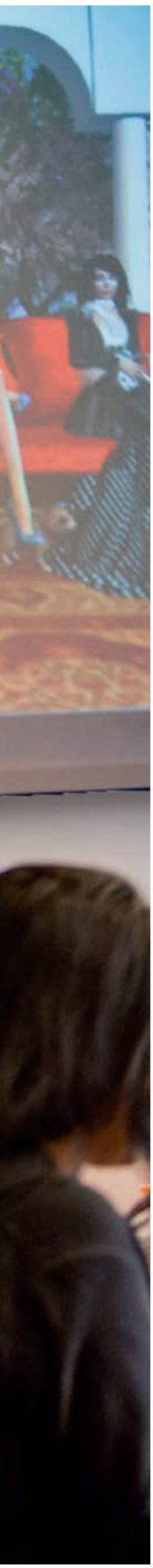
"What you have in French republicanism is a conflict between a commitment to equality and the notion that sexual difference is a natural difference which explains why there can't be equality between women and men. Then on the other side you have Muslim society saying that sex and sexual difference is a problem, and women, whether submitting or not, are covered. So in a sense they are exposing the contradiction in French society, and that's intolerable. It becomes a commentary on the French need to have women uncovered." Read more at www.ias.edu/news/in-the-media/2016-scott-burkini-nyt.

ALISDARE HICKSON

Michael Walzer on the Politics of Resistance

Resistance is a form of collective civil disobedience. It involves physical presence and solidarity; it appeals to moral law or human rights; it is usually illegal but non-violent; it is locally and communally based; its activists are angry citizens and lower-level officials. We should promote it and celebrate it—and recognize at the same time that it is only half a politics. The sit-ins by auto workers in Flint, Michigan in 1938 were an example of resistance; the labor movement was something else. The black students who sat in at lunch counters in North Carolina in 1960 were engaged in resistance; the civil rights movement was something else. The Standing Rock encampment against the Dakota Access pipeline is an act of resistance; the large-scale defense of the environment and indigenous rights is something else. Read more at www.ias.edu/in-the-media/2017/walzer-resistance.

Sociologist and historian Eiko Ikegami of the New School for Social Research gives a talk, "Consciousness and Culture in the Age of Diverse Intelligences," during a workshop on the origins of life, led by Professor Piet Hut in June.



ANDREA KANE

Special Programs and Outreach

The Institute for Advanced Study is committed to the idea that science and learning transcend all geographic boundaries and scholastic disciplines, and that scholars and scientists are members of one commonwealth of the mind. It engages with the greater Princeton community through public lectures, concerts, and events, and extends its influence beyond academia through innovative programs designed to inspire and educate.

BEYOND THE WORK THAT TAKES PLACE in the four Schools, the Institute's scope is broadened and enhanced by its special programs, which contribute much to the vitality of the Institute.

The Program in Interdisciplinary Studies, directed by Professor Piet Hut, explores ways of viewing the world that span a range of disciplines from computational astrophysics, geology, and paleontology to artificial intelligence, cognitive psychology, and philosophy.

The Director's Visitor program enables the Director to invite scholars from a variety of fields, including areas not represented within the four Schools, to participate in the range of intellectual and social activities at the Institute.

The Artist-in-Residence Program was established in 1994 to create a musical presence within the Institute community, and to have in residence a person whose work could be experienced and appreciated by scholars from all disciplines. Artists-in-Residence have included Robert Taub, Jon Magnussen, Paul Moravec, Derek Bermel, Sebastian Currier, and, as of 2016, David Lang.

The Institute also engages in outreach beyond its local community. Since 1994, the IAS/Park City Mathematics Institute has integrated mathematics educators, researchers, and students through innovative programs. The Program for Women and Mathematics, sponsored jointly with Princeton University, provides substantive mathematics content as well as practical encouragement for women to pursue careers in the field of mathematics.

The School of Natural Sciences sponsors Prospects in Theoretical Physics, a two-week residential summer program held at the Institute for exceptionally promising graduate students and postdoctoral scholars. In 1999, the Institute created the Science Initiative Group, an international team of scientific leaders and supporters dedicated to fostering science in developing countries.

The Summer Program in Social Science, led by Professor Didier Fassin, is an interdisciplinary initiative for early-career scholars from Africa, the Middle East, and Latin America, which aims to enrich and expand the realm of social sciences through the confrontation of different intellectual traditions and perspectives.

A Digital Scholarship initiative was formed in 2016 to accelerate the pace of research across disciplines and geographic locations by offering Faculty and Members new tools and technologies to gather and process large amounts of data, visualize the results, and make the data and results openly available.

SPECIAL PROGRAMS

PROGRAM IN INTERDISCIPLINARY STUDIES

ANDREA KANE

Yuko Ishihara (left), who explores phenomenology and philosophy, and Olaf Witkowski (far right), who researches information dynamics and artificial life, are led by Professor Piet Hut (center) during a Program in Interdisciplinary Studies workshop.

Professor **Piet Hut**, head of the Institute's Program in Interdisciplinary Studies, is currently interested in the origin of cognition, or more precisely the spontaneous emergence of autonomous agents in complex systems. A wider interest is the general question of the relationship between a reductionistic analysis and a study of the nature of emergent properties in complex systems. And an overarching interest is the notion of metacognition, or "knowledge of knowledge," in the form of multidisciplinary investigations of the circularity of cognition, from reflection in computer science to reflexivity in social science. In pursuit of these questions, Hut interacted with Visitors in his program covering a range of areas—from astrophysics, astrobiology, geophysics, physics of complex systems, mathematics, statistics, geochemistry, biochemistry, bioinformatics, geomicrobiology, computer science, neuroscience, and artificial life to linguistics, pragmatics, sociology, political science, cognitive science, literature, art history, psychology, and philosophy.

At the Institute, Hut continued to lead the After Hours Conversations series, together with colleagues Yve-Alain Bois and Patrick Geary from the School of Historical Studies, Didier Fassin from the School of Social Science, and Helmut Hofer from the School of Mathematics. These conversations were held in Harry's Bar twice a week for a period of two months during each term, and they were widely seen as an effective way to encourage inter-School communication.

In Japan, Hut continued his association with ELSI, the Earth-Life Science Institute at the Tokyo Institute for Technology, as a foreign Principle Investigator and Councilor. Launched at the end of 2012, ELSI is focused on the study of the origins and evolution of life on Earth, as well as possibly on other planets, within the context of geology and astrophysics. In May 2017, Hut and collaborators organized a two-week summer school at Osaka University, titled "Towards an Integrative Approach to the Study of Awareness," with teachers and students drawn from a large range of disciplines, including neuroscience, cognitive science, artificial intelligence, artificial life, robotics, logic, high-performance computing, psychology, and philosophy, in particular phenomenology.

In Manhattan, Hut accepted the position of President of YHouse, Inc., a nonprofit organization that combines academic studies and outreach with philosophy, art, design, and technology. The main focus is on cognition, in all its forms, from intelligence to consciousness to (self-) awareness.

2016–17 VISITORS

s Second Term

Eran Agmon
Complex Systems, Cognitive Science ✦ Indiana University

Jeff Ames
Computer Science ✦ Rutgers, The State University of New Jersey

Catherine Chung
Writing ✦ Institute for Advanced Study

Henderson (Jim) Cleaves
Chemistry ✦ Carnegie Institution for Science

Ayako Fukui
Harmonic Analysis ✦ ARAYA Brain Imaging

Donato Giovannelli
Geomicrobiology ✦ Rutgers, The State University of New Jersey, and Earth-Life Science Institute, Tokyo Institute of Technology

Erik Hoel
Neuroscience ✦ Columbia University

Yuko Ishihara
Philosophy ✦ Earth-Life Science Institute, Tokyo

Monica Manolescu
American Literature and Art ✦ Université de Strasbourg ✦ *s*

Barnaby Marsh
Evolutionary Dynamics ✦ Harvard University

Michael Th. Rassias
Mathematical Analysis, Analytic Number Theory ✦ Universität Zürich

Emily Su
Neuroscience, Regeneration ✦ Rutgers, The State University of New Jersey

Edwin L. Turner
Astrophysics ✦ Princeton University

Olaf Witkowski
Complex Systems, Artificial Life ✦ The University of Tokyo

ARTIST-IN-RESIDENCE PROGRAM

In his first season as the Institute's Artist-in-Residence, Pulitzer Prize–winning composer **David Lang** curated the 2016–17 Edward T. Cone Concert Series. The season opened with the Choir of Trinity Wall Street performing Lang's *evening morning day* and Guillaume de Machau's rarely performed *Messe de Nostre Dame*. The second concert featured acclaimed piano virtuoso David Jalbert's performance of Johann Sebastian Bach's *Goldberg Variations*. In the spring, an evening of new and traditional Balinese music was presented by Gamelan Galak Tika, an ensemble comprised of gongs, metallophones, hand drums, cymbals, vocals, bamboo flutes, and spiked fiddles. The season concluded with a program by composer Steve Reich, in honor of his eightieth birthday, performed by Sō Percussion.

THOMAS CLARKE

Artist-in-Residence David Lang (top right) participates in a concert talk with the artists of Gamelan Galak Tika, an ensemble of thirty musicians, following an Edward T. Cone Concert held at the Institute in February.

In February, Lang gave a Friends Talk on patternmaking, the common theme throughout the Edward T. Cone Concert Series. Emphasizing how patternmaking participates in the creation of large-scale musical forms, Lang also highlighted musical structure, conventions, and those who push the boundaries of what music can accomplish. A video of the talk "The Patternmakers" is available at www.ias.edu/ideas/2017/lang-patternmakers.

During the academic year, Lang premiered a new piece, *the public domain,* commissioned for the fiftieth anniversary of Mostly Mozart. The work was created with input from search-engine autocomplete, and it was performed by 1,000 volunteer singers in August 2016. Read more at www.ias.edu/news/lang-domain-newyorker.

DIRECTOR'S VISITORS

Graham Farmelo, Fellow at Churchill College, University of Cambridge, finished three chapters of his forthcoming book on the relationship between pure mathematics and fundamental physics. The book is scheduled be published in spring 2019.

Jon Finer, most recently Chief of Staff and Director of Policy Planning at the U.S. Department of State, researched and reflected on two related topics, one contemporary and one historical: the new U.S. Administration's unorthodox approach to foreign policy and the role of history in the making of foreign policy.

Author **Siobhan Roberts** researched a book project in the Kurt Gödel archives, while also further exploring a biography of the mathematician Andreas Floer with Helmut Hofer. In December 2016, Roberts was honored with the Joint Policy Board for Mathematics 2017 Communications Award in recognition of her books, articles, and film about mathematicians. Read more at www.ias.edu/news/2016/roberts-jpbm-award.

CARLOS BARRIA/AFP/GETTY IMAGES

"I was drawn to the Institute for a number of reasons," writes Jon Finer, Director's Visitor (pictured above with then-Secretary of State John Kerry during the Iran nuclear talks in Vienna, 2015). "Having worked closely with outstanding scientists during my time in government—nuclear physicists, on the Iran nuclear talks, and climate scientists, on the Paris climate negotiations—I came to appreciate how essential such expertise and perspectives are to policymaking." Read more at www.ias.edu/ideas/finer/2017/examining-foreign-policy.

OUTREACH

IAS/PARK CITY MATHEMATICS INSTITUTE

PHOTOS BY DAVID TITENSOR

The twenty-seventh annual PCMI Summer Session brought together researchers, college and university faculty, graduate and undergraduate students, and K–12 school teachers for a three-week experience comprising individual courses of study and meaningful interaction centered on the theme of random matrices.

The IAS/Park City Mathematics Institute (PCMI) is an intensive three-week summer program—held annually in Park City, Utah—that includes several parallel sets of activities for different groups across the entire mathematical community. Established in 1991 by a grant from the National Science Foundation, PCMI has been an outreach program of the Institute for Advanced Study since 1994. PCMI is currently funded by major grants from the National Science Foundation and Math for America, as well as grants from private foundations and individuals.

The component programs of PCMI include a workshop for mathematics researchers, ten mini-courses for graduate students, two lecture series for undergraduate students, a program for faculty from predominantly undergraduate institutions, a faculty workshop on increasing minority participation in undergraduate mathematics, a teacher leadership program for K–12 school teachers, an international seminar on mathematics education, and a short course for high school students. Together these programs have over 340 participants. PCMI is a very successful effort toward vertical integration, with participants from different groups interacting with each other both scientifically and socially. The current PCMI director is Rafe Mazzeo (Stanford University).

Each year, a different research theme is chosen, and a set of organizers who are specialists in the topic shape the program. The theme for 2017, "Random Matrices," was organized by Alexei Borodin (Massachusetts Institute of Technology), Ivan Corwin (Columbia University), and Alice Guionnet (Centre National de la Recherche Scientifique–École Normale Supérieure de Lyon). Random matrix theory sits at the interface of many fields of mathematics and physics, and has practical applications in areas of computer science and statistics. The 2017 PCMI Summer Session brought together mathematicians working in many exciting areas of recent research in and around random matrix theory. The participants in the Undergraduate Summer School attended lecture series by Mihai Stoiciu (Williams College) and Antonio Auffinger (Northwestern University). In the Undergraduate Faculty Program, Victor Moll (Tulane University) led an exploration of the properties of special functions to give faculty participants the tools needed to work on research in special functions, both on their own and with their students. The Workshop on Increasing Minority Participation in Undergraduate Mathematics explored issues related to the experiences and participation of women and minority students in mathematics and sought to provide faculty participants with tools to increase the number of undergraduate mathematics majors from underrepresented groups. Two senior scholars were appointed by the Clay Mathematics Institute, and they interacted with participants in all of the PCMI programs: Craig Tracy (University of California, Davis) and Horng-Tzer Yau (Harvard University).

The Teacher Leadership Program hosts sixty teachers from across the country who come together for a collaborative professional development experience in which they learn new mathematics, reflect on best pedagogical practices, and create new materials for their own and other classrooms. During the summer session, the participating teachers planned for a set of academic year outreach activities designed to extend the impact of this program, which include a series of weekend workshops to be held in eight sites around the country during the 2017–18 school year.

The International Seminar "Mathematics Education Around the World: Bridging Policy and Practice" brought together participants from the Czech Republic, Guatemala, Nigeria, the Philippines, Spain, and the United States to engage in a dialogue on preparation of mathematics teachers in the area of probability and its role in the development of secondary mathematics curricula.

The research theme for PCMI 2018 is "Harmonic Analysis," organized by Carlos Kenig (University of Chicago), Fang-Hua Lin (NYU Courant Institute), Svitlana Mayboroda (University of Minnesota), and Tatiana Toro (University of Washington). To learn more about the IAS/Park City Mathematics Institute, including information about the application process, visit https://pcmi.ias.edu.

PROGRAM FOR WOMEN AND MATHEMATICS

ALL PHOTOS ANDREA KANE

The 2017 Women and Mathematics Program featured beginner and advanced workshops and lectures focused on geometry and randomness in group theory led by experts in mathematics from both American and international institutions. The group also participated in local activities, including the Princeton University 5K race, and educational outreach with Trenton's UrbanPromise after-school program.

Originally founded by Karen Uhlenbeck and Chuu-Lian Terng, the twenty-fourth annual Women and Mathematics Program (WAM), "Gallteometry and Randomness in Group Theory," was held at the Institute for Advanced Study May 15–26, 2017. Program activities were sponsored by the Institute, Princeton University, the National Science Foundation, and a grant from the Schwab Charitable Fund made possible by the generosity of Eric and Wendy Schmidt. The program organizers were Dusa McDuff (Barnard College), Christine Taylor and Sun-Yung Alice Chang (Princeton University), and Lisa Carbone (Rutgers University). Yen Duong (University of Illinois at Chicago), Gili Golan (Vanderbilt University), Funda Gultepe (University of Illinois at Urbana-Champaign), and Kasia Mankiewicz (McGill University) served as teaching assistants. Fourteen undergraduates, twenty graduate students, and six postdoctoral mathematicians from thirty universities attended the program.

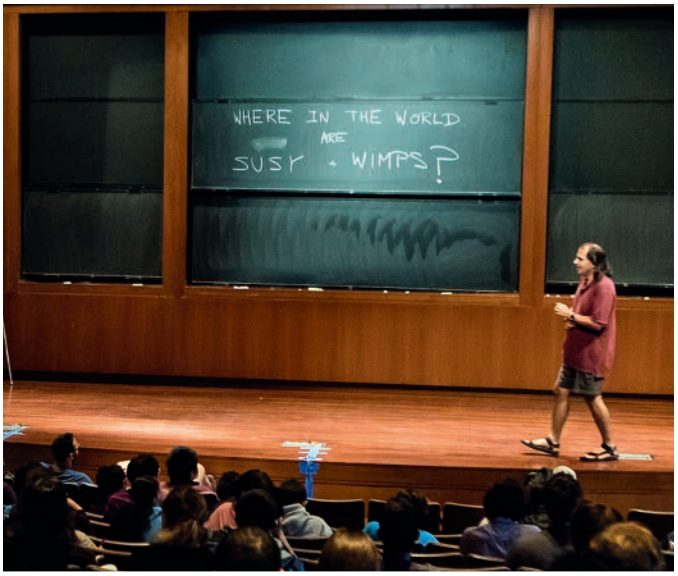
The program included lectures by Olga Kharlampovich (Hunter College), Goulnara Arzhantseva (University of Vienna), Kim Ruane (Tufts University), and Tatiana Nagnibeda (University of Geneva) on topics such as free and hyperbolic groups, random groups, non-positively curved groups, and amenability. Research seminars were led by Angelica Decibel (Brandeis University), Funda Gultepe, Rosemary Guzman, and Heejoung Kim (University of Illinois at Urbana-Champaign), Kasia Jankiewicz (McGill University), Sahana Hassan Balasubramanya (Vanderbilt University), Yuan Liu (University of Wisconsin–Madison), and Kathryn Lockwood (Case Western Reserve University). Colloquia were given by Lisa Carbone (Rutgers University) and Susan Hermiller (University of Nebraska–Lincoln).

The Women-in-Science Seminar series comprised an evening chat on diversity and identity led by Yen Duong and Rosemary Guzman; a panel on mathematicians in academia moderated by Guzman and Evita Nestoridi (Princeton University), with Mirela Ciperiani (University of Texas at Austin), Ana Rita Pires (Fordham University), and Katrin Wehrheim (University of California, Berkeley); a panel on alternative careers for mathematicians with Sara Ellison (Massachusetts Institute of Technology), Margaret Holen (private investor), and Linda Ness (formerly at Applied Research); and a panel on work–life balance, moderated by Guzman and Katie McKeon (Rutgers University), with Maria Chudnovsky (Princeton University), Nancy Hingston (The College of New Jersey), Elizabeth Milicevic (Haverford College), Kim Ruane (Tufts University), and Lauren Williams (University of California, Berkeley).

On May 22, participants visited the Princeton University mathematics department to hear talks by Princeton professors Evita Nestoridi on "Cut-Off for a Class of Hyperplane Arrangement Walks," Adam Marcus on "Interlacing Polynomials and Ramanujan Graphs," and Assaf Naor on "Embeddings of Groups, Poincaré Inequality, and Random Walks." Susan Hermiller (University of Nebraska–Lincoln) led a workshop, "Computations with Finitely Presented Groups with GAP," in a computer lab of the Lewis Library. Participants also engaged in two outreach events. On May 21, fifteen participants ran in a Princeton community 5K race. Immediately after the race, WAM volunteers taught local high school runners some probability of non-transitive Grime dice and the seventeen symmetry wallpaper patterns on a plane. On May 23, ten program participants visited UrbanPromise, Trenton's after-school program at Trinity Episcopal Cathedral, to demonstrate math activities: how to cut Möbius valentines and how to fold and cut a five-pointed star with one cut à la Betsy Ross. WAM also purchased a strategy game called Otrio for the students.

Thanks to a generous grant from Lisa Simonyi, the IAS Women and Mathematics Program is implementing a new Ambassador Program to build support and outreach networks across the country, thus making the annual May WAM program a springboard to energize a wide-ranging outreach program. The Ambassador Program will fund annually up to three postdoctoral or advanced graduate ambassadorships and up to six graduate ambassadors.

PROSPECTS IN THEORETICAL PHYSICS



DAN KOMODA

ANDREA KANE

ANDREA KANE

In July, the Institute hosted the 2017 Prospects in Theoretical Physics program on the theme "Particle Physics at the LHC and Beyond," directed by Professor Nima Arkani-Hamed (top). Videos of the talks are available at www.ias.edu/ideas/videos-prospects-theoretical-physics-2017.

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

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

PiTP 2017 was held July 17–28 on the campus of the Institute for Advanced Study. The theme of the 2017 program was "Particle Physics at the LHC and Beyond." The program topics included: theoretical physics beyond the Standard Model, the status of naturalness and new approaches to fine-tuning problems, LHC Run II updates and projections, new table-top/low-energy probes of fundamental physics, high-intensity, low-energy collider experiments, CP violation and the strong CP problem, the next decade of dark matter, the next decade of CMB/large-scale structure, future accelerators, and neutrino physics. The program was organized as a workshop, with ninety-minute lectures and active student participation in the afternoon, including discussion sessions.

Roughly 120 participants from sixteen countries were officially enrolled in the program, with a majority of the visiting students living in the Princeton University dorms during the two-week program. Moreover, the program lectures attracted many students, postdocs, and professors from nearby institutions.

The 2017 Prospects in Theoretical Physics program was under the direction of Professor Nima Arkani-Hamed and Professor Emerita Chiara Nappi of Princeton University. In addition to the organizers, lecturers included: Nathaniel Craig (University of California, Santa Barbara), André de Gouvêa (Northwestern University), Michael Dine (University of California, Santa Cruz), Rouven Essig (C. N. Yang Institute for Theoretical Physics, Stony Brook University), Peter Graham (Stanford University), Mariangela Lisanti (Princeton University), Jim Olsen (Princeton University), David Spergel (Princeton University), Chris Tully (Princeton University), Liantao Wang (University of Chicago), and Neal Weiner (New York University).

SCIENCE INITIATIVE GROUP

Active since 1999 as an IAS outreach program supporting scientific research in the developing world, the Science Initiative Group (SIG) effectively put itself out of business in 2017 by successfully transferring ownership of the last of its projects to the home continent of its beneficiaries.

The Regional Initiative in Science and Education (RISE), a program supporting African scientists pursuing advanced degrees in sub-Saharan Africa through five university-based thematic networks, was SIG's primary focus from 2008 through 2016. With major funding from Carnegie Corporation of New York, RISE produced 94 doctoral and 91 master's graduates and supported several postdoctoral researchers. Benefits accrued not only to the scientists themselves, but also to the eighteen universities and research institutes that made up the networks, to the institutions where graduates took up academic posts and/or consulting responsibilities, and to the many students and advisees of the graduates.

A 2017 visit by SIG staff to the Federal University of Technology-Akure (FUTA) in Nigeria, one of six institutions comprising the African Materials Science and Engineering Network (AMSEN), provided a compelling snapshot of the impact RISE has had on the development of science and engineering leadership and expertise in sub-Saharan Africa. Seven AMSEN graduates—including two women—who earned doctorates from the University of the Witwatersrand in South Africa or from FUTA are now faculty members at FUTA, where a true community of scholars has formed.

RISE also played a role in promoting gender balance, most strikingly within the historically male-dominated field of materials science. When AMSEN started in 2008, its constituent universities admitted a total of nine men and one woman as doctoral students, and all seven of its master's students were men. As of the end of 2016, 36 men and 10 women had earned advanced degrees through AMSEN or were on track to complete them. More significantly, the success of the female graduates has encouraged more women to pursue materials science at the RISE universities.

The first woman to join AMSEN in pursuit of her doctorate, Adenike Olaseinde, credits her experience in the network for having given her the confidence to succeed in building a materials engineering career: "RISE has made me a better researcher. It supported me not only to do my Ph.D., but also to develop my own research group and laboratory. Being part of this network has given me the confidence to lead." In addition to her role as a Senior Lecturer at FUTA, Dr. Olaseinde created and leads the Advanced Materials and Electrochemical Research Group, and she has spearheaded new collaborations with partners including the University of Botswana, Pennsylvania State University, and the South African National Research Foundation's iThemba Laboratory for Accelerator-Based Sciences.

As RISE graduates use the skills and connections acquired through their networks to pursue academic and research careers, a legacy program will continue where RISE left off. The Nairobi-based African Academy of Sciences, through its Alliance for Accelerating Excellence in Science (AESA) funding platform, has established the AESA-RISE Postdoctoral Fellowship Program. Supported by Carnegie Corporation, and initially open only to RISE doctoral degree recipients, the program aims to foster a culture of advanced research at African universities, building on the RISE collaborative model and involving partners both within Africa and beyond.

ALL PHOTOS SCIENCE INITIATIVE GROUP

Through the Regional Initiative in Science and Education, founded by SIG in 2008, more than 120 advanced degrees have been awarded to students from 18 African countries. *Above:* Dr. Adenike Olaseinde (in yellow) and colleagues at FUTA, Nigeria.

SUMMER PROGRAM IN SOCIAL SCIENCE

ANDREA KANE

Led by Professor Didier Fassin, the 2015–17 Summer Program in Social Science convened nineteen early-career social scientists from Africa, the Middle East, and Latin America over a three-year cycle, with the first year at the Institute (right), the second year at the École des Hautes Études en Sciences Sociales, Paris, and the third year at the Swedish Collegium for Advanced Study in Uppsala (left).

The Summer Program in Social Science was created in 2015 as an international and interdisciplinary initiative for early-career scholars from the "Global South," in order to remedy the underrepresentation of Members from this part of the world in the regular program of the School of Social Science. Designed to draw together twenty social scientists from Africa, the Middle East, and Latin America, it aims to enrich and expand the realm of the social sciences through the confrontation of different intellectual traditions and perspectives; to facilitate and enhance the dialogue between various scientific disciplines and communities; and to strengthen international networks across continents. The program is multi-year so as to establish and consolidate links between the fellows and with the Institute. The first cycle spanned over three years in three different institutions: the Institute for Advanced Study in 2015, the Paris École des Hautes Études en Sciences Sociales in 2016, and the Uppsala Swedish Collegium for Advanced Study in 2017.

During the program, the scholars pursued their own research projects. At an initial stage, each scholar presented his or her project and had it discussed in the perspective of publications in international journals. Thus, a conversation developed between a literary scholar from Palestine interested in the reception of Ibn Rushd's commentary on Aristotle, an anthropologist from Iraq examining the experience of exiles fleeing the war, an economist from the Ivory Coast assessing the impact of microfinance projects, a sociologist from Benin investigating gas smuggling across the border, a political scientist from Brazil analyzing clientelism in local elections, and a legal scholar from Chile studying anti-discrimination laws. This intellectual encounter led to a second level of reflection on the circulation, appropriation, and contestation of knowledge across different worlds and disciplines, which involves asymmetric power relations as well as potential mutual enrichment. Such experiences in the practice of the social sciences are common to many scholars, be they a Mexican sociologist, an Argentinian geographer, an Iranian anthropologist, or a South African historian. They became the matter of a collective project and of a forthcoming volume provisionally titled "The Politics of Global Knowledge."

After the success of the first cycle, supported by the Riksbankens Jubileumsfund, the Wolfensohn Family Foundation, and the three participating institutions in Princeton, Paris, and Uppsala, the Mellon Foundation decided to fund three new cycles, which will be slightly different in their conception. Indeed, they will be two-year programs, with the first year at the Institute and the second in Bogotá at the Universidad Nacional de Colombia and Johannesburg at the University of the Witwatersrand. There will therefore be a more direct involvement of academic institutions and communities from the "Global South," but the general goals of the program will remain similar: on the one hand, offering scholars a stimulating scientific environment for their research; on the other, enriching the social sciences through the confrontation of different scholarly traditions.

ANDREA KANE

Environmental conflicts in Buenos Aires, income inequality in Egypt, water shortage in rural Iran, debates over the age of sexual consent under South African law, and negotiations at the World Trade Organization—among other themes—were explored by participants in the inaugural Summer Program in Social Science. Read more at www.ias.edu/ideas/2015/fassin-summer-program.

DIGITAL SCHOLARSHIP@IAS

The Zaydi Manuscript Tradition: A Digital Portal, led by Professor Sabine Schmidtke, was launched in April in partnership with the Hill Museum & Manuscript Library. Currently, the project comprises 969 manuscripts with full images available through open access at http://projects.ias.edu/zmt.

ZMT 01755/BIBLIOTECA DELL'ACCADEMIA NAZIONALE DEI LINCEI E CORSINIANA

Digital Scholarship@IAS was formed in 2016 to accelerate the pace of research across disciplines and geographic locations by offering Faculty and Members new tools and technologies to gather and process large amounts of data, visualize the results, and make the data and results openly available. Over the course of the academic year 2016–17, significant progress has been achieved. A working group (Jeff Berliner, María Mercedes Tuya, Marcia Tucker, and Sabine Schmidtke) was formed to decide on first measures and initiatives and to outline its future development. A successful series of lunch talks (see sidebar) was initiated, and six speakers gave talks on various aspects of digital scholarship, events which resonated among Faculty and Members of all four Schools as well as external visitors from Princeton University, Princeton Theological Seminary, and Rutgers University.

A Digital Scholarship@IAS webpage (www.ias.edu/digital-scholarship) was launched, containing a powerful toolbox for digital scholarship; resources for historians, social scientists, and natural scientists; information on events in this field at IAS and neighboring institutions; and digital scholarship projects at the Institute. The webpage is continuously curated. In addition, IAS is a member of the New Jersey Digital Humanities Consortium established in September 2016. It was further decided to set up an institutional repository (based on DSpace), a decision of immediate relevance for fundraising efforts and to showcase the output of Institute Faculty. The repository, known as "Albert," will be launched in September 2017.

As a continuation of the two Digital Ottoman Platform workshops of 2015 and 2016, led by Professor Schmidtke, the Institute sponsors OpenOttoman.org. OpenOttoman is developing into a powerful international consortium and partnering with other institutions, among them Pleiades, a joint project of the Ancient World Mapping Center; the Stoa Consortium; and the Institute for the Study of the Ancient World.

The Zaydi Manuscript Tradition: A Digital Portal, led by Professor Schmidtke, was launched in April in partnership with the Hill Museum & Manuscript Library (HMML). HMML serves as a repository for the images and metadata, and the digital portal that allows systematic access to the materials is hosted on the IAS website (http://projects.ias.edu/zmt). Currently, the project comprises 969 manuscripts with full images available through open access; by 2020, some 10,000 to 15,000 manuscripts (mainly from Yemen, but also from European and North American libraries and other places in the Middle East) will be uploaded to the repository and the portal.

Preparations to digitize the Institute's unique collection of squeezes of Greek inscriptions (ca. 60,000 pieces) with the aim of making them available through open access have been taken, an initiative led by Professor Angelos Chaniotis.

Various websites have been set up to highlight research initiatives by IAS Faculty, such as Professor Patrick Geary's Medieval Genetics project; Professor Schmidtke's Shii Studies Research Program; and Professor Chaniotis's database of sources for the study of emotions in the Greek world, which will soon go online.

In Near Eastern Studies, "Eduard Glaser and His Arabic Manuscript Projects," led by Professor Schmidtke, was started in partnership with the Consejo Superior de Investigaciones, Madrid (with Jan Thiele), using the OCHRE Data Service of the University of Chicago as its platform.

DIGITAL SCHOLARSHIP CONVERSATIONS, 2016–17

October 12
Digital Scholarship Conversations ✦ *Digitization and the Law: Copyright, Fair Use, and Open Access* ✦ **Kyle Courtney**, Office for Scholarly Communication, Harvard University

November 11
Digital Scholarship Conversations ✦ *PersDig@UMD, OpenITI, and the Construction of the Infrastructure for Digital Humanities Scholarship on the Premodern Islamicate World* ✦ **Matthew Thomas Miller**, Roshan Institute for Persian Studies, University of Maryland

December 5
Digital Scholarship Conversations ✦ *Enhancing Understanding through Data Visualization* ✦ **Ryan Womack**, Rutgers University Libraries

February 27
Digital Scholarship Conversations ✦ *Mining Stylistic Vividness in Narrative Beginnings: A Scaled Analysis of German Modernism* ✦ **J. Berenike Herrmann**, Georg-August-University Göttingen

March 13
Digital Scholarship Conversations ✦ *Giving Voice to Ancient Texts: Digital Preservation and Access for Endangered Manuscripts from Threatened Communities* ✦ **Columba Stewart**, St. John's University and Hill Museum & Manuscript Library; Member, School of Historical Studies

April 5
Digital Scholarship Conversations ✦ *The Register of the Arabs: Classical Arabic Poetry and Distant Reading* ✦ **Elias Muhanna**, Watson Institute for International & Public Affairs, Brown University

RECORD OF EVENTS

School of Historical Studies

September 26

East Asian Studies Seminar ✦ *Why Are You Sitting in That Tree? Two Intertwined Themes in Buddhist China, Seventeenth to Twentieth Centuries* ✦ **Raoul Birnbaum**, University of California, Santa Cruz; Member, School of Historical Studies

September 27

Medieval Studies Seminar ✦ *First Term Introductions* ✦ **Patrick J. Geary**, Andrew W. Mellon Professor, School of Historical Studies

September 29

Lunchtime Colloquia ✦ *First Term Introductions* ✦ **Angelos Chaniotis**, Professor, School of Historical Studies

October 4

Medieval Studies Seminar ✦ *Graphic Signs of Authority in Late Antiquity and the Early Middle Ages: A Cultural History* ✦ **Ildar Garipzanov**, University of Oslo; Member, School of Historical Studies

October 5

Modern International Relations Seminar ✦ *Informal Group Discussion*

October 6

Lunchtime Colloquia ✦ *When Emile Went to War: Becoming a Citizen-Soldier* ✦ **Thomas Dodman**, Boston College; Member, School of Historical Studies

October 11

Medieval Studies Seminar ✦ *Before Abelard: The Intellectual Tradition and the Emergence of the "New" Schools, ca. 1050–1100* ✦ **Frank Rexroth**, Georg-August-Universität Göttingen; Member, School of Historical Studies

October 12

Modern International Relations Seminar ✦ *Informal Group Discussion*

Digital Scholarship Conversations: *Digitization and the Law: Copyright, Fair Use, and Open Access* ✦ **Kyle K. Courtney**, Harvard University

October 13

Lunchtime Colloquia ✦ *Spiral Letters: Material Texts and Power in Early Modern Korea* ✦ **Hwisang Cho**, Xavier University; Member, School of Historical Studies

Public Lecture ✦ *Mahatma Gandhi and Islam* ✦ **Gita Dharampal-Frick**, Universität Heidelberg

October 17

East Asian Studies Seminar ✦ *Building Communism: Soviet Advisors in China, 1949–59* ✦ **Deborah Kaple**, Princeton University

October 18

Ancient Studies Seminar ✦ *Transformations in Egyptian Scribal Culture in the Hellenistic and Roman Periods* ✦ **Jacco Dieleman**, University of California, Los Angeles; Member, School of Historical Studies

Medieval Studies Seminar ✦ *Astrologers, the Future, and the Fascination with Time—Approaches to a Transdisciplinary Discussion* ✦ **Klaus Oschema**, Universität Heidelberg; Member, School of Historical Studies

October 19

Modern International Relations Seminar ✦ *Informal Group Discussion*

October 20

Lunchtime Colloquia ✦ *From Left to Right: Lucy S. Dawidowicz, the New York Intellectuals, and the Politics of Jewish History* ✦ **Nancy Sinkoff**, Rutgers, The State University of New Jersey; Member, School of Historical Studies

October 21

Near Easterner's Lunch ✦ *Informal Group Discussion*

October 26

Modern International Relations Seminar ✦ *Informal Group Discussion*

October 27

Lunchtime Colloquia ✦ *Intimate Relations: Students, Masters, and Truth at the "New" Schools of the Twelfth Century* ✦ **Frank Rexroth**, Georg-August-Universität Göttingen; Member, School of Historical Studies

October 31

Medieval Studies Seminar ✦ *Relationships between Nomadic-Pastoralist Incomers and the Settled Population of Fifth-Century Hungary* ✦ **Susanne Hakenbeck**, University of Cambridge; Member, School of Historical Studies

November 2

Modern International Relations Seminar ✦ *Informal Group Discussion*

Book Talk ✦ *Patricia Crone's Collected Studies in Three Volumes* ✦ Commentary by **Sabine Schmidtke**, Professor, School of Historical Studies ✦ **Kathy van Vliet-Leigh**, Brill Academic Publishers ✦ **Michael A. Cook**, Princeton University ✦ **Hanna Siurua**, Editor of Patricia Crone's *Collected Studies*

November 3

Lunchtime Colloquia ✦ *Domesticating the Global and Materializing the Unknown: A Study of Album of Beasts at the Qianlong Court* ✦ **Yu-chih Lai**, Academia Sinica; Member, School of Historical Studies

November 7

East Asian Studies Seminar ✦ *Identities and Boundaries in Early Medieval China* ✦ **Andrew Chittick**, Eckerd College; Member, School of Historical Studies

November 8

Medieval Studies Seminar ✦ *Byzantine Intersectionality: Some Minuscule Histories on Premodern Oppression* ✦ **Roland Betancourt**, University of California, Irvine; Member, School of Historical Studies

November 9

Modern International Relations Seminar ✦ *Informal Group Discussion*

November 10

Lunchtime Colloquia ✦ *Libiamo ne' lieti calici*: *Symposiastic Life in an Egyptian Village: New Ostraca from the French-Italian Excavations in Tebtynis* ✦ **Fabian Reiter**, Universität Trier; Member, School of Historical Studies

November 14

East Asian Studies Seminar ✦ *Privilege vs. Market: Conceiving Government Bonds in Qing China and Meiji Japan* ✦ **Elisabeth Kaske**, Carnegie Mellon University; Member, School of Historical Studies

November 15

Ancient Studies Seminar ✦ *Conversations with the Gods: Q&A in the Oracular Tablets of Dodona* ✦ **Angelos Chaniotis**, Professor, School of Historical Studies

Medieval Studies Seminar ✦ *Illusion in Theory and Practice* ✦ **Robert Goulding**, University of Notre Dame; Member, School of Historical Studies

November 16

Modern International Relations Seminar ✦ *Informal Group Discussion*

Art History Seminar ✦ *Thinks I, Shooting Stars*? ✦ **Yve-Alain Bois**, Professor, School of Historical Studies

November 17

Lunchtime Colloquia ✦ *The View from the Tigris: Recentering the Origins of Christian Monasticism* ✦ **Columba Stewart**, St. John's University; Member, School of Historical Studies

November 22
Medieval Studies Seminar ✦ *Ascetic Taxonomy of Antioch and Edessa* ✦ **Columba Stewart**, St. John's University; Member, School of Historical Studies

November 23
Modern International Relations Seminar ✦ *Informal Group Discussion*

November 30
Modern International Relations Seminar ✦ *Informal Group Discussion*

December 1
Lunchtime Colloquia ✦ *Coacoochee's Borderlands: A Native American Explorer in Nineteenth-Century North America* ✦ **Cameron B. Strang**, University of Nevada, Reno; Member, School of Historical Studies

December 5
East Asian Studies Seminar ✦ *Taboos, Rituals, and Magic on Travel in Medieval China* ✦ **Xin Yu**, Fudan University; Member, School of Historical Studies

December 6
Ancient Studies Seminar ✦ *Booze and Weeds in an Egyptian Village? Problematic Issues in the New Ostraca from Tebtynis* ✦ **Fabian Reiter**, Universität Trier; Member, School of Historical Studies

Medieval Studies Seminar ✦ *Old Hispanic Chant and the Textual Culture of Visigothic Iberia* ✦ **Rebecca Maloy**, University of Colorado; Member, School of Historical Studies

December 7
Modern International Relations Seminar ✦ *Informal Group Discussion*

December 8
Lunchtime Colloquia ✦ *The Album of Ahmed I: Cross-Cultural Collecting and the Art of Album-Making in Seventeenth-Century Istanbul* ✦ **Emine Fetvaci**, Boston University; Member, School of Historical Studies

December 12
East Asian Studies Seminar ✦ *Research Notes on Climate Change and Steppe Empires* ✦ **Nicola Di Cosmo**, Luce Foundation Professor in East Asian Studies, School of Historical Studies

December 14
Public Lecture ✦ *Jewish and Islamic Philosophical Thought in al-Andalus: New Perspectives* ✦ **Sarah Stroumsa**, The Hebrew University of Jerusalem.

Art History Seminar ✦ *Looking at Byzantine Manuscripts Relating to Siege Warfare and Other Diagrammatic Depictions of Space in Order to Consider the oOntology of the Secular Image as a Distributed Network of Objects, Images, and Things* ✦ **Roland Betancourt**, University of California, Irvine; Member, School of Historical Studies

December 15
Lunchtime Colloquia ✦ *Two Philosophies of Money in Early Eighteenth-Century Japan* ✦ **Federico Marcon**, Princeton University; Member, School of Historical Studies

January 16
East Asian Studies Seminar ✦ *Making "The Forgotten Emperor": Documentaries and Academic Research in a Digital Age* ✦ **Chao-Hui Jenny Liu**, Princeton University, and **Virginia Bower**, University of the Arts, Philadelphia

January 17
Medieval Studies Seminar ✦ *Second Term Introductions* ✦ **Patrick J. Geary**, Andrew W. Mellon Professor, School of Historical Studies

January 19
Lunchtime Colloquia ✦ *Second Term Introductions* ✦ **Angelos Chaniotis**, Professor, School of Historical Studies

January 23
East Asian Studies Seminar ✦ *Epistolary Revolution in Early Modern Korea* ✦ **Hwisang Cho**, Xavier University; Member, School of Historical Studies

January 24
Ancient Studies Seminar ✦ *Roman Emperors and the Acceptance of Divine Honors* ✦ **Christopher Jones**, Harvard University

Medieval Studies Seminar ✦ *The Spectre in the Garden* ✦ **Robert Goulding**, University of Notre Dame; Member, School of Historical Studies

January 25
Modern International Relations Seminar ✦ *Informal Group Discussion*

January 26
Lunchtime Colloquia ✦ *The Political Economy of Office Selling in Nineteenth Century China* ✦ **Elisabeth Kaske**, Carnegie Mellon University; Member, School of Historical Studies

February 1
Modern International Relations Seminar ✦ *Informal Group Discussion*

February 2
Lunchtime Colloquia ✦ *Early Modern Iberian Bibliopolitics* ✦ **Fabien Montcher**, Saint Louis University; Member, School of Historical Studies

February 6
East Asian Studies Seminar ✦ *How Did Money Think in Tokugawa Japan?* ✦ **Federico Marcon**, Princeton University; Member, School of Historical Studies

February 7
Ancient Studies Seminar ✦ *Ideological Expression in Achaemenid Persia: The Glorification of the King and the Conjunction with the Divine* ✦ **Matthew Waters**, University of Wisconsin–Eau Claire; Member, School of Historical Studies

February 8
Art History Seminar ✦ *The Visual Field of Moscow Conceptualism: Reflections on "Thinking Pictures" (Zimmerli Art Museum, September–December 2016)* ✦ **Jane Sharp**, Rutgers, The State University of New Jersey

February 9
Lunchtime Colloquia ✦ *Consolidating Ecclesiastical Authority: The Case of the Patriarchate of Constantinople in the Early Modern Ottoman Empire* ✦ **Anastasios (Tom) Papademetriou**, Stockton University; Member, School of Historical Studies

February 14
Medieval Studies Seminar ✦ *The Vocabulary of Power in Charlemagne's Capitularies* ✦ **Jennifer Davis**, The Catholic University of America; Member, School of Historical Studies

February 15
Modern International Relations Seminar ✦ *Informal Group Discussion*

February 16
Lunchtime Colloquia ✦ *Labors of Vietnamese Territory: The Crucible of Dien Bien Phu (1953–54)* ✦ **Christian Lentz**, The University of North Carolina at Chapel Hill; Member, School of Historical Studies

February 21
Medieval Studies Seminar ✦ *Wretched Experts—Astrologers and the Reciprocal Elucidation of Modern and Medieval Expertise* ✦ **Klaus Oschema**, Universität Heidelberg; Member, School of Historical Studies

February 22
Modern International Relations Seminar ✦ *Informal Group Discussion*

February 23
Lunchtime Colloquia ✦ *The Life and Afterlife of Román Ramírez, Morisco of Deza* ✦ **Patrick O'Banion**, Lindenwood University; Member, School of Historical Studies

February 24
Workshop: *Why Syriac Matters* ✦ **Muriel Debié**, École Pratique des Hautes Études; Member, School of Historical Studies

February 27

East Asian Studies Seminar ✦ *Imaginary Histories: Ezra Pound's China and Japan* ✦ **Michael Davis**, Princeton Theological Seminary

February 28

Ancient Studies Seminar ✦ *Hermupolis Magna and the Nomarchy of Antinoopolis: The Foundation of a New City and Its Administrative Challenges* ✦ **Alexander Free**, Ludwig-Maximilians-Universität München

Medieval Studies Seminar ✦ *Faltering Images: Failure and Error in Byzantine Manuscript Illumination* ✦ **Roland Betancourt**, University of California, Irvine; Member, School of Historical Studies

March 1

Modern International Relations Seminar ✦ *Informal Group Discussion*

Book Talk ✦ *The Invention of Humanity* ✦ **Siep Stuurman**, Author; Member (2005) in the School of Historical Studies ✦ Panelists: **Jonathan Israel**, Professor Emeritus, School of Historical Studies; **Nicola Di Cosmo**, Luce Foundation Professor in East Asian Studies, School of Historical Studies; **Michael Walzer**, Professor Emeritus, School of Social Science

March 2

Lunchtime Colloquia ✦ *Building the Greater Nazi Reich: Lessons from "The Man in The High Castle" and Occupied Norway* ✦ **Despina Stratigakos**, University at Buffalo, The State University of New York; Member, School of Historical Studies

March 3

Epigraphic Friday ✦ *Posthumous Honors for Philopoemen (IG V 432)* ✦ **Christopher Jones**, Harvard University ✦ *LSCG 139 and Its Contexts* ✦ **Andrej Petrovic**, University of Virginia ✦ *The Two Faces of Marmarini (Kernos 2015: 13–51; 2016: 185–268)* ✦ **Mat Carbon**, Center for Hellenic Studies, Harvard University, Washington, D.C. ✦ *Honoring the Official: Honorific Monuments from Ptolemaic Cyprus as Mirror of the Relationship Between Polis, Official, and King* ✦ **Benjamin Wieland**, Albert-Ludwigs-Universität Freiburg ✦ *The Memory of Salmakis: A Historical and Cultural Approach to the "Pride of Halikarnassos"* ✦ **Marco Santini**, Princeton University ✦ *New Inscriptions from Hierapolis* ✦ **Francesco Guizzi**, Università degli Studi di Roma, La Sapienza; Member, School of Historical Studies ✦ *Hadrian's Epigram from Thespiai* ✦ **Paraskevi Martzavou**, Columbia University ✦ *Modeling the Future of the Past: 3D Imaging and Epigraphy* ✦ **Aaron Hershkowitz**, Rutgers, The State University of New Jersey ✦ *A New Encomium from Aphrodisias* ✦ **Angelos Chaniotis**, Professor, School of Historical Studies ✦ *Aphrodisias in Late Antiquity, no. 154 and Rome* ✦ **Glen W. Bowersock**, Professor Emeritus, School of Historical Studies

March 6

East Asian Studies Seminar ✦ *Postcolonial Territory in Asia's Borderlands* ✦ **Christian Lentz**, The University of North Carolina at Chapel Hill; Member, School of Historical Studies

March 7

Medieval Studies Seminar ✦ *Evagrius Ponticus, The Gnostikos, or, To the One Who Has Become Worthy of Knowledge: A New Translation from the Greek and Syriac* ✦ **Columba Stewart**, St. John's University; Member, School of Historical Studies

March 8

Modern International Relations Seminar ✦ *Informal Group Discussion*

Public Lecture ✦ *Ramon Marti: Engaging Islam and Judaism on the Edge of Scholastic Christendom* ✦ **Thomas Burman**, University of Notre Dame

March 9

Lunchtime Colloquia ✦ *Roll Over, Darwin: Structuralist Evolution Theory, 1750s till 1950s* ✦ **Nicolaas Rupke**, Washington and Lee University; Member, School of Historical Studies

March 13

East Asian Studies Seminar ✦ *Truth Contested: Imperial Politics, Image Discourse, and European Botanical Studies at the Qianlong Court* ✦ **Yu-chih Lai**, Academia Sinica; Member, School of Historical Studies

March 15

Art History Seminar ✦ *The Artist and xyr Model: Or, What Counts as Convention?* ✦ **Beatrice Kitzinger**, Princeton University

March 16

Lunchtime Colloquia ✦ *Jerusalem in the Seventh Century: A Case of Divided Memories* ✦ **Muriel Debié**, École Pratique des Hautes Études; Member, School of Historical Studies

March 21

Medieval Studies Seminar ✦ *From Scripture to Chant: The Sacrificia as Biblical Exegesis* ✦ **Rebecca Maloy**, University of Colorado; Member, School of Historical Studies

March 23

Lunchtime Colloquia ✦ *Carolingian Legal Culture and the Wandalgarius Codex* ✦ **Jennifer Davis**, The Catholic University of America; Member, School of Historical Studies

March 27–28

Climate Change in Eurasian Late Antiquity: A Dialogue between Science, History, and Archaeology ✦ *Environment, Climate, and Society in the Late Antique Eastern Mediterranean: An Analysis of Adaptation, Vulnerability, and Regionality* ✦ **Adam Izdebski**, Jagiellonian University, Krakow, Poland ✦ *Short-Term Environmental Shocks and Socio-Political Change in Sixth-Century Antioch* ✦ **Lee Mordechai**, Princeton University ✦ *Dust Storms and Urban Greening in China's Medieval Capital Kaifeng, 900–1150* ✦ **Yuan Chen**, Yale University ✦ *Short-Term Climate Change, Mass Migration, and Political Upheaval in the Late Medieval World, ca. 1160–1220* ✦ **William Atwell**, Hobart and William Smith Colleges ✦ *Climate Variability and Early Nomadic Empires* ✦ **Nicola Di Cosmo**, Luce Foundation Professor in East Asian Studies, School of Historical Studies ✦ *Eurasian Megadroughts and the Hun-Avar Migrations* ✦ **Edward Cook**, Lamont-Doherty Earth Observatory, Columbia University ✦ *Tree-Ring Evidence for the Late Antique Little Ice Age* ✦ **Ulf Büntgen**, Cambridge University ✦ *Mystery Eruptions and Forensic Volcanology in the Late Antique Period* ✦ **Clive Oppenheimer**, Cambridge University ✦ *Environmental History and Historical Climatology* ✦ **John McNeill**, Georgetown University ✦ *Rise and Collapse of the Xiongnu and Xianbei Empires in Inner Asia: Was Climate Involved?* ✦ **Ursula Brosseder**, Universität Bonn ✦ *The Turkic Empires in Inner Asia: Climate Change, Collapse, and Resilience* ✦ **Jan Bemmann**, Universität Bonn ✦ *Political and Social Factors in the Shaping of an Archaeological Landscape: The Case of the Bukhara Oasis (Uzbekistan) between the third/fourth and the ninth/tenth centuries C.E.* ✦ **Sören Stark**, Institute for the Study of the Ancient World, New York University ✦ *Morbifera Nubes: Climate and Infectious Disease in Late Antiquity* ✦ **Timothy Newfield**, Georgetown University ✦ *Using Stable Isotope Analysis to Investigate Climate Change in Historic Periods: What Can the Method Tell Us?* ✦ **Susanne Hakenbeck**, University of Cambridge

March 28

Ancient Studies Seminar ✦ *Water for the City: New Epigraphic Evidence from the Lycos Valley (Turkey)* ✦ **Francesco Guizzi**, Università degli Studi di Roma, La Sapienza; Member, School of Historical Studies

Medieval Studies Seminar ✦ *War and Religions in Late Antique Northern Mesopotamia: An Unedited Syriac Text on the Transformation of a Church into a Fire Temple in Amida (Diyarbakir)* ✦ **Muriel Debié**, École Pratique des Hautes Études; Member, School of Historical Studies

March 29

Modern International Relations Seminar ✦ *Informal Group Discussion*

March 30

Lunchtime Colloquia ✦ *Heaven Can Tell: Late Medieval Astrologers as Experts and Scientific Political Advisers* ✦ **Klaus Oschema**, Universität Heidelberg; Member, School of Historical Studies

April 4

Medieval Studies Seminar ✦ *Byzantine Liturgical Rites at a Lost Pregnancy: Orthodox Christianity, Women, Miscarriage, and Abortion in the Late Middle Ages* ✦ **Nina Glibetic**, The Hebrew University of Jerusalem; Member, School of Historical Studies

April 5

Modern International Relations Seminar ✦ *Informal Group Discussion*

Public Lecture ✦ *Qur'anists in al-Andalus?* ✦ **Maribel Fierro**, Instituto de Lenguas y Culturas del Mediterráneo y Oriente Próximo, Consejo Superior de Investigaciones Cientificas

April 6

Lunchtime Colloquia ✦ *Heaven and History: Astrology and Regimes of Historicity in Early Islam* ✦ **Antoine Borrut**, University of Maryland, College Park; Member, School of Historical Studies

April 11

Ancient Studies Seminar ✦ *Assessing Deception and Truthfulness in Forensic Narratives from Classical Athens* ✦ **Christos Kremmydas**, Royal Holloway, University of London; Member, School of Historical Studies

Medieval Studies Seminar ✦ *The Schools of Peter Abelard and the Boundaries of Scholarly Communication in the Twelfth Century* ✦ **Frank Rexroth**, Georg-August-Universität Göttingen; Member, School of Historical Studies

April 12

Modern International Relations Seminar ✦ *Informal Group Discussion*

April 13

Lunchtime Colloquia ✦ *U.S.-Germany-China: The Search for Order and National Advantage* ✦ **Klaus Larres**, The University of North Carolina, Chapel Hill; Member, School of Historical Studies

April 18

Medieval Studies Seminar ✦ *The Ritual Performance of Female Identity in Byzantium: A Liturgical Rite of Passage for Binding Up an Adolescent's Hair* ✦ **Gabriel Radle**, Seeger Center for Hellenic Studies, Princeton University

April 20–21

Patricia Crone Memorial Conference: The Arabic Literary Genizot Beyond Denominational Borders ✦ *Opening Remarks* ✦ **Sabine Schmidtke**, Professor, School of Historical Studies ✦ *The Literary Genizot: A Window to a Mediterranean Republic of Letters* ✦ **Sarah Stroumsa**, The Hebrew University of Jerusalem ✦ *Meanderings in the Arabic Literary Geniza* ✦ **Oded Zinger**, Duke University ✦ *The Afghan Genizah* ✦ **Shaul Shaked**, The Hebrew University of Jerusalem✦ *Ninth-Century Judeo-Arabic Biblical Exegesis in a Christian Context* ✦ **David Sklare**, Ben-Zvi Institute, Jerusalem ✦ *Sīrat ʿAntar in the Genizot of Cairo* ✦ **Krisztina Szilágyi**, University of Cambridge ✦ *Judaeo-Arabic Dream Books from the Cairo Genizah* ✦ **Blanca Villuendas**, CSIC, Madrid ✦ *The Hebrew Bible in the Judaeo-Islamic milieu* ✦ **Ben Outhwaite**, University of Cambridge ✦ *al-Uṣūl al-Muhadhdhabiyya: A Joint Theological Project of a Karaite Scholar and a Sunni Judge in Mid-Twelfth Century Fāṭimid Egypt* ✦ **Haggai Ben-Shammai**, The Hebrew University of Jerusalem ✦ *Abd al-Jabbār al-Hamaḏānī's K. al-Muḥīṭ bi-l-taklīf and Its Satellite Literature in Jewish Genizot (Reconstruction of the Relevant Texts and Their Reception among Jewish Readers)* ✦ **Gregor Schwarb**, School of Oriental and African Studies, London ✦ *Arabic (Theological/Philosophical) Literature in the Judaeo-Arabic Judicial Works from the Cairo Genizah* ✦ **Zvi Stampfer**, The Hebrew University of Jerusalem ✦ *The Reception of Qāḍī Ibn Labbād among the Muslims and Jews* ✦ **Sabine Schmidtke**, Professor, School of Historical Studies ✦ *Karaite Material in Arabic Script* ✦ **Geoffrey Khan**, University of Cambridge ✦ *Abd al-Jabbār and His Kitāb al-Manʿ wa-l-tamānu* ✦ **Hassan Farhang Ansari**, Member, School of Historical Studies ✦ *Syriac Scribbles in the Cairo Genizah and the Syriac Presence in Fustāt* ✦ **George A. Kiraz**, Beth Mardutho: The Syriac Institute ✦ *Linguistic Variation in Egyptian Judaeo-Arabic and Arabic Folk Narratives from the Ottoman Period* ✦ **Magdalen Connolly**, University of Cambridge ✦ *Muslim Arabic Literature in Hebrew Letters: A Neglected Genizah* ✦ **María Ángeles Gallego**, Instituto de Lenguas y Culturas del Mediterráneo y Oriente Próximo, CSIC, Madrid ✦ *The Sephardic Manuscripts in the Firkovitch Collection* ✦ **Alla Markova**, Brooklyn Public Library ✦ *Judeo-Arabic Preaching 800–1200: Uncovering a Lost Genre* ✦ **Moshe Lavee**, University of Haifa ✦ *Sufi Literature of Genizot from the Abraham Firkovich Collection of the National Library of Russia in St. Petersburg* ✦ **Pavel Basharin**, Russian State University for the Humanities, Moscow ✦ *Alchemical Texts in the Genizot* ✦ **Y. Tzvi Langerman**, Bar-Ilan University ✦ *Biblical Versions in Arabic: Recent Explorations in the Genizot* ✦ **Ronny Vollandt**, Ludwig-Maximilians-Universität München ✦ *Yefet Ben Eli's Translation and Commentary on the Book of Job in Judeo-Arabic: Differences between the Only Available Manuscript in Arabic Letters and the 24 Available Manuscripts in Hebrew Letters and Their Possible Sources and Explanations* ✦ **Arik Sadan**, Tel Aviv University ✦ *The Early Judeo-Persian Bible Exegesis: The Manuscripts in the British Library and in the National Library of Russia* ✦ **Ofir Haim**, The Hebrew University of Jerusalem ✦ *Bruno Chiesa's Scholarly Work on Paul Kahle* ✦ **Francesca Bellino**, Università degli Studi di Torino and Princeton University ✦ *Closing Remarks* ✦ **Sabine Schmidtke**, Professor, School of Historical Studies, and **Geoffrey Khan**, University of Cambridge

April 21

RBS-Mellon Symposium: Eccentric Readings in East Asia ✦ *Unconventional Ways of Writing Chinese in Dunhuang* ✦ **Imre Galambos**, University of Cambridge ✦ *Jumping and Twisting : Reading Buddhist Doxis through the Praxis of Popular Board Games* ✦ **Charlotte Eubanks**, The Pennsylvania State University ✦ *Responses* ✦ **Brinkley Messick**, Columbia University; **David Lurie**, Columbia University; **Paize Keulemans**, Princeton University ✦ Convened by **Hwisang Cho**, Xavier University; Member, School of Historical Studies; **Nicola Di Cosmo**, Luce Foundation Professor in East Asian Studies, School of Historical Studies

June 12–14

Advanced School in the Humanities: Judaism, Christianity, and Islam: Religious Communities and Communities of Knowledge ✦ *Opening Remarks* ✦ **Sabine Schmidtke**, Professor, School of Historical Studies, and **Guy Stroumsa**, The Hebrew University of Jerusalem ✦ *Parting Ways of Knowing: Rereading the "Two Powers" Statement in TB Ḥagigah 15a* ✦ **Emanuel Fiano**, Fordham University ✦ *To Divide and Construct—Ancient Christian Hereseology, Its Rise and Impact* ✦ **Winrich Löhr**, Universität Heidelberg ✦ *Intercommunal Oaths from Antiquity to Late Antiquity* ✦ **Moshe Blidstein**, The Hebrew University of Jerusalem ✦ *Simple Believers: The Layering of Knowledge in Christian Communities* ✦ **Jack Tannous**, Princeton University ✦ *The Greek-Syriac-Arabic Intellectual Interface Before Bayt al-Ḥikmah: The Case of George of the Arabs* ✦ **George A. Kiraz**, Beth Mardutho: The Syriac Institute ✦ *Science in the Service of Biblical History: A Ninth-Century Northern-Mesopotamian Account of the Longevity of the Patriarchs* ✦ **Yonatan Moss**, The Hebrew University of Jerusalem ✦ *Narrating Translation into Arabic in al-Andalus* ✦ **Maribel Fierro**, Instituto de Lenguas y Culturas del Mediterráneo y Oriente Próximo, Consejo Superior de Investigaciones Cientificas ✦ *The Chosen Place as Point of Content and Contention: Samaritan Traditions About Mount Garizim* ✦ **Stefan Schorch**, Martin-Luther-Univerität Halle-Wittenberg ✦ *The Significance of Silence: Single-Source Evidence on Intercommunal Events in al-Andalus* ✦ **Sarah Stroumsa**, The Hebrew University of Jerusalem ✦ *Between Hebraica Veritas, Graeca Veritas and Taḥrīf: Exegetical Strategies in Early Rūm Orthodox (Melkite) Polemic Tracts* ✦ **Miriam Hjälm**, Ludwig-Maximilians-Universität Müchen ✦ *Copts in Coexistence with Their Muslim Rulers in Eleventh-Century Egypt* ✦ **Juan Pedro Monferrer-Sala**, Universidad de Córdoba ✦ *The Concept of Adab among Muslims and Jews in Eleventh and Twelfth–Century Andalusia* ✦ **Reimund Leicht**, The Hebrew University of Jerusalem ✦ *Lost in Translation: Obstacles Endangering the Safe Journey of Philosophical Texts across Religious, Cultural, and Linguistic Boundaries* ✦ **Steven Harvey**, Bar-Ilan University ✦ *Selecting, Transforming, Integrating:*

The Mechanics of Appropriating Arabic 'Ilm among Thirteenth-Century Dominicans ✦ **Katja Krause**, Durham University ✦ *Learned Magic and Popular Beliefs: New Evidence for the Origins of the "Witches-Sabbat"* ✦ **Ayelet Even Ezra**, The Hebrew University of Jerusalem ✦ *The Other "Great Eagle": Interreligious Panegyrics and the Limits of Interpretation* ✦ **Jonathan Decter**, Brandeis University ✦ *Astrology Serving Judaism: Moses Ashkenazi Cohen's Urim ve-Tummim and Jewish Thought in the Fifteenth-Century Eastern Mediterranean* ✦ **Robert G. Morrison**, Bowdoin College ✦ *Closing Remarks* ✦ **Michael A. Cook**, Princeton University

School of Mathematics

September 15

Working Group on Algebraic Number Theory

Joint IAS/Princeton University Number Theory Seminar ✦ *Modular Forms and Optimization in Euclidean Space* ✦ **Maryna Viazovska**, Humboldt-Universität zu Berlin

September 20

Princeton/IAS Symplectic Geometry Seminar ✦ *Lagrangian Cell Complexes and Markov Numbers* ✦ **Jonny Evans**, University College London

Computer Science/Discrete Mathematics Seminar II ✦ *Algebraic Geometric Codes and Their Applications* ✦ **Gil Cohen**, Visitor, School of Mathematics

Short Talks by Postdoctoral Members ✦ *Effective Quantum Dynamics* ✦ **Sören Petrat**, Member, School of Mathematics ✦ *Log Geometric Techniques for Open Invariants in Mirror Symmetry* ✦ **Nurömür Hülya Argüz**, Member, School of Mathematics ✦ *Canonical Bases Arising from Quantum Symmetric Pairs* ✦ **Huanchen Bao**, Member, School of Mathematics ✦ *Witch Trees and the Kontsevich Operad* ✦ **Nathaniel Bottman**, Member, School of Mathematics ✦ *Resilient Functions* ✦ **Eshan Chattopadhyay**, Member, School of Mathematics ✦ *The Sum-of-squares Meta-algorithm for Computational Problems* ✦ **Pravesh Kothari**, Princeton University; Member, School of Mathematics

Auroux Watching Seminar

September 21

Homological Mirror Symmetry (minicourse) ✦ *Non-Archimedean Geometry for Symplectic Geometers* ✦ **Mohammed Abouzaid**, Columbia University; Member, School of Mathematics

Short Talks by Postdoctoral Members ✦ *Moduli Interpretations for Noncongruence Modular Curves* ✦ **William Yun Chen**, Member, School of Mathematics ✦ *Interaction between Wall Crossing and Quiver Representations* ✦ **Man Wai Cheung**, Member, School of Mathematics ✦ *Symplectic Topology and Critical Points of Complex-Valued Functions* ✦ **Sheel Ganatra**, Member, School of Mathematics ✦ *Points, Lines, Planes, Etc.* ✦ **June Huh**, Princeton University; Veblen Fellow, School of Mathematics ✦ *Strong-Coupling Renormalization Group in the Hierarchical Kondo Model* ✦ **Ian Jauslin**, Member, School of Mathematics ✦ *Long Time Behavior of Nonlinear Wave Equations and the Soliton Resolution Conjecture* ✦ **Hao Jia**, Member, School of Mathematics

September 22

Working Group on Algebraic Number Theory

Joint IAS/Princeton University Number Theory Seminar ✦ *Recent Progress on Serre Weight Conjectures* ✦ **Bao Le Hung**, The University of Chicago

September 23

Homological Mirror Symmetry (minicourse) ✦ *Non-Archimedean Geometry for Symplectic Geometers* ✦ **Mohammed Abouzaid**, Columbia University; Member, School of Mathematics

Short Talks by Postdoctoral Members ✦ *Almost Commuting Matrices* ✦ **Ilya Kachkovskiy**, Member, School of Mathematics ✦ *Twists of Elliptic Curves* ✦ **Nayoung Kim**, Member, School of Mathematics ✦ *Lifting Galois Representations* ✦ **Daniel Le**, Member, School of Mathematics ✦ *Mirror Symmetry for Open Surfaces* ✦ **Heather Lee**, Member, School of Mathematics ✦ *Which Homology Spheres Bound Homology Balls?* ✦ **Francesco Lin**, Princeton University; Veblen Research Instructor, School of Mathematics ✦ *Projective Dehn Twist* ✦ **Cheuk Yu Mak**, Member, School of Mathematics

September 26

Computer Science/Discrete Mathematics Seminar I ✦ *Counting Solutions to Random Constraint Satisfaction Problems* ✦ **Allan Sly**, Princeton University

NSF Information Session

Short Talks by Postdoctoral Members ✦ *On the 16-Rank of Class Groups of Quadratic Number Fields* ✦ **Djordjo Zeljko Milovic**, Member, School of Mathematics ✦ *Trivial and Interesting Relations from Fixed-Point Localization* ✦ **Amitai Netser Zernik**, Member, School of Mathematics ✦ *Accelerated Stochastic Gradient Descent via New Model for First-Order Optimization* ✦ **Zeyuan Allen-Zhu**, Member, School of Mathematics ✦ *Pseudo-calibration, Sum of Squares, and Planted Clique* ✦ **Aaron Potechin**, Member, School of Mathematics ✦ *Zeros of Polynomials on Cartesian Products* ✦ **Orit Esther Raz**, Member, School of Mathematics

September 27

Reading Group on Legendrian Knots and Associated Categories

Princeton/IAS Symplectic Geometry Seminar ✦ *Cost of Splitting Lagrangians* ✦ **Octav Cornea**, Université de Montréal

Short Talks by Postdoctoral Members ✦ *A Brief Introduction to Continuous Symplectic Geometry* ✦ **Sobhan Seyfaddini**, Member, School of Mathematics ✦ *Points* ✦ **Yiwei She**, Member, School of Mathematics ✦ *Floer Theory and Metrics in Contact and Symplectic Topology* ✦ **Egor Shelukhin**, Member, School of Mathematics ✦ *Symplectic Mapping Class Groups and Mirror Symmetry* ✦ **Nicholas Sheridan**, Princeton University; Member, School of Mathematics ✦ *Motives of Projective Pseudo-homogeneous Varieties* ✦ **Srimathy Srinivasan**, Member, School of Mathematics ✦ *Lagrangian and Legendrian Skeleta* ✦ **Zachary Sylvan**, Member, School of Mathematics

Auroux Watching Seminar

September 28

Short Talks by Postdoctoral Members ✦ *On the Sensitivity Conjecture* ✦ **Avishay Tal**, Member, School of Mathematics ✦ *Cycles in the de Rham Cohomology of Abelian Varieties* ✦ **Yunqing Tang**, Member, School of Mathematics ✦ *Geometric Langlands Correspondence via Quantization in Positive Characteristic* ✦ **Roman Travkin**, Member, School of Mathematics ✦ *Invariant Homotopy Theory in the Univalent Foundations* ✦ **Guillaume Brunerie**, Member, School of Mathematics ✦ *Homological Generalizations of Trace* ✦ **Dmitry Vaintrob**, Member, School of Mathematics ✦ *Transversality for Coproduct and Cobracket* ✦ **Dingyu Yang**, Member, School of Mathematics ✦ *Symplectic Topology and the Loop Space* ✦ **Jingyu Zhao**, Member, School of Mathematics

Mathematical Conversations ✦ *Local-to-Global Approaches to Homological Mirror Symmetry* ✦ **Mohammed Abouzaid**, Columbia University; Member, School of Mathematics

September 29

Working Group on Algebraic Number Theory

Analysis/Number Theory Seminar ✦ *Quantitative Distributional Aspects of Generic Diagonal Forms* ✦ **Jean Bourgain**, IBM von Neumann Professor, School of Mathematics

Joint IAS/Princeton University Number Theory Seminar ✦ *Asymptotic Behavior of Supercuspidal Representations and Sato-Tate Equidistribution for Families* ✦ **Ju-Lee Kim**, Massachusetts Institute of Technology; Visiting Professor, School of Mathematics

September 30

Beyond Endoscopy ✦ *Geometry of Arc Spaces and the Hankel Transform I* ✦ **Ngô Bảo Châu**, The University of Chicago ✦ *The Geometric Theory of Automorphic Forms over Riemann Surfaces as a Theory of Eigenfunctions of Hecke Operators and Its Possible Surprises I* ✦ **Robert P. Langlands**,

Professor Emeritus, School of Mathematics ✦ *Geometric Side of the Trace Formula and Related Problems* ✦ **Ali Altuğ**, Massachusetts Institute of Technology ✦ *Decomposing Symmetric Powers* ✦ **Bill Casselman**, The University of British Columbia ✦ *The Geometric Theory of Automorphic Forms over Riemann Surfaces as a Theory of Eigenfunctions of Hecke Operators and Its Possible Surprises II* ✦ **Robert P. Langlands**, Professor Emeritus, School of Mathematics

October 1

Beyond Endoscopy ✦ *Geometry of Arc Spaces and the Hankel Transform II* ✦ **Ngô Bảo Châu**, The University of Chicago ✦ *Regular Supercuspidal Representations* ✦ **Tasho Kaletha**, University of Michigan ✦ *L-Functions, Monoids, and Bessel Functions* ✦ **Freydoon Shahidi**, Purdue University ✦ *Asymptotics for Hecke Eigenvalues with Improved Error Term* ✦ **Jasmin Matz**, Universität Leipzig ✦ *Beyond Endoscopy and Geometric Terms* ✦ **James Arthur**, University of Toronto

October 4

Princeton/IAS Symplectic Geometry Seminar ✦ *Packaging the Construction of Kuranishi Structure on the Moduli Space of Pseudo-holomorphic Curve* ✦ **Kenji Fukaya**, Stony Brook University, The State University of New York ✦ *Projective Dehn Twist via Lagrangian Cobordism* ✦ **Cheuk Yu Mak**, Member, School of Mathematics

Special Math/Physics Seminar ✦ *Derivation of the Vlasov Equation* ✦ **Peter Pickl**, Ludwig-Maximilians-Universität München

Auroux Watching Seminar

October 5

Avi Is 60: A Celebration of Mathematics and Computer Science

Homological Mirror Symmetry (minicourse) ✦ *Liouville Sectors and Fukaya Categories of Stein Manifolds* ✦ **John Pardon**, Visitor, School of Mathematics

October 6

Avi Is 60: A Celebration of Mathematics and Computer Science

Working Group on Algebraic Number Theory

Joint IAS/Princeton University Number Theory Seminar ✦ *The Unpolarized Shafarevich Conjecture for K3 Surfaces* ✦ **Yiwei She**, Member, School of Mathematics

October 7

Avi Is 60: A Celebration of Mathematics and Computer Science

Homological Mirror Symmetry (minicourse) ✦ *Liouville Sectors and Fukaya Categories of Stein Manifolds* ✦ **John Pardon**, Visitor, School of Mathematics

October 8

Avi Is 60: A Celebration of Mathematics and Computer Science

October 10

Members' Seminar ✦ *Gauss-Manin Connections from a TQFT Viewpoint* ✦ **Paul Seidel**, Massachusetts Institute of Technology; Distinguished Visiting Professor, School of Mathematics

October 11

Homological Mirror Symmetry Reading Group ✦ *Gamma-Integral Structures Reading Group*

Princeton/IAS Symplectic Geometry Seminar ✦ *Monotone Lagrangians in Cotangent Bundles* ✦ **Luis Diogo**, Columbia University ✦ *Length and Width of Lagrangian Cobordisms* ✦ **Joshua Sabloff**, Haverford College; Member, School of Mathematics

Auroux Watching Seminar

October 12

Working Seminar on Representation Theory ✦ *Cocenters and Representations of p-adic Groups* ✦ **Xuhua He**, University of Maryland; von Neumann Fellow, School of Mathematics

Reading Group on Homological Mirror Symmetry and K3 Surfaces

Mathematical Conversations ✦ *Going to Mars for Symplectic Geometers and Their Friends* ✦ **Edward Belbruno**, Princeton University

October 13

Reading Group on Punctured Log Gromov-Witten Theory ✦ *A Smooth Introduction to Log Geometry and Log Gromov-Witten Theory*

Analysis Math-Physics Seminar ✦ *Universality in Numerical Computations with Random Data: Case Studies* ✦ **Percy A. Deift**, Courant Institute of Mathematical Sciences, New York University; Member, School of Mathematics

Working Group on Algebraic Number Theory

Joint IAS/Princeton University Number Theory Seminar ✦ *Local Points of Supersingular Elliptic Curves on Z_p-Extensions* ✦ **Mirela Ciperiani**, The University of Texas at Austin; von Neumann Fellow, School of Mathematics

October 17

Computer Science/Discrete Mathematics Seminar I ✦ *Matrix Invariants and Algebraic Complexity Theory* ✦ **Harm Derksen**, University of Michigan

Members' Seminar ✦ *Homological Mirror Symmetry and Symplectic Mapping Class Groups* ✦ **Nicholas Sheridan**, Princeton University; Member, School of Mathematics

October 18

Homological Mirror Symmetry Reading Group ✦ *Gamma-Integral Structures Reading Group*

Computer Science/Discrete Mathematics Seminar II ✦ *Real Rooted Polynomials and Multivariate Extensions* ✦ **Adam Marcus**, Princeton University; von Neumann Fellow, School of Mathematics

Princeton/IAS Symplectic Geometry Seminar ✦ *From Lusternik-Schnirelmann Theory to Conley Conjecture* ✦ **Başak Gürel**, University of Central Florida

Auroux Watching Seminar

October 19

Working Seminar on Representation Theory ✦ *Categorification of the Positive Half of* $\mathbb{U}_q(\mathfrak{sl}_2)$ ✦ **Huanchen Bao**, Member, School of Mathematics

Reading Group on Homological Mirror Symmetry and K3 Surfaces

Analysis Math-Physics Seminar ✦ *Universality in Numerical Computations with Random Data: Analytical Results* ✦ **Percy A. Deift**, Courant Institute of Mathematical Sciences, New York University; Member, School of Mathematics

October 20

Reading Group on Punctured Log Gromov-Witten Theory

Working Group on Algebraic Number Theory

Joint IAS/Princeton University Number Theory Seminar ✦ *The Hasse-Weil Zeta Functions of the Intersection Cohomology of Minimally Compactified Orthogonal Shimura Varieties* ✦ **Yihang Zhu**, Harvard University

October 21

Reading Group on Cluster Algebras

Mathematical Conversations ✦ *Extractors and Ramsey Graphs* ✦ **Eshan Chattopadhyay**, Member, School of Mathematics

October 24

Computer Science/Discrete Mathematics Seminar I ✦ *On the Query Complexity of Boolean Monotonicity Testing* ✦ **Xi Chen**, Columbia University

Marston Morse Lectures ✦ *Regularity Methods in Combinatorics, Number Theory, and Computer Science* ✦ **Jacob Fox**, Stanford University

October 25

Homological Mirror Symmetry Reading Group ✦ *Gamma-Integral Structures Reading Group*

Computer Science/Discrete Mathematics Seminar II ✦ *Sum of Squares, Quantum Entanglement, and Log Rank* ✦ **David Steurer**, Cornell University; Member, School of Mathematics

Princeton/IAS Symplectic Geometry Seminar ✦ *Towards a Theory of Singular Symplectic Varieties* ✦ **Aleksey Zinger**, Stony Brook University, The State University of New York

Marston Morse Lectures ✦ *Arithmetic Regularity, Removal, and Progressions* ✦ **Jacob Fox**, Stanford University

Auroux Watching Seminar

October 26

Homological Mirror Symmetry (minicourse) ✦ *Logarithmic Gromov-Witten Invariants* ✦ **Helge Ruddat**, Johannes Gutenberg-Universität Mainz; Member, School of Mathematics

Reading Group on Homological Mirror Symmetry and K3 Surfaces

Analysis Math-Physics Seminar ✦ *The Sachdev-Ye-Kitaev Quantum Mechanics Model, Black Holes, and Random Matrices* ✦ **Douglas Stanford**, Member, School of Natural Sciences

Marston Morse Lectures ✦ *Dependent Random Choice* ✦ **Jacob Fox**, Stanford University

Mathematical Conversations ✦ *Phase Transitions and Symmetry Breaking* ✦ **Ian Jauslin**, Member, School of Mathematics

October 27

Reading Group on Punctured Log Gromov-Witten Theory

Working Group on Algebraic Number Theory

Joint IAS/Princeton University Number Theory Seminar ✦ *The Arithmetic of Noncongruence Subgroups of SL(2, Z)* ✦ **William Yun Chen**, Member, School of Mathematics

October 28

Homological Mirror Symmetry (minicourse) ✦ *Logarithmic Gromov-Witten Invariants* ✦ **Helge Ruddat**, Johannes Gutenberg-Universität Mainz; Member, School of Mathematics

October 29

Workshop on Topology: Identifying Order in Complex Systems ✦ *Directed Co/Homology Sheaves for Pursuit/Evasion Games* ✦ **Robert Ghrist**, University of Pennsylvania ✦ *Minimizers of the Landau–de Gennes Energy Around a Spherical Colloid Particle* ✦ **Lia Bronsard**, McMaster University ✦ *Global Defect Topology in Nematic Liquid Crystals* ✦ **Thomas Machon**, University of Pennsylvania ✦ *Distance Functions, Data, and Comparison Geometry* ✦ **Steven Ferry**, Rutgers, The State University of New Jersey ✦ *No Equations, No Parameters, No Variables: Data and the Reconstruction of Normal Forms by Learning Informed Observation Geometries* ✦ **Yannis Kevrekidis**, Princeton University

October 31

Workshop on Emerging Topics

Computer Science/Discrete Mathematics Seminar I ✦ *Communication Complexity of Approximate Nash Equilibria* ✦ **Aviad Rubinstein**, University of California, Berkeley

Members' Seminar ✦ *Reciprocity Laws for Torsion Classes* ✦ **Ana Caraiani,** Universität Bonn

November 1

Workshop on Emerging Topics

Homological Mirror Symmetry Reading Group ✦ *Gamma-Integral Structures Reading Group*

Computer Science/Discrete Mathematics Seminar II ✦ *Settling the Complexity of Computing Approximate Two-Player Nash Equilibria* ✦ **Aviad Rubinstein**, University of California, Berkeley

Princeton/IAS Symplectic Geometry Seminar ✦ *Lagrangian Whitney Sphere Links* ✦ **Ivan Smith**, University of Cambridge

Auroux Watching Seminar

November 2

Workshop on Emerging Topics

Homological Mirror Symmetry Seminar ✦ *Riemann-Hilbert Correspondence Revisited* ✦ **Yan Soibelman**, Kansas State University

Reading Group on Homological Mirror Symmetry and K3 Surfaces

November 3

Workshop on Emerging Topics

November 4

Workshop on Emerging Topics

Homological Mirror Symmetry Reading Group ✦ *A Proof of Gamma Conjecture in Some Cases via Mirror Symmetry* ✦ **Hiroshi Iritani**, Kyoto University

Members' Seminar ✦ *Counting Galois Representations* ✦ **Frank Calegari**, The University of Chicago

Mathematical Conversations ✦ *Asymptotic Representation Theory over Z* ✦ **Thomas Church**, Stanford University; Member, School of Mathematics

November 7

Workshop on Homological Mirror Symmetry: Methods and Structures

Computer Science/Discrete Mathematics Seminar I ✦ *Non-unique Games over Compact Groups and Orientation Estimation in Cryo-EM* ✦ **Amit Singer**, Princeton University

November 8

Workshop on Homological Mirror Symmetry: Methods and Structures

Computer Science/Discrete Mathematics Seminar II ✦ *Exact Tensor Completion via Sum of Squares* ✦ **Aaron Potechin**, Member, School of Mathematics

November 9

Workshop on Homological Mirror Symmetry: Methods and Structures

Working Seminar on Representation Theory ✦ ***C**-Representation Theory of p-adic Groups through the Glass of Types* ✦ **Ju-Lee Kim**, Massachusetts Institute of Technology; Visiting Professor, School of Mathematics

Analysis Math-Physics Seminar ✦ *Strong Ballistic Transport for Quasiperiodic Schrödinger Operators and Lieb-Robinson Bounds for XY Spin Chains* ✦ **Ilya Kachkovskiy**, Member, School of Mathematics

November 10

Workshop on Homological Mirror Symmetry: Methods and Structures

Working Group on Algebraic Number Theory

Joint IAS/Princeton University Number Theory Seminar ✦ *Albanese of Picard Modular Surfaces, and Rational Points* ✦ **Mladen Dimitrov**, Université Lille 1

November 11

Workshop on Homological Mirror Symmetry: Methods and Structures

November 12

Facets of Differential Privacy Symposium ✦ *Composition: The Key to Differential Privacy is Success* ✦ **Guy Rothblum**, Weizmann Institute ✦ *Differentially Private Algorithms: Some Primitives and Paradigms* ✦ **Kunal Talwar**, Google Brain ✦ *Dusting for Fingerprints in Private Data* ✦ **Jonathan Ullman**, Northeastern University ✦ *Differential Privacy in Context: Conceptual and Ethical Considerations* ✦ **Helen Nissenbaum**, Cornell Tech and New York University ✦ *Rigorous Data Dredging: Theory and Tools for Adaptive Data Analysis* ✦ **Aaron Roth**, University of Pennsylvania

November 14

Computer Science/Discrete Mathematics Seminar I ✦ *The Mathematics of Natural Algorithms* ✦ **Bernard Chazelle**, Princeton University

Members' Seminar ✦ *Eigenvalue Bounds on Sums of Random Matrices* ✦ **Adam Marcus**, Princeton University; von Neumann Fellow, School of Mathematics

November 15

Computer Science/Discrete Mathematics Seminar II ✦ *Non-malleable Extractors for Constant Depth Circuits, and Affine Functions* ✦ **Eshan Chattopadhyay**, Member, School of Mathematics

Homological Mirror Symmetry Reading Group ✦ *Gamma Class from Gauged Linear Sigma Models and B-Brane Transport* ✦ **Mauricio Romo**, Member, School of Natural Sciences

Princeton/IAS Symplectic Geometry Seminar ✦ *The Gauged Symplectic Sigma-Model* ✦ **Constantin Teleman**, University of California, Berkeley, and University of Oxford

Auroux Watching Seminar

November 16

Working Seminar on Representation Theory ✦ *p-adic Representations of p-adic Groups* ✦ **Daniel Le**, Member, School of Mathematics

Reading Group on Homological Mirror Symmetry and K3 Surfaces

Analysis Math-Physics Seminar ✦ *Free Dynamics of a Tracer Particle in a Fermi Sea* ✦ **Sören Petrat**, Member, School of Mathematics

Mathematical Conversations ✦ *The Uncertainty Principle* ✦ **Charles Fefferman**, Princeton University

November 17

Working Group on Algebraic Number Theory

Joint IAS/Princeton University Number Theory Seminar ✦ *Nonabelian Cohen-Lenstra Heuristics and Function Field Theorems* ✦ **Melanie Wood**, University of Wisconsin–Madison

November 21

Computer Science/Discrete Mathematics Seminar I ✦ *On the Effect of Randomness on Planted 3-Coloring Models* ✦ **Uri Feige**, Weizmann Institute of Science

Members' Seminar ✦ *Modular Forms with Small Fourier Coefficients* ✦ **Florian Sprung**, Princeton University; Visitor, School of Mathematics

November 22

Homological Mirror Symmetry Reading Group ✦ *Gamma-Integral Structures Reading Group*

Computer Science/Discrete Mathematics Seminar II ✦ *Theory of Accelerated Methods* ✦ **Zeyuan Allen-Zhu**, Member, School of Mathematics

Auroux Watching Seminar

November 23

Reading Group on Homological Mirror Symmetry and K3 Surfaces

Mathematical Conversations ✦ *Noncongruence Subgroups of SL(2, Z)* ✦ **William Yun Chen**, Member, School of Mathematics

November 28

Computer Science/Discrete Mathematics Seminar I ✦ *Stochastic Block Models and Probabilistic Reductions* ✦ **Emmanuel Abbe**, Princeton University

Members' Seminar ✦ *Asymptotic Representation Theory over Z* ✦ **Thomas Church**, Stanford University; Member, School of Mathematics

November 29

Computer Science/Discrete Mathematics Seminar II ✦ *Combinatorial Rigidity of Graphs Embedded in* $\mathbb{R}^2$ ✦ **Orit Esther Raz**, Member, School of Mathematics

Princeton/IAS Symplectic Geometry Seminar ✦ *Rectification and the Floer Complex: Quantizing Lagrangians in T*N* ✦ **Claude Viterbo**, Ecole Normale Supérieure, Paris ✦ *C^0 Hamiltonian Dynamics and a Counterexample to the Arnold Conjecture* ✦ **Sobhan Seyfaddini**, Member, School of Mathematics

Auroux Watching Seminar

November 30

Homological Mirror Symmetry (minicourse) ✦ *Noncommutative Geometry, Smoothness, and Fukaya Categories* ✦ **Sheel Ganatra**, Member, School of Mathematics

Reading Group on Homological Mirror Symmetry and K3 Surfaces

Analysis Math-Physics Seminar ✦ *A Spectral Gap in $SL^2(\mathbb{R})$ and Applications: Expansion, Furstenberg Measures, and the Anderson-Bernoulli Model* ✦ **Jean Bourgain**, IBM von Neumann Professor, School of Mathematics

Special Seminar ✦ *Modulo p Representations of Reductive p-adic Groups: Functorial Properties* ✦ **Marie-France Vignéras**, Institut de Mathématiques de Jussieu

December 1

Working Group on Algebraic Number Theory

Joint IAS/Princeton University Number Theory Seminar ✦ *Integral Points on Moduli Schemes and Thue Equations* ✦ **Rafael von Känel**, Princeton University

December 2

Homological Mirror Symmetry (minicourse) ✦ *Noncommutative Geometry, Smoothness, and Fukaya Categories* ✦ **Sheel Ganatra**, Member, School of Mathematics

Mathematical Conversations ✦ *Revisiting Isoperimetric Inequalities for Lagrangians* ✦ **Claude Viterbo**, Ecole Normale Supérieure, Paris

December 5

Computer Science/Discrete Mathematics Seminar I ✦ *On the Number of Ordinary Lines Determined by Sets in Complex Space* ✦ **Shubhangi Saraf**, Rutgers, The State University of New Jersey

Members' Seminar ✦ *Types and Their Applications* ✦ **Ju-Lee Kim**, Massachusetts Institute of Technology; Visiting Professor, School of Mathematics

December 6

Homological Mirror Symmetry Reading Group ✦ *Gamma-Integral Structures Reading Group*

Computer Science/Discrete Mathematics Seminar II ✦ *Approximate Constraint Satisfaction Requires Subexponential Size Linear Programs* ✦ **Pravesh Kothari**, Princeton University; Member, School of Mathematics

Princeton/IAS Symplectic Geometry Seminar ✦ *Contact Manifolds with Flexible Fillings* ✦ **Oleg Lazarev**, Stanford University

Auroux Watching Seminar

December 7

Working Seminar on Representation Theory ✦ *Mirror Symmetry on the Bruhat-Tits Building and Representations of p-adic Groups* ✦ **Dmitry Vaintrob**, Member, School of Mathematics

Reading Group on Homological Mirror Symmetry and K3 Surfaces

Analysis Math-Physics Seminar ✦ *Introduction to Many-Body Localization* ✦ **David Huse**, Princeton University

Mathematical Conversations ✦ *Negative Correlation and Hodge-Riemann Relations* ✦ **June Huh**, Princeton University; Veblen Fellow, School of Mathematics

December 8

Working Group on Algebraic Number Theory

Joint IAS/Princeton University Number Theory Seminar ✦ *Arithmetic and Geometry of Picard Modular Surfaces* ✦ **Dinakar Ramakrishnan**, California Institute of Technology; Visitor, School of Mathematics

December 12

Computer Science/Discrete Mathematics Seminar I ✦ *On Gradient Complexity of Measures on the Discrete Cube* ✦ **Ronen Eldan**, Weizmann Institute of Science

Members' Seminar ✦ *Points and Lines* ✦ **Nathaniel Bottman**, Member, School of Mathematics

December 13

Homological Mirror Symmetry Reading Group ✦ *Gamma-Integral Structures Reading Group*

Computer Science/Discrete Mathematics Seminar II ✦ *Sum of Squares Lower Bounds for Refuting Any CSP* ✦ **Pravesh Kothari**, Princeton University; Member, School of Mathematics

Princeton/IAS Symplectic Geometry Seminar ✦ *Positive Loops of Loose Legendrians and Applications* ✦ **Guogang Liu**, Université de Nantes ✦ *Log Geometric Techniques for Open Invariants in Mirror Symmetry* ✦ **Nurömür Hülya Argüz**, Member, School of Mathematics

Auroux Watching Seminar

December 14

Homological Mirror Symmetry (minicourse) ✦ *Numerical Invariants from Bounding Chains* ✦ **Jake Solomon**, The Hebrew University of Jerusalem; Visitor, School of Mathematics

Reading Group on Homological Mirror Symmetry and K3 Surfaces

December 15

Working Group on Algebraic Number Theory

Joint IAS/Princeton University Number Theory Seminar ✦ *On the Spectrum of Faltings Height* ✦ **Juan Rivera-Letelier**, University of Rochester

December 16

Homological Mirror Symmetry (minicourse) ✦ *Numerical Invariants from Bounding Chains* ✦ **Jake Solomon**, The Hebrew University of Jerusalem; Visitor, School of Mathematics

January 17

Computer Science/Discrete Mathematics Seminar I ✦ *The Polynomial Method and the Cap Set Problem* ✦ **Jordan Ellenberg**, University of Wisconsin–Madison

Computer Science/Discrete Mathematics Seminar II ✦ *The Polynomial Method: More Results and Open Questions* ✦ **Jordan Ellenberg**, University of Wisconsin–Madison

January 18

Homological Mirror Symmetry (organizational meeting)

Homological Mirror Symmetry (minicourse) ✦ *Constructible Sheaves in Symplectic Topology* ✦ **David Treumann**, Boston College; von Neumann Fellow, School of Mathematics

January 20

Homological Mirror Symmetry (minicourse) ✦ *Constructible Sheaves in Mirror Symmetry* ✦ **David Treumann**, Boston College; von Neumann Fellow, School of Mathematics

January 23

Computer Science/Discrete Mathematics Seminar I ✦ *Active Learning with "Simple" Membership Queries* ✦ **Shachar Lovett**, University of California, San Diego

Members' Seminar ✦ *Combinatorics of the Amplituhedron* ✦ **Lauren Williams**, University of California, Berkeley; von Neumann Fellow, School of Mathematics

January 24

Computer Science/Discrete Mathematics Seminar II ✦ *Robust Sensitivity* ✦ **Shachar Lovett**, University of California, San Diego

Reading Group on Degeneration of Hodge–de Rham Spectral Sequences

Special Mathematical Physics Seminar ✦ *Reinforced Random Walks and Statistical Physics* ✦ **Pierre Tarres**, Université Paris-Dauphine

January 25

Analysis Math-Physics Seminar ✦ *Large Coupling Asymptotics for the Lyapunov Exponent of Quasi-periodic Schrödinger Operators with Analytic Potentials* ✦ **Christoph Marx**, Oberlin College

Mathematical Conversations ✦ *Voevodsky's Univalent Foundations for Mathematics* ✦ **Daniel Grayson**, University of Illinois at Urbana-Champaign; Visitor, School of Mathematics

January 27

Working Seminar on Representation Theory ✦ *A Gelfand-Graev Formula and Stable Transfer Factors for SL_n* ✦ **Daniel Johnstone**, The University of Chicago

January 30

Computer Science/Discrete Mathematics Seminar I ✦ *Quantifying Tradeoffs between Fairness and Accuracy in Online Learning* ✦ **Aaron Roth**, University of Pennsylvania

Members' Seminar ✦ *Homological versus Hodge-Theoretic Mirror Symmetry* ✦ **Timothy Perutz**, The University of Texas at Austin; von Neumann Fellow, School of Mathematics

Short Talks by Postdoctoral Members ✦ *Monotone Lagrangians in Euclidean Spaces* ✦ **Ailsa Keating**, Member, School of Mathematics ✦ *The Space of Equations for an Algebraic Curve* ✦ **Dhruv Ranganathan**, Member, School of Mathematics ✦ *First Steps of Non-Archimedean Enumerative Geometry* ✦ **Tony Yue Yu**, Visitor, School of Mathematics

January 31

Computer Science/Discrete Mathematics Seminar II ✦ *Sketching and Embedding Are Equivalent for Norms* ✦ **Alex Andoni**, Columbia University

Floer Homology and Khovanov Homology Reading Group

Reading Group on Degeneration of Hodge–de Rham Spectral Sequences

Reading Group on Quantization of BCOV and the Higher-Genus B-Model

February 1

Homological Mirror Symmetry (minicourse) ✦ *Noncommutative Algebraic Varieties, Their Properties and Geometric Realizations* ✦ **Dmitri Orlov**, Steklov Mathematical Institute, Russian Academy of Sciences; Member, School of Mathematics

Reading Group on Homological Mirror Symmetry and K3 Surfaces ✦ *The Yau-Zaslow Conjecture/KMPS Theorem* ✦ **Amitai Netser Zernik**, Member, School of Mathematics

Mathematical Conversations ✦ *Lagrangian Tori, Mutations, and Toric Degenerations* ✦ **Denis Auroux**, University of California, Berkeley; Member, School of Mathematics

February 2

Princeton/IAS Symplectic Geometry Seminar ✦ *Relative Quantum Product and Open WDVV Equations* ✦ **Sara Tukachinsky**, Université de Montréal

Joint IAS/Princeton University Number Theory Seminar ✦ *Superconnections and Special Cycles* ✦ **Luis Garcia**, University of Toronto

February 3

Homological Mirror Symmetry (minicourse) ✦ *Noncommutative Algebraic Varieties, Their Properties and Geometric Realizations* ✦ **Dmitri Orlov**, Steklov Mathematical Institute, Russian Academy of Sciences; Member, School of Mathematics

February 6

Computer Science/Discrete Mathematics Seminar I ✦ *Strongly Refuting Random CSPs below the Spectral Threshold* ✦ **Prasad Raghavendra**, University of California, Berkeley

Members' Seminar ✦ *Local Systems and the Hofer-Zehnder Capacity* ✦ **Alexandru Oancea**, Université Pierre et Marie Curie; Member, School of Mathematics

February 7

Computer Science/Discrete Mathematics Seminar II ✦ *Optimization in Dynamical Systems* ✦ **Amir Ali Ahmadi**, Princeton University

Floer Homology and Khovanov Homology Reading Group

Reading Group on Degeneration of Hodge–de Rham Spectral Sequences

February 8

Homological Mirror Symmetry (minicourse) ✦ *Noncommutative Algebraic Varieties, Their Properties and Geometric Realizations II* ✦ **Dmitri Orlov**, Steklov Mathematical Institute, Russian Academy of Sciences; Member, School of Mathematics

Reading Group on Homological Mirror Symmetry and K3 Surfaces

Analysis Math-Physics Seminar ✦ *Discrete Harmonic Analysis and Applications to Ergodic Theory* ✦ **Mariusz Mirek**, Universität Bonn; Member, School of Mathematics

February 9

Princeton/IAS Symplectic Geometry Seminar ✦ *Gromov-Witten Theory of Locally Conformally Symplectic Manifolds and the Fuller Index* ✦ **Yakov Savelyev**, Universidad de Colima

Reading Group on Mirror Symmetry by Examples ✦ **Lev Borisov**, Rutgers, The State University of New Jersey; Member, School of Mathematics

Working Group on Algebraic Number Theory

Joint IAS/Princeton University Number Theory Seminar ✦ *Diophantine Problems and the p-adic Torelli Map* ✦ **Brian Lawrence**, Stanford University

February 10

Working Seminar on Representation Theory ✦ *Canonical Bases Arising from Quantum Symmetric Pairs* ✦ **Huanchen Bao**, Member, School of Mathematics

Mathematical Conversations ✦ *The Positive Grassmannian* ✦ **Lauren Williams**, University of California, Berkeley; von Neumann Fellow, School of Mathematics

February 13

Emerging Topics Workshop on Nodal Sets of Eigenfunctions

Computer Science/Discrete Mathematics Seminar I ✦ *Nearest Neighbor Search for General Symmetric Norms via Embeddings into Product Spaces* ✦ **Ilya Razenshteyn**, Massachusetts Institute of Technology

Members' Seminar ✦ *Mirror Symmetry via Berkovich Geometry I: Overview* ✦ **Tony Yue Yu**, Visitor, School of Mathematics

February 14

Emerging Topics Workshop on Nodal Sets of Eigenfunctions

Computer Science/Discrete Mathematics Seminar II ✦ *A Unified Duality-Based Approach to Bayesian Mechanism Design* ✦ **Matt Weinberg**, Princeton University

Floer Homology and Khovanov Homology Reading Group

Reading Group on Degeneration of Hodge–de Rham Spectral Sequences

Reading Group on Quantization of BCOV and the Higher-Genus B-Model ✦ *Perturbative Quantization and Master Equation* ✦ **James Pascaleff**, University of Illinois at Urbana-Champaign; Member, School of Mathematics

February 15

Emerging Topics Workshop on Nodal Sets of Eigenfunctions

Homological Mirror Symmetry (minicourse) ✦ *Mirror Symmetry via Berkovich Geometry II: The Non-Archimedean SYZ Fibration* ✦ **Tony Yue Yu**, Visitor, School of Mathematics

Analysis Math-Physics Seminar ✦ *Functional Inequalities and Gradient Flow for Quantum Evolution* ✦ **Eric Carlen**, Rutgers, The State University of New Jersey

Mathematical Conversations ✦ *Random Permutations and Statistical Mechanics* ✦ **Thomas Spencer**, Professor, School of Mathematics

February 16

Emerging Topics Workshop on Nodal Sets of Eigenfunctions

Princeton/IAS Symplectic Geometry Seminar ✦ *C^∞ Closing Lemma for Three-Dimensional Reeb Flows via Embedded Contact Homology* ✦ **Kei Irie**, Kyoto University

Reading Group on Mirror Symmetry by Examples ✦ **Lev Borisov**, Rutgers, The State University of New Jersey; Member, School of Mathematics

Joint IAS/Princeton University Number Theory Seminar ✦ *16-Rank of Class Groups of Quadratic Number Fields* ✦ **Djordjo Zeljko Milovic**, Member, School of Mathematics

February 17

Emerging Topics Workshop on Nodal Sets of Eigenfunctions

Homological Mirror Symmetry (minicourse) ✦ *Mirror Symmetry via Berkovich Geometry III: Log Calabi-Yau Surfaces* ✦ **Tony Yue Yu**, Visitor, School of Mathematics

February 21

Computer Science/Discrete Mathematics Seminar II ✦ *Program Obfuscation: Outside the Black Box* ✦ **Omer Paneth**, Massachusetts Institute of Technology

Floer Homology and Khovanov Homology Reading Group ✦ *Algebraic and Geometric Formality Results for Fukaya Categories* ✦ **Dingyu Yang**, Member, School of Mathematics

Reading Group on Degeneration of Hodge–de Rham Spectral Sequences

Marston Morse Lectures ✦ *Folding Papers and Turbulent Flows* ✦ **Camillo De Lellis**, Universität Zürich

February 22

Reading Group on Homological Mirror Symmetry and K3 Surfaces

Analysis Math-Physics Seminar ✦ *Singularity Formation in Incompressible Fluids* ✦ **Tarek Elgindi**, Princeton University

Mathematical Conversations ✦ *A "Geometric Group Theory" for Homeomorphisms Groups?* ✦ **Frédéric Le Roux**, Institut de Mathématiques de Jussieu

February 23

Princeton/IAS Symplectic Geometry Seminar ✦ *Symplectic Homology for Cobordisms* ✦ **Alexandru Oancea**, Université Pierre et Marie Curie; Member, School of Mathematics

Working Group on Algebraic Number Theory

Reading Group on Mirror Symmetry by Examples

Marston Morse Lectures ✦ *Folding Papers and Turbulent Flows* ✦ **Camillo De Lellis**, Universität Zürich

Joint IAS/Princeton University Number Theory Seminar ✦ *The Subconvexity Problem* ✦ **Ritabrata Munshi**, Tata Institute of Fundamental Research, Mumbai

February 24

Working Seminar on Representation Theory ✦ *Cocenters and Representations of Affine Hecke Algebras* ✦ **Xuhua He**, University of Maryland; von Neumann Fellow, School of Mathematics

Marston Morse Lectures ✦ *Folding Papers and Turbulent Flows* ✦ **Camillo De Lellis**, Universität Zürich

February 27

Computer Science/Discrete Mathematics Seminar I ✦ *New Insights on the (non)-Hardness of Circuit Minimization and Related Problems* ✦ **Eric Allender**, Rutgers, The State University of New Jersey

Members' Seminar ✦ *The Meta-Theory of Dependent Type Theories* ✦ **Vladimir Voevodsky**, Professor, School of Mathematics

February 28

Computer Science/Discrete Mathematics Seminar II ✦ *Structural and Computational Aspects of Brascamp-Lieb Inequalities* ✦ **Avi Wigderson**, Herbert H. Maass Professor, School of Mathematics

Floer Homology and Khovanov Homology Reading Group ✦ *Examples of Formality Results for Fukaya Categories* ✦ **John Pardon**, Visitor, School of Mathematics

Reading Group on Degeneration of Hodge–de Rham Spectral Sequences

Reading Group on Quantization of BCOV and the Higher-Genus B-Model ✦ *Perturbative Quantization and Master Equation (cont'd)* ✦ **James Pascaleff**, University of Illinois at Urbana-Champaign; Member, School of Mathematics

March 1

Homological Mirror Symmetry (minicourse) ✦ *Canonical Coordinates for Calabi-Yau Manifolds I* ✦ **Sean Keel**, The University of Texas at Austin; Member, School of Mathematics

Reading Group on Homological Mirror Symmetry and K3 Surfaces

Analysis Math-Physics Seminar ✦ *Hyperuniformity in Many-Particle Systems and Its Generalizations* ✦ **Salvatore Torquato**, Princeton University

Mathematical Conversations ✦ *Categories and Filtrations* ✦ **Ludmil Katzarkov**, Universität Wien; Member, School of Mathematics

March 2

Princeton/IAS Symplectic Geometry Seminar ✦ *Liouville Sectors and Local Open-Closed Map* ✦ **John Pardon**, Visitor, School of Mathematics

Working Group on Algebraic Number Theory

Reading Group on Mirror Symmetry by Examples

Joint IAS/Princeton University Number Theory Seminar ✦ *Real Structures on Ordinary Abelian Varieties* ✦ **Mark Goresky**, Visitor, School of Mathematics

March 3

Homological Mirror Symmetry (minicourse) ✦ *Canonical Coordinates for Calabi-Yau Manifolds II* ✦ **Sean Keel**, The University of Texas at Austin; Member, School of Mathematics

March 6

Computer Science/Discrete Mathematics Seminar I ✦ *Interactive Coding with Nearly Optimal Round and Communication Blowup* ✦ **Yael Kalai**, Microsoft Research New England

Members' Seminar ✦ *Information Complexity and Applications* ✦ **Mark Braverman**, Princeton University; von Neumann Fellow, School of Mathematics

March 7

Computer Science/Discrete Mathematics Seminar II ✦ *Some Basic Problems and Results from Invariant Theory* ✦ **Avi Wigderson**, Herbert H. Maass Professor, School of Mathematics

Floer Homology and Khovanov Homology Reading Group ✦ *Gauge Theory and the Jones Polynomial* ✦ **Joel Clingempeel**, Rutgers, The State University of New Jersey

Reading Group on Degeneration of Hodge–de Rham Spectral Sequences

Reading Group on Quantization of BCOV and the Higher-Genus B-Model ✦ *Perturbative Quantization and Master Equation (cont'd)* ✦ **James Pascaleff**, University of Illinois at Urbana-Champaign; Member, School of Mathematics

March 8

Reading Group on Homological Mirror Symmetry and K3 Surfaces

Special Representation Theory Seminar ✦ *"Small" Representations of Finite Classical Groups* ✦ **Shamgar Gurevich**, University of Wisconsin and Yale University

Special Representation Theory Seminar ✦ *On the Role of Rank in Representation Theory of the Classical Groups* ✦ **Roger Howe**, Yale University and Texas A&M University

Mathematical Conversations ✦ *Geometric Realizations of Algebraic Objects* ✦ **Dmitri Orlov**, Steklov Mathematical Institute, Russian Academy of Sciences; Member, School of Mathematics

March 9

Princeton/IAS Symplectic Geometry Seminar ✦ *Fukaya Categories and Variation of Symplectic Form* ✦ **Chris Woodward**, Rutgers, The State University of New Jersey

Working Group on Algebraic Number Theory

Reading Group on Mirror Symmetry by Examples ✦ *HMS for CP^2 and Its Toric Noncommutative Deformations* ✦ **Denis Auroux**, University of California, Berkeley; Member, School of Mathematics

Princeton Neuroscience Institute Seminar ✦ *The "P vs. NP" Problem: Efficient Computation, Internet Security, and the Limits to Human Knowledge* ✦ **Avi Wigderson**, Herbert H. Maass Professor, School of Mathematics

Joint IAS/Princeton University Number Theory Seminar ✦ *On Small Sums of Roots of Unity* ✦ **Philipp Habegger**, Universität Basel

March 13

Workshop on Homological Mirror Symmetry: Emerging Developments and Applications

Computer Science/Discrete Mathematics Seminar I ✦ *On the Cryptographic Hardness of Finding a Nash Equilibrium* ✦ **Nir Bitansky**, Massachusetts Institute of Technology

Computer Science/Discrete Mathematics Seminar II ✦ *Indistinguishability Obfuscation from 5-Linear Maps: A Reduction from Flying Pigs to Jumping Pigs* ✦ **Nir Bitansky**, Massachusetts Institute of Technology

March 15

Workshop on Homological Mirror Symmetry: Emerging Developments and Applications

March 16

Workshop on Homological Mirror Symmetry: Emerging Developments and Applications

Joint IAS/Princeton University Number Theory Seminar ✦ *Mirror Symmetry and Another Look at Kloosterman Sums* ✦ **Nicolas Templier**, Cornell University

March 17

Workshop on Homological Mirror Symmetry: Emerging Developments and Applications

Joint BCOV/Hodge–de Rham Reading Group ✦ *Calabi-Yau Geometry and Quantum B-Model* ✦ **Si Li**, Tsinghua University

March 20

Computer Science/Discrete Mathematics Seminar I ✦ *Approximate Counting and the Lovasz Local Lemma* ✦ **Ankur Moitra**, Massachusetts Institute of Technology

Members' Seminar ✦ *Efficient Non-convex Polynomial Optimization and the Sum-of-squares Hierarchy* ✦ **David Steurer**, Cornell University; Member, School of Mathematics

March 21

Reading Group on Degeneration of Hodge–de Rham Spectral Sequences

March 22

Reading Group on Homological Mirror Symmetry and K3 Surfaces

Mathematical Conversations ✦ *Poincaré Duality in Loop Spaces* ✦ **Nancy Hingston**, The College of New Jersey

March 23

Princeton/IAS Symplectic Geometry Seminar ✦ *The Simplification of Caustics* ✦ **Daniel Alvarez-Gavela**, Stanford University

March 24

Princeton/IAS Symplectic Geometry Seminar ✦ *Continuous Covers on Symplectic Manifolds* ✦ **François Lalonde**, Université de Montréal

March 27

Computer Science/Discrete Mathematics Seminar I ✦ *Applications of Monotone Constraint Satisfaction* ✦ **Robert Robere**, University of Toronto

Members' Seminar ✦ *Extremal Problems in Combinatorial Geometry* ✦ **Orit Esther Raz**, Member, School of Mathematics

Reading Group on Mirror Symmetry by Examples ✦ **Denis Auroux**, University of California, Berkeley; Member, School of Mathematics

March 28

Computer Science/Discrete Mathematics Seminar II ✦ *Applications of Monotone Constraint Satisfaction* ✦ **Robert Robere**, University of Toronto

Floer Homology and Khovanov Homology Reading Group ✦ *Mirror Symmetry for T^*P^1 and Conjectural Models for Khovanov Homology* ✦ **Mohammed Abouzaid**, Columbia University; Visitor, School of Mathematics

Working Group on Algebraic Number Theory

March 29

Homological Mirror Symmetry (minicourse) ✦ *Homological Mirror Symmetry for the Pair of Pants* ✦ **Denis Auroux**, University of California, Berkeley; Member, School of Mathematics

Analysis Math-Physics Seminar ✦ *Applications of Twisted Technology* ✦ **Christoph Thiele**, University of California, Los Angeles ✦ *On Structure Results for Intertwining Operators* ✦ **Wilhelm Schlag**, The University of Chicago

March 30

Princeton/IAS Symplectic Geometry Seminar ✦ *The Many Forms of Rigidity for Symplectic Embeddings* ✦ **Felix Schlenk**, Université de Neuchâtel ✦ *The Stabilized Symplectic Embedding Problem* ✦ **Dusa McDuff**, Columbia University

Working Group on Algebraic Number Theory

Joint IAS/Princeton University Number Theory Seminar ✦ *Galois Representations for the General Symplectic Group* ✦ **Arno Kret**, University of Amsterdam

March 31

Homological Mirror Symmetry (minicourse) ✦ *Speculations about Homological Mirror Symmetry for Affine Hypersurfaces* ✦ **Denis Auroux**, University of California, Berkeley; Member, School of Mathematics

Princeton/IAS Symplectic Geometry Seminar ✦ *Rigid Holomorphic Curves Are Generically Super-rigid* ✦ **Chris Wendl**, Humboldt-Universität zu Berlin

Reading Group on Homological Mirror Symmetry and K3 Surfaces

Mathematical Conversations ✦ *String Topology from the Symplectic Viewpoint* ✦ **Alexandru Oancea**, Université Pierre et Marie Curie; Member, School of Mathematics

April 1

Workshop on Topology: Identifying Order in Complex Systems ✦ *Complexity in Different Contexts* ✦ **Saugata Basu**, Purdue University ✦ *Auxetic Deformations and Elliptic Curves* ✦ **Ciprian Borcea**, Rider University ✦ *A Change in Stripes for Cholesteric Shells via Modulated Anchoring* ✦ **Lisa Tran**, University of Pennsylvania ✦ *Contact Invariants and Reeb Dynamics* ✦ **Jo Nelson**, Columbia University ✦ *Multiscale Methods for Dictionary Learning, Regression, and Optimal Transport for Data Near Low-Dimensional Sets* ✦ **Mauro Maggioni**, Johns Hopkins University

April 3

Computer Science/Discrete Mathematics Seminar I ✦ *A Time-Space Lower Bound for a Large Class of Learning Problems* ✦ **Ran Raz**, Weizmann Institute of Science

Members' Seminar ✦ *Algebra and Geometry of the Scattering Equations* ✦ **Peter Goddard**, Professor Emeritus, School of Natural Sciences

Reading Group on Mirror Symmetry by Examples ✦ *Mirror Symmetry for a Toric Calabi-Yau 3-Fold* ✦ **Bohan Fang**, Peking University; Member, School of Mathematics

April 4

Computer Science/Discrete Mathematics Seminar II ✦ *Computability and Complexity in Analysis and Dynamics* ✦ **Mark Braverman**, Princeton University; von Neumann Fellow, School of Mathematics

Floer Homology and Khovanov Homology Reading Group ✦ *A Khovanov Stable Homotopy Type* ✦ **Francesco Lin**, Princeton University; Veblen Research Instructor, School of Mathematics

Reading Group on Degeneration of Hodge–de Rham Spectral Sequences

Informal Talk ✦ *On Zimmer's Conjecture* ✦ **Sebastian Hurtado-Salazar**, The University of Chicago

April 5

Reading Group on Quantization of BCOV and the Higher-Genus B-Model ✦ **Mauricio Romo**, Member, School of Natural Sciences

Analysis Math-Physics Seminar ✦ *Unwinding the Amplituhedron* ✦ **Nima Arkani-Hamed**, Professor, School of Natural Sciences

Informal Talk ✦ *On Zimmer's Conjecture* ✦ **Sebastian Hurtado-Salazar**, The University of Chicago

Mathematical Conversations ✦ *Almost Commuting Matrices: Finite- and Infinite-Dimensional Proofs* ✦ **Ilya Kachkovskiy**, Member, School of Mathematics

April 6

Princeton/IAS Symplectic Geometry Seminar ✦ *On Zimmer's Conjecture* ✦ **Sebastian Hurtado-Salazar**, The University of Chicago

Reading Group on Homological Mirror Symmetry and K3 Surfaces

Working Group on Algebraic Number Theory

Joint IAS/Princeton University Number Theory Seminar ✦ *Basic Loci of Shimura Varieties* ✦ **Xuhua He**, University of Maryland; von Neumann Fellow, School of Mathematics

April 7

Homological Mirror Symmetry Mini-Workshop ✦ *Two Rigid Algebras and a Heat Kernel* ✦ **Amitai Netser Zernik**, Member, School of Mathematics

Homological Mirror Symmetry Mini-Workshop ✦ *Theta Functions and Quiver Representations* ✦ **Man Wai Cheung**, Member, School of Mathematics

Homological Mirror Symmetry Mini-Workshop ✦ *Symplectic Dehn Twists from Spherical Manifolds* ✦ **Cheuk Yu Mak**, Member, School of Mathematics

April 10

Computer Science/Discrete Mathematics Seminar I ✦ *In Pursuit of Obfuscation* ✦ **Allison Bishop**, Columbia University

Reading Group on Mirror Symmetry by Examples

April 11

Computer Science/Discrete Mathematics Seminar II ✦ *Noncommutative Probability for Computer Scientists* ✦ **Adam Marcus**, Princeton University; von Neumann Fellow, School of Mathematics

Floer Homology and Khovanov Homology Reading Group ✦ *Gauge-Theoretic and Symplectic-Topological Aspects of the Haydys-Witten Equations* ✦ **Daniel Vitek**, Princeton University

April 12

Homological Mirror Symmetry (minicourse) ✦ *Mirror Symmetry for Moduli of Flat Bundles and Non-Abelian Hodge Theory* ✦ **Tony Pantev**, University of Pennsylvania

Analysis Math-Physics Seminar ✦ *Soliton Resolution for Energy Critical Wave and Wave Map Equations* ✦ **Hao Jia**, Member, School of Mathematics

Reading Group on Degeneration of Hodge–de Rham Spectral Sequences ✦ *Algebraic Proofs of Degenerations of Hodge–de Rham Complexes* ✦ **Andrei Căldăraru**, University of Wisconsin–Madison

Mathematical Conversations ✦ *Equidistribution + Arakelov Intersection Theory = Certain Thin Set of Primes Is Infinite* ✦ **Yunqing Tang**, Member, School of Mathematics

April 13

Princeton/IAS Symplectic Geometry Seminar ✦ *Sheaves and Contact Non-squeezing in* $\mathbb{R}^{2n} \times S^1$ ✦ **Sheng-Fu Chiu**, Northwestern University ✦ *Contact Non-squeezing in* $\mathbb{R}^{2n} \times S^1$ *by Other Means* ✦ **Maia Fraser**, University of Ottawa

Reading Group on Quantization of BCOV and the Higher-Genus B-Model ✦ *Computing a Categorical Gromov-Witten Invariant* ✦ **Andrei Căldăraru**, University of Wisconsin–Madison

Working Group on Algebraic Number Theory

Reading Group on Quantization of BCOV and the Higher-Genus B-Model ✦ *Givental's Quantization of Semi-simple Frobenius Manifolds* ✦ **Bohan Fang**, Peking University; Member, School of Mathematics

Joint IAS/Princeton University Number Theory Seminar ✦ *Congruences between Motives and Congruences between Values of L-Functions* ✦ **Olivier Fouquet**, Université Paris-Sud 11

April 14

Homological Mirror Symmetry (minicourse) ✦ *Mirror Symmetry for Moduli of Flat Bundles and Non-Abelian Hodge Theory* ✦ **Tony Pantev**, University of Pennsylvania

April 17

Computer Science/Discrete Mathematics Seminar I ✦ *Efficient Empirical Revenue Maximization in Single-Parameter Auction Environments* ✦ **Yannai Gonczarowski**, The Hebrew University of Jerusalem and Microsoft Israel R&D Center

April 18

Computer Science/Discrete Mathematics Seminar II ✦ *Bounds on Roots of Polynomials (and Applications)* ✦ **Adam Marcus**, Princeton University; von Neumann Fellow, School of Mathematics

Reading Group on Quantization of BCOV and the Higher-Genus B-Model ✦ *Derivation of Holomorphic Anomaly Equation* ✦ **Mauricio Romo**, Member, School of Natural Sciences

April 19

Reading Group on Homological Mirror Symmetry and K3 Surfaces

Analysis Math-Physics Seminar ✦ *Thermodynamical Approach to the Markoff-Hurwitz Equation* ✦ **Michael Magee**, Yale University ✦ *Billiards and Hodge Theory* ✦ **Simion Filip**, Harvard University

April 20

Princeton/IAS Symplectic Geometry Seminar ✦ *Symplectic Field Theory and Codimension-2 Stable Hamiltonian Submanifolds* ✦ **Richard Siefring**, Ruhr-Universität Bochum

Working Group on Algebraic Number Theory

Joint IAS/Princeton University Number Theory Seminar ✦ *Even Galois Representations and the Cohomology of GL(2, Z)* ✦ **Avner Ash**, Boston College

April 26

Floer Homology and Khovanov Homology Reading Group ✦ *Symplectic Topology and the Haydys-Witten Equations* ✦ **Daniel Vitek**, Princeton University

April 27

Princeton/IAS Symplectic Geometry Seminar ✦ *Lagrangian Floer Theory in Symplectic Fibrations* ✦ **Douglas Schultz**, Rutgers, The State University of New Jersey

Working Group on Algebraic Number Theory

Joint IAS/Princeton University Number Theory Seminar ✦ *Heights in Families of Abelian Varieties* ✦ **Ziyang Gao**, Visitor, School of Mathematics

May 4

Princeton/IAS Symplectic Geometry Seminar ✦ *Floer Theory in Spaces of Stable Pairs over Riemann Surfaces* ✦ **Timothy Perutz**, The University of Texas at Austin; von Neumann Fellow, School of Mathematics

Working Group on Algebraic Number Theory

Joint IAS/Princeton University Number Theory Seminar ✦ *The Cohomology of Local Shimura Varieties* ✦ **Jared Weinstein**, Boston University

May 11

Princeton/IAS Symplectic Geometry Seminar ✦ *String Topology Coproduct: Geometric and Algebraic Aspects* ✦ **Manuel Rivera**, University of Miami

Joint IAS/Princeton University Number Theory Seminar ✦ *The p-Curvature Conjecture and Monodromy about Simple Closed Loops* ✦ **Ananth Shankar**, Harvard University

May 15

2017 Women and Mathematics

May 16

2017 Women and Mathematics

May 17

2017 Women and Mathematics

May 18

2017 Women and Mathematics

Joint IAS/Princeton University Number Theory Seminar ✦ *Potential Automorphy of Some Non-self-dual Galois Representations* ✦ **Richard Taylor**, Robert and Luisa Fernholz Professor, School of Mathematics

May 19

2017 Women and Mathematics

Analysis Math-Physics Seminar ✦ *Orbital Stability of Standing Waves for Dispersive Models* ✦ **Shijun Zheng**, Georgia Southern University

May 23

2017 Women and Mathematics

May 24

2017 Women and Mathematics

May 25

2017 Women and Mathematics

Joint IAS/Princeton University Number Theory Seminar ✦ *Subconvex Equidistribution of Cusp Forms* ✦ **Paul Nelson**, Eidgenössische Technische Hochschule Zürich

School of Natural Sciences

ASTROPHYSICS ACTIVITIES

September 6
Institute for Advanced Study/Princeton University Joint Astrophysics Colloquium ✦ *The Observational Quest for the Earliest Galaxies: Progress and Challenges* ✦ **Richard Ellis**, University College London and European Southern Observatory, Germany

September 12
Princeton University/Institute for Advanced Study Early Universe/Cosmology Lunch Discussion ✦ *Introductions* ✦ *Proper Image Subtraction—Optimal Transient Detection, Photometry, and Hypothesis Testing* ✦ **Barak Zackay**, Weizmann Institute of Science

September 19
Princeton University/Institute for Advanced Study Early Universe/Cosmology Lunch Discussion ✦ *High-Redshift Astrophysics Using Every Photon* ✦ **Patrick Breysse**, Johns Hopkins University

September 20
Institute for Advanced Study/Princeton University Joint Astrophysics Colloquium ✦ *A Single Prolific r-Process Event Preserved in an Ultra-faint Dwarf Galaxy* ✦ **Anna Frebel**, Massachusetts Institute of Technology and MIT Kavli Institute for Astrophysics and Space Research

September 22
Astrophysics Informal Seminar ✦ *Formation of the Hubble Sequence* ✦ **S. Michael Fall**, Space Telescope Science Institute, NASA, Baltimore

September 27
Institute for Advanced Study/Princeton University Joint Astrophysics Colloquium ✦ *Hydrodynamical Simulations of Galaxy Formation: Progress, Pitfalls, and Promises* ✦ **Volker Springel**, Heidelberger Institut für Theoretische Studien

September 29
Astrophysics Informal Seminar ✦ *Chaotic Dances of Vectors: Misaligned Exoplanets, Disks/Rings, and Planet IX* ✦ **Dong Lai**, Cornell University; Visitor, School of Natural Sciences

October 3
Princeton University/Institute for Advanced Study Early Universe/Cosmology Lunch Discussion ✦ *Probing Compact Dark Matter* ✦ **Julian Munoz**, Johns Hopkins University

October 4
Institute for Advanced Study/Princeton University Joint Astrophysics Colloquium ✦ *Frontiers of Radiative Plasma Astrophysics: Powering the Brightest Gamma-Ray Flares by Relativistic Magnetic Reconnection* ✦ **Dmitri Anatoljevich Uzdensky**, University of Colorado; Junior Visiting Professor, School of Natural Sciences

October 6
Astrophysics Informal Seminar ✦ *Turbulent Lives: Tales of Neutron Stars* ✦ **David Radice**, Member, School of Natural Sciences

October 11
Institute for Advanced Study/Princeton University Joint Astrophysics Colloquium ✦ *Challenging Einstein: Lunar Laser Ranging as an Absolute Test* ✦ **Tom Murphy**, University of California, San Diego

October 13
Astrophysics Informal Seminar ✦ *The Membrane Paradigm and Black Hole Astrophysics* ✦ **Robert Penna**, Columbia University

October 17
Princeton University/Institute for Advanced Study Early Universe/Cosmology Lunch Discussion ✦ *The Observed Squeezed Limit of Slow-Roll Inflation* ✦ **Giovanni Cabass**, Università degli Studi di Roma, La Sapienza

October 18
Institute for Advanced Study/Princeton University Joint Astrophysics Colloquium ✦ *The Polarized Microwave Background: ACTPol and Beyond* ✦ **Jo Dunkley**, Princeton University

October 20
Astrophysics Informal Seminar ✦ *Simulating Dark Matter* ✦ **Raúl Angulo**, Centro de Estudios de Física del Cosmos de Aragón

October 25
Institute for Advanced Study/Princeton University Joint Astrophysics Colloquium ✦ *The Thermal Odyssey of the Photoionized Intergalactic Medium* ✦ **Matthew McQuinn**, University of Washington; Junior Visiting Professor, School of Natural Sciences

October 27
Astrophysics Informal Seminar ✦ *Large-Scale Structure Cross-Correlations* ✦ **Jia Liu**, Princeton University

October 31
Princeton University/Institute for Advanced Study Early Universe/Cosmology Lunch Discussion ✦ *Multi-tracing Anisotropic Non-Gaussianity with Galaxy Shapes* ✦ **Elisa Chisari**, University of Oxford

November 1
Institute for Advanced Study/Princeton University Joint Astrophysics Colloquium ✦ *Chemistry of Protoplanetary Disks and Nascent Planets* ✦ **Karin Öberg**, Harvard-Smithsonian Center for Astrophysics

November 3
Astrophysics Informal Seminar ✦ *Asteroseismology Reveals Strong Magnetic Fields in the Cores of Red Giant Stars* ✦ **Jim Fuller**, California Institute of Technology

November 7
Princeton University/Institute for Advanced Study Early Universe/Cosmology Lunch Discussion ✦ *Atomic Dark Matter: Predictions for Small-Scale Structure* ✦ **Anna Kwa**, University of California, Irvine

November 8
Institute for Advanced Study/Princeton University Joint Astrophysics Colloquium ✦ *The Future in Discovery and the Discovery in the Future* ✦ **Szabolcs Marka**, Columbia University

November 15
Institute for Advanced Study/Princeton University Joint Astrophysics Colloquium ✦ *Seeking Clues to Explain the Diverse Architectures of Exoplanetary Systems* ✦ **Heather Knutson**, California Institute of Technology

November 17
Astrophysics Informal Seminar ✦ *Chondrules: Constraining Protoplanetary Disks* ✦ **Alexander Hubbard**, American Museum of Natural History

November 21
Princeton University/Institute for Advanced Study Early Universe/Cosmology Lunch Discussion ✦ *A New Bias to CMB Lensing Measurements* ✦ **Vanessa Boehm**, Max-Planck-Institut für Astrophysik

November 22
Institute for Advanced Study/Princeton University Joint Astrophysics Colloquium ✦ *Extraordinary Physics with Millisecond Pulsars* ✦ **Scott Ransom**, National Radio Astronomy Observatory

November 29
Institute for Advanced Study/Princeton University Joint Astrophysics Colloquium ✦ *The First High-Resolution X-Ray Spectrum of a Galaxy Cluster* ✦ **Maxim Markevitch**, Goddard Space Flight Center, NASA

December 1
Astrophysics Informal Seminar ✦ *Chaos, Stellar Streams, and the Galactic Bar* ✦ **Adrian Price-Whelan**, Princeton University

December 5
Princeton University/Institute for Advanced Study Early Universe/Cosmology Lunch Discussion ✦ *New Information in Ancient Photons: Novel Approaches to CMB Secondary Anisotropies* ✦ **Colin Hill**, Columbia University

December 6
Institute for Advanced Study/Princeton University Joint Astrophysics Colloquium ✦ *Controlling Star Formation, from Clouds to Galaxies* ✦ **Eve C. Ostriker**, Princeton University

December 8
Astrophysics Informal Seminar ✦ *Cosmic Neutrinos and Large-Scale Structure* ✦ **Marilena Loverde**, Stony Brook University, The State University of New York

December 13
Institute for Advanced Study/Princeton University Joint Astrophysics Colloquium ✦ *Dark Matter Substructure: Cosmological Treasure Trove or a Pandora's Box?* ✦ **Frank van den Bosch**, Yale University

December 15
Astrophysics Informal Seminar ✦ *Perturbations Are No Spectator Sport* ✦ **Daniel Grin**, Haverford College

January 23
Princeton University/Institute for Advanced Study Early Universe/Cosmology Lunch Discussion ✦ *Measuring the CMB Gravitational Lensing Potential with SPTpol* ✦ **Laura Mocanu**, The University of Chicago

February 13
Princeton University/Institute for Advanced Study Early Universe/Cosmology Lunch Discussion ✦ *General Discussion* ✦ **Matias Zaldarriaga**, Professor, School of Natural Sciences, **David Spergel**, Princeton University, and **Jo Dunkley**, Princeton University

February 16
Astrophysics Informal Seminar ✦ *Observational Tools for Nonlinear Large-Scale Structure* ✦ **Marcel Manfred Schmittfull**, Member, School of Natural Sciences

February 23
Astrophysics Informal Seminar ✦ *Cosmology of Flavor-Mixed Dark Matter* ✦ **Mikhail Medvedev**, The University of Kansas and Harvard-Smithsonian Center for Astrophysics

March 1
Astrophysics Informal Seminar ✦ *The Sizes of Kuiper Belt Objects* ✦ **Yanqin Wu**, University of Toronto

March 2
Astrophysics Informal Seminar ✦ *Seeding Massive Black Holes in Galaxies* ✦ **Jerry Sellwood**, Rutgers, The State University of New Jersey

March 6
Princeton University/Institute for Advanced Study Early Universe/Cosmology Lunch Discussion ✦ *General Discussion* ✦ **Matias Zaldarriaga**, Professor, School of Natural Sciences, **David Spergel**, Princeton University, and **Jo Dunkley**, Princeton University

March 9
Astrophysics Informal Seminar ✦ *Uncovering the Signatures of Obscured AGN in Mergers* ✦ **Laura Blecha**, University of Maryland

March 16
Astrophysics Informal Seminar ✦ *Mass Ejection in Common Envelope Interactions: Observational Evidence Begins to Constrain a Long-Standing Theoretical Problem* ✦ **Morgan MacLeod**, Member, School of Natural Sciences

March 20
Princeton University/Institute for Advanced Study Early Universe/Cosmology Lunch Discussion ✦ *Discussion about CMB-S4 Experiment* ✦ **Matias Zaldarriaga**, Professor, School of Natural Sciences, **David Spergel**, Princeton University, and **Jo Dunkley**, Princeton University

March 23
Astrophysics Informal Seminar ✦ *Secular Evolution in Discrete Self-gravitating Stellar Discs* ✦ **Jean-Baptiste Fouvry**, Member, School of Natural Sciences

March 30
Astrophysics Informal Seminar ✦ *Search for Intergalactic Magnetic Fields and Implications* ✦ **Tanmay Vachaspati**, Arizona State University

April 3
Princeton University/Institute for Advanced Study Early Universe/Cosmology Lunch Discussion ✦ *Lagrangian Models of Galaxy Clustering* ✦ **Emanuele Castorina**, University of California, Berkeley

April 5
Astrophysics Informal Seminar ✦ *Cosmic Shear as a Probe of Galaxy Formation Physics* ✦ **Simon Foreman**, Canadian Institute for Theoretical Astrophysics

April 13
Astrophysics Informal Seminar ✦ *Nonlinear Tides in Coalescing Binary Neutron Stars* ✦ **Nevin Weinberg**, Massachusetts Institute of Technology

April 17
Princeton University/Institute for Advanced Study Early Universe/Cosmology Lunch Discussion ✦ *New Things to Do with the CMB Part Deux: A Handful of (Squeezed) Bispectra* ✦ **Daan Meerburg**, Canadian Institute for Theoretical Astrophysics

April 20
Astrophysics Informal Seminar ✦ *Weighing Galaxy Clusters with Weak Lensing in the Hyper-SuprimeCam Survey* ✦ **Elinor Medezinski**, Princeton University

April 27
Astrophysics Informal Seminar ✦ *Resuming Infrared Effects at the BAO Scale* ✦ **Gabriele Trevisan**, New York University

May 1
Princeton University/Institute for Advanced Study Early Universe/Cosmology Lunch Discussion ✦ *Cosmology and a Massive Graviton* ✦ **Adam Solomon**, University of Pennsylvania

May 4
Astrophysics Informal Seminar ✦ *Two Robots Exploring the Habitable Sky: Robo-AO and Evryscope* ✦ **Nicholas Law**, The University of North Carolina at Chapel Hill

May 11
Astrophysics Informal Seminar ✦ *Towards a Theory of Rotating Convection in Stars and Planets* ✦ **Yoram Lithwick**, Northwestern University

May 18
Astrophysics Informal Seminar ✦ *Eccentric Companions to Two Kepler Planets: Clues to the Formation of Warm Jupiters* ✦ **Kento Masuda**, Princeton University

May 25
Astrophysics Informal Seminar ✦ *Gamma-Ray Emission from Novae* ✦ **Jennifer Sokoloski**, Columbia University

May 26
Astrophysics Informal Seminar ✦ *Resolving Gas and Dust in Transitional Disks: The ALMA View on Planet Formation* ✦ **Nienke van der Marel**, University of Hawai'i

June 1
Astrophysics Informal Seminar ✦ *Implications of a Frame-Dependent Dark Energy Action* ✦ **Stephen L. Adler**, Professor Emeritus, School of Natural Sciences

June 8
Astrophysics Informal Seminar ✦ *From Particles to Fields: Chaotic Gravitational Dynamics in Star Clusters* ✦ **Nathan Leigh**, American Museum of Natural History

HIGH ENERGY THEORY ACTIVITIES

September 12
High Energy Theory Seminar ✦ *Moonshine, Old and New* ✦ **Jeffrey Harvey**, The University of Chicago

September 15–17

NatiFest: Celebrating the Science of Nathan Seiberg ✦ *Monodromy in QCD: Insights from Supersymmetric Theories with Soft Breakings* ✦ **Michael Dine**, University of California, Santa Cruz ✦ *Making Contact with the Sphere* ✦ **Zohar Komargodski**, Weizmann Institute of Science ✦ *A Taste of Flavor* ✦ **Yossi Nir**, Weizmann Institute of Science ✦ *Three Points in a Talk (to Say Nothing of the Prologue)* ✦ **Gregory Moore**, Rutgers, The State University of New Jersey; Distinguished Visiting Professor, School of Natural Sciences ✦ *Some Tools for Exploring Supersymmetric RG Flows* ✦ **Thomas Dumitrescu**, Harvard University ✦ *Aspects of 6d QFTs* ✦ **Ken Intriligator**, University of California, San Diego ✦ *Some Boundary States for Bosons* ✦ **Edward Witten**, Charles Simonyi Professor, School of Natural Sciences ✦ *A 2d Stress Tensor for 4d Gravity* ✦ **Andrew Strominger**, Harvard University ✦ *Boundaries, Interfaces, and Dualities* ✦ **Davide Gaiotto**, Perimeter Institute for Theoretical Physics ✦ *Three Roads Not (Yet) Taken* ✦ **Ofer Aharony**, Weizmann Institute of Science ✦ *Emergent Supersymmetry from a Lattice of Interacting Majorana Modes* ✦ **Ian Affleck**, The University of British Columbia ✦ *Comments on Seiberg Duality* ✦ **David Kutasov**, The University of Chicago ✦ *Some Modular Properties of Superstring Scattering Amplitudes* ✦ **Michael Green**, University of Cambridge ✦ *Gravitational Scattering Theory as a Map Between Current Algebras on the Conformal Boundary* ✦ **Tom Banks**, Rutgers, The State University of New Jersey ✦ *On the Time-Reversal Anomaly of 2+1d TQFTs* ✦ **Yuji Tachikawa**, The University of Tokyo ✦ *Views on Physics* ✦ **David Gross**, University of California, Santa Barbara ✦ *The Large D Black Hole Membrane Paradigm* ✦ **Shiraz Minwalla**, Tata Institute of Fundamental Research, Mumbai ✦ *Black Hole Degeneracies from Worldsheet Instantons* ✦ **Sameer Murthy**, King's College London ✦ *The SYK Model, AdS$_2$, and Conformal Symmetry* ✦ **Juan Maldacena**, Carl P. Feinberg Professor, School of Natural Sciences ✦ *Nati Puts You On Shell* ✦ **Nima Arkani-Hamed**, Professor, School of Natural Sciences ✦ *Natural SUSY vs. the LHC* ✦ **David Shih**, Rutgers, The State University of New Jersey ✦ *Facing Complexity, Singularities, and Holography in a Parallel Universe: Sesame* ✦ **Eliezer Rabinovici**, The Hebrew University of Jerusalem ✦ *Black Holes and Random Matrices* ✦ **Stephen Shenker**, Stanford University

September 19

High Energy Theory Seminar ✦ *Little String Theories and Their Compactifications* ✦ **David R. Morrison**, University of California, Santa Barbara

High Energy Theory Seminar ✦ *Recovering the Spacetime Metric from a Holographic Dual* ✦ **Gary Horowitz**, University of California, Santa Barbara

September 21

Physics Group Meeting ✦ *Infrared Counting of Ultraviolet Operators* ✦ **Shu-Heng Shao**, Member, School of Natural Sciences

September 22

Informal High Energy Theory Seminar ✦ *A Holographic Perspective on the Weak Gravity Conjecture* ✦ **Miguel Montero**, Universidad Autónoma de Madrid

September 30

High Energy Theory Seminar ✦ *M-Theory and 6d SCFTs* ✦ **Kantaro Ohmori**, Member, School of Natural Sciences

October 5

Physics Group Meeting ✦ *Holographic Complexity, Randomness, and the Butterfly Effect* ✦ **Daniel A. Roberts**, Member, School of Natural Sciences

October 11

Informal High Energy Theory Seminar ✦ *Rethinking the Origin of Small Neutrino Masses* ✦ **Lena Funcke**, Max-Planck-Institut für Physik and Ludwig-Maximilians-Universität München

October 14

High Energy Theory Seminar ✦ *AdS Black Hole Entropy and Gauge Theory* ✦ **Francesco Benini**, Scuola Internazionale Superiore di Studi Avanzati, Trieste, Italy; Junior Visiting Professor, School of Natural Sciences

October 17

Workshop on Chaos, the SYK Model, and AdS2 ✦ *New Results in the SYK Model* ✦ **Alexei Kitaev**, California Institute of Technology

High Energy Theory Seminar ✦ *Strange Metals, Black Holes, and Graphene* ✦ **Subir Sachdev**, Harvard University

October 18

Workshop on Chaos, the SYK Model, and AdS2 ✦ *Adding Space to the SYK Model* ✦ **Xiaoliang Qi**, Stanford University

October 19

Workshop on Chaos, the SYK Model, and AdS2 ✦ *Microscopic Model of Quantum Butterfly Effect: Out-of-Time-Order Correlators and Traveling Combustion Waves* ✦ **Lev Ioffe**, Rutgers, The State University of New Jersey

Physics Group Meeting ✦ *Entanglement Structure of Non-equilibrium Steady States* ✦ **Brian Swingle**, Stanford University

October 24

High Energy Theory Seminar ✦ *Projective Geometry of Scattering Amplitudes* ✦ **Ellis Ye Yuan**, Member, School of Natural Sciences

October 31

High Energy Theory Seminar ✦ *A 1d Topological Sector of 3d SCFTs from Supersymmetric Localization* ✦ **Silviu Pufu**, Princeton University

November 4

High Energy Theory Seminar ✦ *The Ryu-Takayanagi Formula and Extremal Surfaces* ✦ **Xi Dong**, Member, School of Natural Sciences

November 9

Physics Group Meeting ✦ *The Weak Gravity Conjecture: Variations and Applications* ✦ **Matthew Reece**, Harvard University, Junior Visiting Professor, School of Natural Sciences

November 14

High Energy Theory Seminar ✦ *Symmetry Enriched Emergent U(1) Gauge Theories* ✦ **Senthil Todadri**, Massachusetts Institute of Technology

November 18

High Energy Theory Seminar ✦ *Anomalies of 6d SCFTs* ✦ **Clay Cordova**, Long-term Member, School of Natural Sciences

November 28

High Energy Theory Seminar ✦ *Correlation Functions in Superconformal Field Theories* ✦ **Jaume Gomis**, Perimeter Institute for Theoretical Physics

November 30

Physics Group Meeting ✦ *Quantum Mechanics with Noncommutative Amplitudes* ✦ **Gregory Moore**, Rutgers, The State University of New Jersey; Distinguished Visiting Professor, School of Natural Sciences

December 8

Informal High Energy Theory Seminar ✦ *Understanding the Landscape of N=2 Superconformal Field Theories* ✦ **Mario Martone**, Cornell University

December 9

High Energy Theory Seminar ✦ *WIMPs, Miracles, and Coincidences* ✦ **Raffaele Tito D'Agnolo**, Member, School of Natural Sciences

December 12

High Energy Theory Seminar ✦ *Bosonization in Two and Three Dimensions and Spin Structures* ✦ **Anton Kapustin**, California Institute of Technology

January 9

High Energy Theory Seminar ✦ *Half-Hour Talk and Discussion on "Bubbling Geometries for AdS2 × S2"* ✦ **Oleg Lunin**, University at Albany, The State University of New York

January 26
Precision Frontier Seminar ✦ *Basics of AC Signal Processing and the Fluctuation-Dissipation Theorem* ✦ **Ken Van Tilburg**, New York University; Member, School of Natural Sciences

February 1
Physics Group Meeting ✦ *The Lightcone Bootstrap and the Spectrum of the 3d Ising CFT* ✦ **David Simmons-Duffin**, Long-term Member, School of Natural Sciences

February 2
Precision Frontier Seminar ✦ *Searches for Light Scalar Particles* ✦ **Ken Van Tilburg**, New York University; Member, School of Natural Sciences

February 6
High Energy Theory Seminar ✦ *Towards a Theory of the QCD String* ✦ **Sergei Dubovsky**, New York University

February 10
Precision Frontier Seminar ✦ *Searches for Light Pseudoscalars* ✦ **Ken Van Tilburg**, New York University; Member, School of Natural Sciences

High Energy Theory Seminar ✦ *Loop Amplitudes from Ambitwistor Strings* ✦ **Yvonne Geyer**, Member, School of Natural Sciences

February 15
Physics Group Meeting ✦ *Discussion of MOND and LCDM* ✦ **Matias Zaldarriaga**, Professor, School of Natural Sciences

February 22
High Energy Theory Seminar ✦ *Black Holes and Quantum Complexity* ✦ **Leonard Susskind**, Stanford University

February 24
High Energy Theory Seminar ✦ *The Second Law of Quantum Complexity* ✦ **Leonard Susskind**, Stanford University

February 27
High Energy Theory Seminar ✦ *Nonlinear Gravity from Entanglement* ✦ **Mark van Raamsdonk**, The University of British Columbia

February 28
Precision Frontier Seminar ✦ *Searches for Pseudoscalar Dark Matter Coupled to Photons* ✦ **Yoni Kahn**, Princeton University

March 10
High Energy Theory Seminar ✦ *SL(N) Chern-Simons, Cluster Algebras, and Defects* ✦ **Mauricio Romo**, Member, School of Natural Sciences

March 13
High Energy Theory Seminar ✦ *T and LST* ✦ **David Kutasov**, The University of Chicago

March 15
Physics Group Meeting ✦ *Kinematic Space and Applications* ✦ **Bartlomiej Stanislaw Czech**, Member, School of Natural Sciences

March 16
Precision Frontier Seminar ✦ *Light Vector Dark Matter: Inflationary Production and Laboratory Detection* ✦ **David Pinner**, Princeton University

March 17
High Energy Theory Seminar ✦ *BPS Graphs for Class S* ✦ **Maxime Gabella**, Member, School of Natural Sciences

March 24
High Energy Theory Seminar ✦ *Group Theory of the Crossing Equation* ✦ **Abhijit Gadde**, Member, School of Natural Sciences

March 29
Physics Group Meeting ✦ *Algebraic EE and Holography* ✦ **Jennifer Lin**, Member, School of Natural Sciences

April 3
High Energy Theory Seminar ✦ *Holographic Complexity: A Progress Report* ✦ **Rob Myers**, Perimeter Institute for Theoretical Physics

April 4
Precision Frontier Seminar ✦ *Prospects for Direct Detection of the Cosmic Neutrino Background* ✦ **Matthew Low**, Member, School of Natural Sciences

April 12
Physics Group Meeting ✦ *Why the Energy Density Is Positive* ✦ **Aron Wall**, Member, School of Natural Sciences

April 17
High Energy Theory Seminar ✦ *Six-Point String Scattering: Simulation of Horizon Infallers* ✦ **Eva Silverstein**, Stanford University

April 21
High Energy Theory Seminar ✦ *Continuous and Discrete Gauge Symmetries in F-Theory* ✦ **Mirjam Cvetic**, University of Pennsylvania

April 25
Informal High Energy Theory Seminar ✦ *Integrability of d-Dimensional Conformal Blocks* ✦ **Mikhail Isachenkov**, Weizmann Institute of Science

April 26
Physics Group Meeting ✦ *On the Operator Content of dS* ✦ **Dionysios Anninos**, Member, School of Natural Sciences

May 3
Physics Group Meeting ✦ *Thoughts on Inertia and Gravity from Entanglement in (A)dS-Spacetimes* ✦ **Erik Verlinde**, University of Amsterdam

May 5
High Energy Theory Seminar ✦ *How Much Information Can We Get from Traversable Wormholes?* ✦ **Douglas Stanford**, Long-term Member, School of Natural Sciences

May 8
High Energy Theory Seminar ✦ *Magnificent Four* ✦ **Nikita Nekrasov**, Stony Brook University, The State University of New York

May 10
Physics Group Meeting ✦ *Link Invariants and Topological Quantum Matter* ✦ **Pavel Putrov**, Member, School of Natural Sciences

May 17
Physics Group Meeting ✦ *A Few Basics of Deep Learning* ✦ **Dmitry Krotov**, Member, School of Natural Sciences

May 22
High Energy Theory Seminar ✦ *Entanglement, Replicas, and Thetas* ✦ **Sunil Mukhi**, Tata Institute for Fundamental Research, Mumbai

June 19
High Energy Theory Seminar ✦ *Space of Field Theories, UV Completeness, and Integrability* ✦ **Alexander Zamolodchikov**, Rutgers, The State University of New Jersey

July 17–28
Prospects in Theoretical Physics 2017: Particle Physics at the LHC and Beyond ✦ *Organizers and lecturers:* **Nima Arkani-Hamed**, Professor, School of Natural Sciences; **Nathaniel Craig**, University of California, Santa Barbara; **André de Gouvêa**, Northwestern University; **Michael Dine**, University of California, Santa Cruz; **Rouven Essig**, C. N. Yang Institute for Theoretical Physics, Stony Brook University, The State University of New York; **Peter Graham**, Stanford University; **Mariangela Lisanti**, Princeton University; **Chiara Nappi**, Princeton University; **Jim Olsen**, Princeton University; **David Spergel**, Princeton University; **Chris Tully**, Princeton University; **Liantao Wang**, The University of Chicago; **Neal Weiner**, New York University

THE SIMONS CENTER FOR SYSTEMS BIOLOGY ACTIVITIES

September 14
The Simons Center for Systems Biology Informal Talks on Abstract/Conceptual/Quantitative Aspects of Biology ✦ *Functional Bow-Tie Structure of Large-Scale Metabolic Networks* ✦ **Sanjay Jain**, University of Delhi; Member, School of Natural Sciences

September 28
The Simons Center for Systems Biology Informal Talks on Abstract/Conceptual/Quantitative Aspects of Biology ✦ *Modularity*

and Feedback in Gene Regulatory Networks of Bacteria ✦ **Sanjay Jain**, University of Delhi; Member, School of Natural Sciences

October 5

The Simons Center for Systems Biology Informal Talks on Abstract/Conceptual/ Quantitative Aspects of Biology ✦ **Naama Brenner**, Technion–Israel Institute of Technology

October 19

The Simons Center for Systems Biology Informal Talks on Abstract/Conceptual/ Quantitative Aspects of Biology ✦ **Arvind Murugan**, The University of Chicago

November 23

The Simons Center for Systems Biology Informal Talks on Abstract/Conceptual/ Quantitative Aspects of Biology ✦ **Edo Kussell**, New York University

December 1

The Simons Center for Systems Biology Informal Talks on Abstract/Conceptual/ Quantitative Aspects of Biology ✦ **Uttam Bhat**, Boston University

December 21

Neuroendrocrine Joint Lab Meeting ✦ **Evan Vosburgh**, Sackler Laboratory ✦ **Chris Harris**, Raymond and Beverly Sackler Foundation and Rutgers Cancer Institute of New Jersey ✦ **Steven Libutti**, Rutgers Cancer Institute of New Jersey ✦ **Ziqiang Yuan**, Rutgers Cancer Institute of New Jersey ✦ **Mijung Kwon**, Rutgers Cancer Institute of New Jersey

January 11

DNA Dynamics and Neurodegeneration Symposium ✦ *Genomic Integrity, Chromatin Remodeling, and Activity Dependent Gene Expression* ✦ **Li-Huei Tsai**, Picower Institute for Learning and Memory, Massachusetts Institute of Technology ✦ *Repeat Instability and Human Disease* ✦ **Christopher Pearson**, The Hospital for Sick Children ✦ *Integrated Genetic and Systems Biology Approaches to Dissect Huntington's Disease Pathogenesis* ✦ **X. William Yang**, Semel Institute for Neuroscience and Human Behavior, University of California, Los Angeles ✦ *Stress Response at the Replication Fork* ✦ **Agata Smogorzewska**, The Rockefeller University ✦ *Recurrently Breaking Genes in Neuronal Progenitors* ✦ **Fred Alt**, Howard Hughes Medical Institute, Boston Children's Hospital

February 1

The Simons Center for Systems Biology Informal Talks on Abstract/Conceptual/ Quantitative Aspects of Biology ✦ **Daniel A. Beller**, Harvard University

February 15

The Simons Center for Systems Biology Informal Talks on Abstract/Conceptual/ Quantitative Aspects of Biology ✦ **John Bechhoefer**, Simon Fraser University

February 22

The Simons Center for Systems Biology Informal Talks on Abstract/Conceptual/ Quantitative Aspects of Biology ✦ **Kunihiko Kaneko**, The University of Tokyo; Member, School of Natural Sciences

March 23

The Simons Center for Systems Biology Informal Talks on Abstract/Conceptual/ Quantitative Aspects of Biology ✦ *Restriction and Modification Systems in Bacteria* ✦ **Maros Pleska**, Institute of Science and Technology Austria

March 31

The Simons Center for Systems Biology Informal Talks on Abstract/Conceptual/ Quantitative Aspects of Biology ✦ **Yuichi Wakamoto**, The University of Tokyo

April 6

Governor's Conference on Effective Partnering in Cancer Research ✦ "New Technologies in Cancer Research" ✦ *Quantifying Non-self in Tumors* ✦ **Benjamin Greenbaum**, Icahn School of Medicine at Mount Sinai ✦ *Next-Generation Biomarkers for Precision Cancer Immunotherapy* ✦ **David Kaufman**, Merck Research Laboratories ✦ *Physical and Biological Approaches Towards Understanding Tumor/Immune Interactions* ✦ **James R. Heath**, California Institute of Technology ✦ *Advancing Drug Discovery—Translating Small and Big Data into Insight* ✦ **Gunaretnam Rajagopal**, Janssen Research & Development ✦ *Algorithms for Pathway Discovery for Precision Medicine* ✦ **Jennifer Chayes**, Microsoft Research New England and New York City ✦ *Computational and Systems Biology of Cancer: Discover, Design, Deliver* ✦ **Chris Sander**, Dana-Farber Cancer Institute

April 12

The Simons Center for Systems Biology Informal Talks on Abstract/Conceptual/ Quantitative Aspects of Biology ✦ *Hydration Forces in Biological Tissues* ✦ **Peter Fratzl**, Max-Planck-Institut für Kolloid- und Grenzflächenforschung

April 28–29

Continuing Exploration of Topics for Collaborations between Computer Scientists and Oncologists ✦ *Measuring T-Cell Receptor Sequences and Their Antigens* ✦ **Drew Pardoll**, Johns Hopkins University School of Medicine, and **Alex Baras**, Johns Hopkins University School of Medicine ✦ *Aging T-Cells* ✦ **Mark M. Davis**, Stanford University School of Medicine ✦ *The Exhausted T-Cell* ✦ **Josephine Giles**, Penn Institute for Immunology, Perelman School of Medicine, University of Pennsylvania ✦ *The Quest for Neoantigens* ✦ **Benjamin Greenbaum**, Icahn School of Medicine at Mount Sinai ✦ *Biomarkers for Immunotherapy* ✦ **David Kaufman**, Merck Research Laboratories ✦ *Long-Term Survivors of Pancreatic Cancer* ✦ **Vinod Balachandran**, Memorial Sloan-Kettering Cancer Center ✦ *Immunotherapy for Ovarian Cancers* ✦ **Alexandra Snyder**, Memorial Sloan-Kettering Cancer Center

May 10

Neuroendocrine Tumor Symposium ✦ *Neuroendocrine Tumor Therapy in 2017—Current Landscape and Future Prospects* ✦ **Edward M. Wolin**, Montefiore Einstein Center for Cancer Care, Albert Einstein College of Medicine ✦ *Next-Generation Sequencing in Pancreatic Neuroendocrine Tumors: Defining Differentiation and Grade Genetically* ✦ **Diane Reidy-Lagunes**, Memorial Sloan-Kettering Cancer Center ✦ *Genes Involved in Metastasis of Neuroendocrine Tumors of the Pancreas and Small Intestine* ✦ **Chris R. Harris**, Raymond and Beverly Sackler Foundation and Rutgers Cancer Institute of New Jersey ✦ *Next Steps in Cancer Immunotherapy* ✦ **Eric H. Rubin**, Merck Research Laboratories ✦ *Epigenetic Pathways as Targets in Human Cancer* ✦ **Shelley L. Berger**, University of Pennsylvania

June 1–2

Mathematical Methods in Cancer Evolution and Heterogeneity Workshop ✦ *On the Origins of CLL Evolution* ✦ **Dan Landau**, Weill Cornell Medicine, Cornell University ✦ *Quantifying Non-self in Tumors* ✦ **Benjamin Greenbaum**, Icahn School of Medicine at Mount Sinai ✦ *Real-Time Clonal Evolution from Diagnosis to Relapse in 100 Pediatric Acute Lymphoblastic Leukemia* ✦ **Jinghui Zhang**, St. Jude Children's Research Hospital ✦ *Decoding Epigenomic Programs Governing Tumor-Specific T-Cell Dysfunction and Therapeutic Reprogrammability* ✦ **Christina Leslie**, Memorial Sloan-Kettering Cancer Center ✦ *TRACERx: Evolution in Space and Time* ✦ **Nicholas McGranahan**, Cancer Research UK ✦ *Utility of Research Autopsies for Understanding the Evolutionary Dynamics of Cancer* ✦ **Christine A. Iacobuzio-Donahue**, Memorial Sloan-Kettering Cancer Center ✦ *Quantifying Tumor Evolution through Spatial Computational Modeling and Bayesian Statistical Inference* ✦ **Christina Curtis**, Stanford University ✦ *Measurement of Evolutionary Dynamics in Human Cancers Using Mathematical Modelling of Genomic Data* ✦ **Trevor Graham**, Barts Cancer Institute, Queen Mary, University of London ✦ *Algorithms for Inferring Evolution and Migration of Tumors* ✦ **Ben Raphael**, Princeton University ✦ *Melanoma Therapeutic Strategies That Select Against Resistance by Exploiting MYC-Driven Evolutionary Convergence* ✦ **Sayan Mukherjee**, Duke University ✦ *Steering Cancer Evolution: Harnessing Phenotypic Heterogeneity to Design Better Therapies* ✦ **Alexander**

Anderson, Moffitt Cancer Center ✦ *Combining Sequence and Structural Features Leads to Accurate Interpretation of Genetic Variation: Large-Scale Modeling and Classification of De Novo Human Mutations with VIPUR* ✦ **Richard Bonneau**, New York University ✦ *Topological Data Modeling* ✦ **Gunnar Carlsson**, Stanford University

June 6

Joshua Lederberg–John von Neumann Symposium: Towards Quantitative Biology (at The Rockefeller University) ✦ *Correlated Mutations and Homologous Recombination in Bacterial Populations* ✦ **Edo Kussell**, New York University ✦ *Immune Recognition, Spandrel, and Antagonism* ✦ **Paul François**, McGill University ✦ *Neural Mechanisms of Visual Object Recognition* ✦ **Tatyana O. Sharpee**, Salk Institute for Biological Studies ✦ *Confidence, Deliberation, and Democracy* ✦ **Mariano Sigman**, Universidad Torcuato Di Tella, Argentina ✦ *Possible and Impossible Cells* ✦ **Mukund Thattai**, Tata Institute of Fundamental Research, Mumbai

June 21–22

Convergence Scholars Meeting ✦ *Transposon Mutagenesis Identified Genes and Evolutionary Forces Driving GI Cancer* ✦ **Neal Copeland**, University of Texas MD Anderson Cancer Center ✦ *A Recellularized Human Colon Model Identifies Early-Stage Cancer Driver Genes* ✦ **Nancy Jenkins**, University of Texas MD Anderson Cancer Center ✦ *Opposing Effects of IFNgamma on Regulating Drug Response in EGFR Mutated NSCLC Cells* ✦ **Xiaoxiao Sun**, University of California, San Francisco ✦ *Characterizing the Innate Immune Response to Repeat RNAs in Cancer* ✦ **Mihir Rajurkar**, Massachusetts General Hospital, Harvard University ✦ *Quantifying Non-coding RNAs in Cancers* ✦ **Alexander Solovyov**, Icahn School of Medicine at Mount Sinai ✦ *Neoantigen Discovery in Pancreatic Ductal Adenocarcinoma* ✦ **John Alec Moral**, Memorial Sloan-Kettering Cancer Center ✦ *Stromal Genetic Signatures in Breast Cancer Development with RNAseq* ✦ **Raditya Utama**, Cold Spring Harbor Laboratory ✦ *Modeling Cancer Microenvironment: From Patterns of Cancer-Associated Fibroblasts to the Switch of Immune Microenvironment* ✦ **Xuefei Li**, Rice University ✦ *Systematic Functional Characterization of Resistance to High-Order Combination Therapy in Breast Cancer* ✦ **Xiuning Le**, Beth Israel Deaconess Medical Center, Harvard University ✦ *Clonal Dynamics in Neoadjuvant and Metastatic Breast Cancer* ✦ **Junfei Zhao**, Columbia University Medical Center, Columbia University ✦ *Lessons from Translational Research in Myeloid Malignancies* ✦ **Ross Levine**, Memorial Sloan-Kettering Cancer Center ✦ *Uncovering Immune Response to Cancer Using Statistical Modeling of TCR Sequences* ✦ **Yuval Elhanati**, Princeton University ✦ *A Network Model of Signal Transduction Pathways in Breast Cancer: Drug Resistance and Combinatorial Therapies* ✦ **Jorge Zanudo**, Pennsylvania State University ✦ *Maximum Entropy Analysis of the Breast Tumor Microenvironment* ✦ **Julie Wortman**, University of California, Irvine ✦ *Personalizing Cancer Treatment Using the Novel Cell-Based Functional Assay Dynamic BH3* ✦ **Joan Montero**, Dana-Farber Cancer Institute, Harvard University ✦ *Understanding Target Therapy Resistance in ER-Positive Breast Cancer* ✦ **Guotai Xu**, Memorial Sloan-Kettering Cancer Center

School of Social Science

September 21

School of Social Science Orientation Session

School of Social Science Welcome Party

September 26

Social Science Seminar ✦ *Why Do We Punish? Beyond Theories of Justification* ✦ **Didier Fassin**, James D. Wolfensohn Professor, School of Social Science

September 28

Law and the Social Sciences Seminar ✦ Organizational Meeting

October 3

Social Science Seminar ✦ *The Ecology of Political Activism: Rights-Oriented Lawyering in China* ✦ **Sida Liu**, University of Toronto; Member, School of Social Science

October 5

Law and the Social Sciences Seminar ✦ Discussion of readings on the theme "Michel Foucault and Juridical Power" ✦ curated by **Bernard E. Harcourt**, Columbia University and École des Hautes Études en Sciences Sociales, Paris; Visiting Professor, School of Social Science

October 10

Social Science Seminar ✦ *Precarious Hope, Migrant Legalization, and the Limits of Affect Theory* ✦ **Ayşe Parla**, Sabanci University; Member, School of Social Science

October 11

Law and Emotions Reading Group

October 12

Law and the Social Sciences Film Series ✦ *A Separation,* directed by Asghar Farhadi ✦ Post-screening discussion led by **Vanja Hamzić**, School of Oriental and African Studies, University of London; Member, School of Social Science, and **Amr Shalakany**, American University in Cairo; Member, School of Social Science

October 17

Social Science Seminar ✦ *The Emperor's New Genes: Race, Science, Policy, and the Allure of Objectivity* ✦ **Ruha Benjamin**, Princeton University; Member, School of Social Science

October 19

Law and the Social Sciences Seminar ✦ Discussion of readings on the theme "Revolution, Transition, and New Legal Orders" ✦ curated by **Juan Obarrio**, Johns Hopkins University; Member, School of Social Science, **Amr Shalakany**, American University in Cairo; Member, School of Social Science, and **Linda M. G. Zerilli**, The University of Chicago; Member, School of Social Science

October 24

Social Science Seminar ✦ *Making Up the Ex-offender* ✦ **Reuben Jonathan Miller**, University of Michigan; Member, School of Social Science

October 31

Social Science Seminar ✦ *The Counterrevolution* ✦ **Bernard E. Harcourt**, Columbia University and École des Hautes Études en Sciences Sociales, Paris; Visiting Professor, School of Social Science

November 2

Law and the Social Sciences Seminar ✦ Discussion of readings on the theme "The Ordinary Life of Law" ✦ curated by **Céline Bessière**, Université Paris-Dauphine; Member, School of Social Science, **Andrew Dilts**, Loyola Marymount University; Member, School of Social Science, and **Sida Liu**, University of Toronto; Member, School of Social Science

Reflection on Critique ✦ Planning Meeting

November 7

Social Science Seminar ✦ *Insurgent Universality: Journeying on the Roads Not Taken* ✦ **Massimiliano Tomba**, Università degli Studi di Padova; Member, School of Social Science

Reflection on Critique

November 14

Social Science Seminar ✦ *Towards a New Theory of Torture* ✦ **Nick Cheesman**, The Australian National University; Member, School of Social Science

November 15

Law and the Social Sciences Film Series ✦ *Courthouse on the Horseback*, directed by Jie Liu ✦ Post-screening discussion led by **Teng Biao,** Visitor, School of Social Science, and **Sida Liu**, University of Toronto; Member, School of Social Science

November 16

Law and the Social Sciences Seminar ✦ Discussion of readings on the theme "After the Fact: Reflection on 11/9/16" ✦ curated by **Didier Fassin,** James D. Wolfensohn Professor, School of Social Science, and **Bernard E.**

Harcourt, Columbia University and École des Hautes Études en Sciences Sociales, Paris; Visiting Professor, School of Social Science

November 21

Social Science Seminar ✦ *Carceral Human Rights* ✦ **Karen Engle**, The University of Texas at Austin; Member, School of Social Science

November 28

Social Science Seminar ✦ *Show Time: Race-Making through Violent Display* ✦ **Lee Ann Fujii**, University of Toronto; Member, School of Social Science

Reflection on Critique

November 30

Law and the Social Sciences Seminar ✦ Discussion of readings on the theme "Contemporary Critical Approaches to the Law" ✦ curated by **Bernard E. Harcourt**, Columbia University and École des Hautes Études en Sciences Sociales, Paris; Visiting Professor, School of Social Science, and **Karen Engle**, The University of Texas at Austin; Member, School of Social Science

December 5

Social Science Seminar ✦ *Abolitionist Killjoys and the Social Life of Social Death* ✦ **Andrew Dilts**, Loyola Marymount University; Member, School of Social Science

December 7

Law and the Social Sciences Seminar ✦ Discussion of readings on the theme "Law and Neoliberalism" ✦ curated by **Didier Fassin**, James D. Wolfensohn Professor, School of Social Science, **Lori A. Allen**, School of Oriental and African Studies, University of London; Member, School of Social Science, and **Jonathan Morduch**, New York University; Member, School of Social Science

Law and the Social Sciences Film Series ✦ *13th*, directed by Ava DuVernay ✦ Post-screening discussion led by **Bernard E. Harcourt**, Columbia University and École des Hautes Études en Sciences Sociales, Paris; Visiting Professor, School of Social Science, and **Reuben Jonathan Miller**, University of Michigan; Member, School of Social Science

December 8

Reflection on Critique ✦ **Wendy Brown**, University of California, Berkeley

December 12

Social Science Seminar ✦ *Humanitarian Design and the Scale of the Future* ✦ **Peter Redfield**, The University of North Carolina at Chapel Hill; Member, School of Social Science

January 23

Social Science Seminar ✦ *Adam and Juan Patricio: Dis/Possessed* ✦ **David Kazanjian**, University of Pennsylvania; Member, School of Social Science

January 25

Law and the Social Sciences Seminar ✦ Discussion of readings on the theme "Law and Disobedience" ✦ curated by **Didier Fassin,** James D. Wolfensohn Professor, School of Social Science, and **Bernard E. Harcourt**, Columbia University and École des Hautes Études en Sciences Sociales, Paris; Visiting Professor, School of Social Science

Law and the Social Sciences Film Series ✦ *Into the Abyss*, directed by Werner Herzog ✦ Post-screening discussion led by **Andrew Dilts**, Loyola Marymount University; Member, School of Social Science, and **Allegra M. McLeod**, Georgetown University; Member, School of Social Science

January 30

Social Science Seminar ✦ *Seeking Asylum, Finding God: Asylum-Seeking on Religious Grounds and the Politics of Deservingness in the Era of "Probationary Citizenship"* ✦ **Jaeeun Kim**, University of Michigan; Member, School of Social Science

Reflection on Critique

February 6

Social Science Seminar ✦ *The Honest But Unfortunate Debtor: Social Class, Statebuilding, and U.S. Law* ✦ **Emily Zackin**, Johns Hopkins University; Member, School of Social Science

February 8

Law and the Social Sciences Seminar ✦ Discussion of readings on the theme "The Archives and Black Lives" ✦ curated by **David Kazanjian**, University of Pennsylvania; Member, School of Social Science, and **Reuben Jonathan Miller**, University of Michigan; Member, School of Social Science

February 13

Social Science Seminar ✦ *Emancipation Binds* ✦ **Fadi A. Bardawil**, The University of North Carolina at Chapel Hill; Member, School of Social Science

February 22

Law and the Social Sciences Seminar ✦ Discussion of readings on the theme "Alegality or Infrapolitics?" ✦ curated by **Nick Cheesman**, The Australian National University; Member, School of Social Science, and **Vanja Hamzić**, School of Oriental and African Studies, University of London; Member, School of Social Science

Law and the Social Sciences Film Series ✦ *Abluka*, directed by Emin Alper ✦ Post-screening discussion led by **Ayşe Parla**, Sabanci University; Member, School of Social Science

February 27

Social Science Seminar ✦ *Markets and Social Action* ✦ **Jonathan Morduch**, New York University; Member, School of Social Science

March 6

Social Science Seminar ✦ *On Cultural Relativism: Forced Marriage and "Honor" Killings in London, UK* ✦ **Lalaie Ameeriar**, University of California, Santa Barbara; Member, School of Social Science

March 8

Law and the Social Sciences Seminar ✦ Discussion of readings on the theme "Law and Violence" ✦ curated by **Massimiliano Tomba**, Università degli Studi di Padova; Member, School of Social Science, and **Fadi A. Bardawil**, The University of North Carolina at Chapel Hill; Member, School of Social Science

March 13

Social Science Seminar ✦ *Is Disease Part of the Job? Economic and Moral Restructuring in a French Factory* ✦ **Pascal Marichalar**, Institut de Recherche Interdisciplinaire sur les Enjeux Sociaux, École des Hautes Études en Sciences Sociales, Paris; Visitor, School of Social Science

March 20

Social Science Seminar ✦ *Doing Wealth Inequality in the Family* ✦ **Céline Bessière**, Université Paris-Dauphine; Member, School of Social Science

March 22

Law and the Social Sciences Film Series ✦ *Hunger*, directed by Steve McQueen ✦ Post-screening discussion led by **Banu Bargu**, The New School

March 27

Social Science Seminar ✦ *Why Do We Investigate? The Political Epistemology of International Commissions of Inquiry* ✦ **Lori A. Allen**, School of Oriental and African Studies, University of London; Member, School of Social Science

April 3

Social Science Seminar ✦ *Statistics in the Courtroom: Do They Threaten the Fair Trial?* ✦ **Marcello Di Bello**, Lehman College, The City University of New York; Member, School of Social Science

April 5

Law and the Social Sciences Seminar ✦ Discussion of readings on the theme "Islamic Law" ✦ curated in collaboration with **Fadi A.**

Bardawil, The University of North Carolina at Chapel Hill; Member, School of Social Science

Post-Seminar Guest Speaker ✦ *Islamic Governance, Sharīʿa Interpretation* ✦ **Brinkley M. Messick**, Columbia University

April 17
Social Science Seminar ✦ *Imagining Abolition* ✦ **Allegra M. McLeod**, Georgetown University; Member, School of Social Science

April 19
Law and the Social Sciences Seminar ✦ Discussion of readings on the theme "The Question of Human Rights" ✦ curated by **Lori A. Allen**, School of Oriental and African Studies, University of London; Member, School of Social Science, **Teng Biao,** Visitor, School of Social Science, **Karen Engle**, The University of Texas at Austin; Member, School of Social Science, and **Sida Liu**, University of Toronto; Member, School of Social Science

April 24
Social Science Seminar ✦ *Law and Behold* ✦ **Juan Obarrio**, Johns Hopkins University; Member, School of Social Science

May 1
Social Science Seminar ✦ *Critique and the Realistic Spirit* ✦ **Linda M. G. Zerilli**, The University of Chicago; Member, School of Social Science

May 3
Law and the Social Sciences Seminar ✦ Discussion of readings on the theme "Comparative Criminology" ✦ curated in collaboration with **Didier Fassin,** James D. Wolfensohn Professor, School of Social Science

Post-Seminar Guest Speaker ✦ *The Social Roots of America's Penal State* ✦ **David Garland**, New York University

May 8
Social Science Seminar ✦ *Interruption* ✦ **Vanja Hamzić**, School of Oriental and African Studies, University of London; Member, School of Social Science

May 12
Public Policy Lecture ✦ *Reflections on Inequality and Capital in the 21st Century* ✦ **Thomas Piketty**, École des Hautes Études en Sciences Sociales and École d'Économie de Paris

May 17
Law and the Social Sciences Seminar ✦ *Reflection on the Year's Discussions and Conversations*

May 18–19
Borders and Boundaries Seminar Workshop

June 25–30
Summer Program in Social Science (Uppsala, Sweden)

Director's Office Events

September 19
Member Welcome Reception

September 30
Edward T. Cone Concert Series and Talk ✦ **Choir of Trinity Wall Street**

October 1
Edward T. Cone Concert Series ✦ **Choir of Trinity Wall Street**

October 7
Public Lectures ✦ *Algorand: The Public Ledger* ✦ **Silvio Micali**, Massachusetts Institute of Technology ✦ *Quantum Physics and the Computational Lens* ✦ **Dorit Aharonov**, The Hebrew University of Jerusalem

AMIAS Family Barbeque

October 14
AMIAS Public Lectures ✦ *The Left Side of History: World War II and Re-emergent Nationalisms in Contemporary Eastern Europe* ✦ **Kristen Ghodsee**, Bowdoin College; President of the Association of Members of the Institute for Advanced Study ✦ *Nessun Dorma: From Night Stories to a History of the Night in the Greek World* ✦ **Angelos Chaniotis**, Professor, School of Historical Studies

October 15
Science Talk for Families ✦ *The Magic of Light and Color* ✦ **Robbert Dijkgraaf**, Director and Leon Levy Professor

October 19
Speaker Series on Diversity Lecture ✦ *Cultures of Brilliance and Academic Gender Gaps* ✦ **Sarah-Jane Leslie**, Princeton University

October 21
Friends Lunch with a Member ✦ *Marianne's Daughters: Being a Woman in Politics in France* ✦ **Anne-Claire Defossez**, Visitor, School of Social Science

October 23
Princeton Symphony Orchestra Concert ✦ **PUBLIQuartet**

October 28
Public Lecture ✦ *Contesting American Values* ✦ **Jonathan Israel**, Professor Emeritus, School of Historical Studies

November 4
Friends Lunch with a Member ✦ *Cosmic Microwave Background: A Cosmologist's Discovery Tools* ✦ **Vera Gluscevic**, Member, School of Natural Sciences

November 9
APS-EPS Award Ceremony and Public Lecture ✦ *The Institute for Advanced Study: The First 100 Years* ✦ **George Dyson**, Science and Technology Historian

November 11
Friends Talk ✦ *Bartolomeo Scappi's Opera: The First Illustrated Cookbook* ✦ **Deborah L. Krohn**, Bard Graduate Center

November 16
Public Lecture ✦ *Claude E. Shannon* ✦ **Sergio Verdú**, Princeton University

November 18
Friends Lunch with a Member ✦ *The Mysterious Mr. Harriot* ✦ **Robert Goulding**, University of Notre Dame; Member, School of Historical Studies

S. T. Lee Public Lecture ✦ *Philologists as Rogues?* ✦ **Benjamin Elman**, Princeton University

Edward T. Cone Concert Series and Talk ✦ **David Jalbert**

November 19
Edward T. Cone Concert Series ✦ **David Jalbert**

December 2
Friends Lunch with a Member ✦ *Scientific Storytelling for the New Yorker* ✦ **Siobhan Roberts**, IAS Director's Visitor

World Disorder Lecture Series ✦ *Lawless Economy? Putin's Russia and the Imperfect Market* ✦ **Bill Browder**, Hermitage Capital Management

December 4
Princeton Symphony Orchestra Concert ✦ **Singularity Quartet**

December 19
Institute Community Holiday Party

January 18
Friends Dessert with a Member ✦ *Precarious Hope: Migrants, Law and Relative Privilege in Turkey* ✦ **Ayşe Parla**, Sabanci University; Member, School of Social Science

February 3
Friends Talk ✦ *The Patternmakers* ✦ **David Lang**, Artist-in-Residence

February 10
Friends Lunch with a Member ✦ *Prisoner Reentry as a Social Institution and the Making Up of the Ex-Offender* ✦ **Reuben Jonathan Miller**, University of Michigan; Member, School of Social Science

Edward T. Cone Concert Series and Talk ✦ **Gamelan Galak Tika**

February 11
Edward T. Cone Concert Series ✦ **Gamelan Galak Tika**

February 25
Midwinter Party for Faculty, Members, and Staff

February 28
Public Lecture ✦ *Ernst Kantorowicz: Institute Events and Some Unpublished Writings of a Towering Twentieth-Century Intellectual* ✦ **Robert E. Lerner**, Northwestern University

March 1
World Disorder Lecture Series ✦ *Latin America: Walls or Bridges?* ✦ **Jeffrey Davidow**, Former U.S. Ambassador to Mexico, Venezuela, and Zambia

March 3
Friends Lunch with a Member ✦ *Mathematics and Music: Vibrating Strings and Overtones* ✦ **Ian Jauslin**, Member, School of Mathematics

Edward T. Cone Concert Series and Talk ✦ **Sō Percussion**

March 4
Edward T. Cone Concert Series ✦ **Sō Percussion**

March 8
Public Lecture ✦ *Donald Trump, Angela Merkel, and China: The Dawning of a New Global Order?* ✦ **Klaus Larres**, The University of North Carolina, Chapel Hill; Member, School of Historical Studies

March 10
Friends Talk ✦ *Buddhist Temple Food and Globalization in South Korea* ✦ **Seungsook Moon**, Vassar College

March 12
Princeton Symphony Orchestra Concert ✦ **Jerry Bryant & Friends**

March 13
Public Lecture ✦ *The Usefulness of Useless Knowledge* ✦ Discussion Panel: **Robbert Dijkgraaf**, Director and Leon Levy Professor; **Peter Dougherty**, Princeton University Press; **Vartan Gregorian**, Carnegie Corporation; IAS Trustee Emeritus; and **Shirley Tilghman**, Princeton University; IAS Trustee

March 29
Friends Talk ✦ *What a (Modern) Monk Does: Digitally Preserving Endangered Manuscripts in Threatened Communities* ✦ **Columba Stewart**, St. John's University; Member, School of Historical Studies

April 19
Albert O. Hirschman Prize Ceremony and Program

April 20
Speaker Series on Diversity Lecture ✦ *Gender Bias in Science: Where It Is and Where It Isn't* ✦ **Shulamit Kahn**, Boston University

April 28
AMIAS Public Lecture ✦ *How to Handle a Mummy: A Burial Ritual from Greco-Roman Egypt* ✦ **Jacco Dieleman**, University of California, Los Angeles

May 5
Public Lecture ✦ *Matisse's Scale: What's with the Bamboo Stick?* ✦ **Yve-Alain Bois**, Professor, School of Historical Studies

May 12
Public Policy Lecture ✦ *Reflections on Inequality and Capital in the 21st Century* ✦ **Thomas Piketty**, École des Hautes Études en Sciences Sociales and École d'Économie de Paris

May 19
Friends Lunch with a Member ✦ *The "Works of the Old Men" in Arabia: Discovering a Prehistoric Landscape from the Air . . . and Space* ✦ **David Kennedy**, University of Western Australia; Visitor, School of Historical Studies

May 24
Public Lecture ✦ *Alternative Careers of Mathematicians* ✦ Discussion Panel: **Sarah Ellison**, Massachusetts Institute of Technology; **Margaret Holen**, Goldman Sachs; **Linda Ness**, Applied Communication Sciences

May 31
Institute Talk ✦ *American Foreign Policy in the Age of Trump* ✦ **Jonathan Finer**, Princeton University and Harvard University; IAS Director's Visitor

June 7
Friends Annual Meeting and Picnic

June 9
Staff Picnic

ACKNOWLEDGMENTS

(for the year ended June 30, 2017)

Each year researchers from around the world come to the Institute for Advanced Study to interact, explore, take risks, share, build, and discover. This would not be possible but for the far-sighted vision and support of a worldwide network of philanthropists. We thank our donors for their contributions in fiscal year 2016–17 during which new commitments to endowment and the IAS Fund totaled more than $25 million.

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Nicola Di Cosmo · Freeman J. Dyson · Edward M. Earle · Albert Einstein · John H. Elliott
Didier Fassin · Patrick J. Geary · Clifford Geertz · Felix Gilbert · James F. Gilliam · Peter Goddard
Kurt Gödel · Hetty Goldman · Peter Goldreich · Oleg Grabar · Phillip A. Griffiths · Christian Habicht
Harish-Chandra · Jonathan Haslam · Ernst Herzfeld · Albert O. Hirschman · Helmut Hofer · Lars V. Hörmander
Piet Hut · Jonathan Israel · Ernst H. Kantorowicz · George F. Kennan · Robert P. Langlands · Irving Lavin
Tsung-Dao Lee · Stanislas Leibler · Arnold J. Levine · Elias A. Lowe · Robert MacPherson
Juan Maldacena · Avishai Margalit · Eric S. Maskin · Jack F. Matlock, Jr. · Millard Meiss
Benjamin D. Meritt · John W. Milnor · David Mitrany · Deane Montgomery · Marston Morse
J. Robert Oppenheimer · Abraham Pais · Erwin Panofsky · Peter Paret · Tullio E. Regge
Winfield W. Riefler · Dani Rodrik · Marshall N. Rosenbluth · Peter Sarnak · Sabine Schmidtke
Joan Wallach Scott · Nathan Seiberg · Atle Selberg · Kenneth M. Setton · Carl L. Siegel · Thomas Spencer
Walter W. Stewart · Bengt G. D. Strömgren · Richard Taylor · Homer A. Thompson · Scott Tremaine
Kirk Varnedoe · Oswald Veblen · Vladimir Voevodsky · John von Neumann · Heinrich von Staden
Michael Walzer · Robert B. Warren · André Weil · Hermann Weyl · Morton White · Hassler Whitney
Avi Wigderson · Frank Wilczek · Edward Witten · Ernest Llewellyn Woodward
Chen Ning Yang · Shing-Tung Yau · Matias Zaldarriaga

Institute for Advanced Study—
Louis Bamberger and Mrs. Felix Fuld Foundation

Financial Statements
June 30, 2017 and 2016

(With Independent Auditors' Report Thereon)

Independent Auditors' Report

The Board of Trustees
Institute for Advanced Study–Louis Bamberger and Mrs. Felix Fuld Foundation:

We have audited the accompanying financial statements of Institute for Advanced Study–Louis Bamberger and Mrs. Felix Fuld Foundation (the Institute), which comprise the statements of financial position as of June 30, 2017 and 2016, and the related statements of activities and cash flows for the years then ended, and the related notes to the financial statements.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with U.S. generally accepted accounting principles; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditors' Responsibility

Our responsibility is to express an opinion on these financial statements based on our audits. We conducted our audits in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditors' judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of Institute for Advanced Study–Louis Bamberger and Mrs. Felix Fuld Foundation as of June 30, 2017 and 2016, and the changes in its net assets and its cash flows for the years then ended, in accordance with U.S. generally accepted accounting principles.

KPMG LLP

October 30, 2017

STATEMENTS OF FINANCIAL POSITION
JUNE 30, 2017 AND 2016

Assets		2017	2016
Cash and cash equivalents	$	1,005,909	7,602,998
Accounts receivable and other assets		3,074,199	2,935,387
Grants receivable		1,980,650	1,838,300
Contributions receivable, net		11,677,987	19,905,402
Mortgages receivable		6,284,894	6,888,348
Funds held by bond trustee		2,457,470	2,426,873
Beneficial interest in remainder trust		1,061,403	2,613,469
Land, buildings and improvements, equipment, and rare book collection, net		102,551,004	90,673,753
Investments		777,519,685	765,169,015
Total assets	$	907,613,201	900,053,545
Liabilities and Net Assets			
Liabilities:			
Accounts payable and accrued expenses	$	11,406,056	8,832,768
Deferred revenue		9,617,054	10,845,676
Liabilities under split-interest agreements		1,900,266	1,913,138
Postretirement benefit obligation		17,832,643	18,473,368
Asset retirement obligation		1,116,114	1,082,777
Bond swap liability		3,447,319	5,127,858
Note payable		—	74,665
Long-term debt, net		70,387,750	73,221,984
Total liabilities		115,707,202	119,572,234
Net assets:			
Unrestricted		360,890,589	357,099,237
Temporarily restricted		177,061,931	170,493,442
Permanently restricted		253,953,479	252,888,632
Total net assets		791,905,999	780,481,311
Total liabilities and net assets	$	907,613,201	900,053,545

See accompanying notes to financial statements.

STATEMENT OF ACTIVITIES
YEAR ENDED JUNE 30, 2017

	Unrestricted	Temporarily restricted	Permanently restricted	Total
Revenues, gains, and other support:				
Private contributions and grants	$ 132,207	9,744,027	1,064,847	10,941,081
Government grants	—	6,922,152	—	6,922,152
Investment return	23,379,515	26,930,175	—	50,309,690
Change in fair value of bond swap liability	1,680,539	—	—	1,680,539
Loss on sale of plant assets	(11,834)	—	—	(11,834)
Auxiliary activity	5,372,411	—	—	5,372,411
Net assets released from restrictions— satisfaction of program restrictions	37,027,865	(37,027,865)	—	—
Total revenues, gains, and other support	67,580,703	6,568,489	1,064,847	75,214,039
Expenses:				
School of Mathematics	10,930,788	—	—	10,930,788
School of Natural Sciences	11,364,271	—	—	11,364,271
School of Historical Studies	7,579,365	—	—	7,579,365
School of Social Science	3,627,565	—	—	3,627,565
Libraries and other academic	6,491,183	—	—	6,491,183
Administration and general	15,196,630	—	—	15,196,630
Auxiliary activity	8,599,549	—	—	8,599,549
Total expenses	63,789,351	—	—	63,789,351
Changes in net assets	3,791,352	6,568,489	1,064,847	11,424,688
Net assets—beginning of year	357,099,237	170,493,442	252,888,632	780,481,311
Net assets—end of year	$ 360,890,589	177,061,931	253,953,479	791,905,999

See accompanying notes to financial statements.

STATEMENT OF ACTIVITIES
YEAR ENDED JUNE 30, 2016

	Unrestricted	Temporarily restricted	Permanently restricted	Total
Revenues, gains, and other support:				
Private contributions and grants	$ 62,702	21,119,654	20,195,659	41,378,015
Government grants	—	7,043,263	—	7,043,263
Investment return	(4,032,362)	(4,646,157)	—	(8,678,519)
Change in fair value of bond swap liability	(996,198)	—	—	(996,198)
Loss on sale of plant assets	(532)	—	—	(532)
Auxiliary activity	7,042,436	—	—	7,042,436
Net assets released from restrictions— satisfaction of program restrictions	35,726,709	(35,726,709)	—	—
Total revenues, gains, and other support	37,802,755	(12,209,949)	20,195,659	45,788,465
Expenses:				
School of Mathematics	11,558,556	—	—	11,558,556
School of Natural Sciences	11,870,919	—	—	11,870,919
School of Historical Studies	8,690,016	—	—	8,690,016
School of Social Science	3,309,893	—	—	3,309,893
Libraries and other academic	7,926,242	—	—	7,926,242
Administration and general	16,068,543	—	—	16,068,543
Auxiliary activity	8,312,231	—	—	8,312,231
Total expenses	67,736,400	—	—	67,736,400
Changes in net assets	(29,933,645)	(12,209,949)	20,195,659	(21,947,935)
Net assets—beginning of year	387,032,882	182,703,391	232,692,973	802,429,246
Net assets—end of year	$ 357,099,237	170,493,442	252,888,632	780,481,311

See accompanying notes to financial statements.

STATEMENTS OF CASH FLOWS
YEARS ENDED JUNE 30, 2017 AND 2016

	2017	2016
Cash flows from operating activities:		
Change in net assets	$ 11,424,688	(21,947,935)
Adjustments to reconcile change in net assets to net cash used in operating activities:		
Depreciation	4,942,462	4,849,131
Contributions restricted for endowment and plant	(8,489,319)	(28,645,990)
Net (appreciation) depreciation on investments	(53,600,807)	5,742,935
Change in fair value of bond swap liability	(1,680,539)	996,198
Loss on sale of plant assets	11,834	532
Amortization of debt issuance costs	58,409	49,325
Amortization of bond discount	22,357	19,260
Changes in assets/liabilities:		
Receivables and other assets	322,292	(2,465,977)
Contributions receivable	8,227,415	8,601,358
Beneficial interest in remainder trust	1,552,066	16,354
Accounts payable and accrued expenses	2,573,288	918,419
Deferred revenue	(1,228,622)	5,535,119
Postretirement benefit obligation	(640,725)	3,210,505
Asset retirement obligation	33,337	22,301
Net cash used in operating activities	(36,471,864)	(23,098,465)
Cash flows from investing activities:		
Proceeds from sale of plant assets	1,201,172	—
Purchase of plant assets	(18,032,719)	(12,431,137)
Proceeds from sale of investments	317,226,232	224,230,743
Purchase of investments	(275,976,095)	(227,863,006)
Net cash provided by (used in) investing activities	24,418,590	(16,063,400)
Cash flows from financing activities:		
Contributions restricted for endowment and plant	8,489,319	28,645,990
Decrease in liabilities under split-interest agreements	(12,872)	(223,390)
Debt issuance costs on long-term debt	—	(211,118)
Proceeds from issuance of long-term debt	—	15,220,481
Principal payments on long-term debt	(2,915,000)	(2,575,000)
Principal payments on note payable	(74,665)	(73,196)
Decrease in funds held by bond trustee	(30,597)	(127,224)
Net cash provided by financing activities	5,456,185	40,656,543
Net (decrease) increase in cash and cash equivalents	(6,597,089)	1,494,678
Cash and cash equivalents—beginning of year	7,602,998	6,108,320
Cash and cash equivalents—end of year	$ 1,005,909	7,602,998
Supplemental data:		
Interest paid	$ 2,747,631	2,209,025

See accompanying notes to financial statements.

(1) Organization and Summary of Significant Accounting Policies

Organization

The Institute for Advanced Study—Louis Bamberger and Mrs. Felix Fuld Foundation (the Institute), an independent, private institution devoted to the encouragement, support, and patronage of learning, was founded in 1930 as a community of scholars where intellectual inquiry could be carried out in the most favorable circumstances.

Focused on mathematics and classical studies at the outset, the Institute today consists of the School of Historical Studies, the School of Mathematics, the School of Natural Sciences, and the School of Social Science. Each school has a small permanent faculty, and some 190 fellowships are awarded annually to members visiting the Institute from other research institutions and universities throughout the world.

The Founders' original letter to the first Trustees described the objectives of the Institute as follows: "The primary purpose is the pursuit of advanced learning and exploration in fields of pure science and high scholarship to the utmost degree that the facilities of the institution and the ability of the faculty and students will permit."

Summary of Significant Accounting Policies

Basis of Presentation

The accompanying financial statements, which are presented on the accrual basis of accounting, have been prepared to focus on the Institute as a whole and to present net assets and revenues, expenses, gains, and losses based on the existence or absence of donor-imposed restrictions. Accordingly, net assets and changes therein are classified as follows:

- Permanently restricted net assets—net assets subject to donor-imposed stipulations that they be maintained permanently by the Institute. Generally, the donors of these assets permit the Institute to use all or part of the income earned on related investments for general or specific purposes.
- Temporarily restricted net assets—net assets subject to donor-imposed stipulations that will be met by actions of the Institute and/or by the passage of time.
- Unrestricted net assets—net assets not subject to donor-imposed stipulations. Unrestricted net assets may be designated for specific purposes by action of the Board of Trustees.

Revenues are reported as increases in unrestricted net assets unless use of the related asset is limited by donor-imposed restrictions. Expenses are reported as decreases in unrestricted net assets. Expiration of donor-imposed stipulations that simultaneously increase unrestricted net assets and decrease temporarily restricted net assets are reported as net assets released from restrictions.

(a) Contributions and Grants

Contributions and grants, including unconditional promises to give, are recognized initially at fair value as revenues in the period received. Conditional promises to give are not recognized until they become unconditional, that is when the conditions on which they depend are substantially met. Contributions of assets other than cash are recorded at their estimated fair value. Pledges of contributions to be received after one year are discounted at a risk-adjusted discount rate. The discount rates range from 0.28% to 1.89%. Amortization of discount is recorded as additional contribution revenue in accordance with donor-imposed restrictions, if any, on the contributions. The inputs to the fair value estimate are considered Level 3 in the fair value hierarchy.

Contributions of long-lived assets are reported as unrestricted revenue. Contributions restricted for the acquisition of grounds, buildings, and equipment are reported as temporarily restricted revenues. These contributions are reclassified to unrestricted net assets upon acquisition of the assets.

(b) Cash and Cash Equivalents

Cash and cash equivalents consist of cash on hand and all highly liquid investments with an original maturity of three months or less, except for those managed as a component of the Institute's investment portfolio.

(c) Mortgages receivable

The Institute regularly offers first mortgages on primary residences to full-time faculty and senior administrative employees who have met certain requirements stipulated by the Board of Trustees.

(d) Investments

Investments in marketable securities are reported in the financial statements at fair value based on published market quotations. Investments in limited partnerships and hedge funds are reported in the financial statements at estimated fair value using net asset value (NAV) or its equivalent as a practical expedient, based upon values provided by external investment managers or general partners, unless it is probable that all or a portion of the investment will be sold for an amount different from NAV. The Institute reviews and evaluates the values provided by external investment managers and general partners and agrees with the valuation methods and assumptions used in determining the fair value of funds. These estimated fair values may differ significantly from the values that would have been used had a ready market for these securities existed. As of June 30, 2017 and 2016, the Institute had no plans or intentions to sell investments at amounts different from NAV.

The statements of activities recognize unrealized gains and losses on investments as increases and decreases, respectively, in unrestricted net assets unless their use is temporarily or permanently restricted by explicit donor stipulation or law. Gains and losses on the sale of investment securities are calculated using the specific identification method.

(e) Fair Value Measurements

Fair value is defined as the exchange price that would be received for an asset or paid to transfer a liability (an exit price) in the principal or most advantageous market for the asset or liability in an orderly transaction between market participants on the measurement date. The fair value hierarchy requires an entity to maximize the use of observable inputs and minimize the use of unobservable inputs when measuring fair value. A financial instrument's level within the fair value hierarchy is based on the lowest level of any input that is significant to the fair value measurement. The three levels of inputs used to measure fair value are as follows:

- Level 1: Quoted prices in active markets for identical assets or liabilities.
- Level 2: Observable inputs other than Level 1 prices such as quoted prices for similar assets or liabilities; quoted prices in markets that are not active; or other inputs that are observable or can be corroborated by observable market data for substantially the full term of the assets or liabilities.
- Level 3: Unobservable inputs that are supported by little or no market activity and that are significant to the fair value of the asset or liabilities.

Fair value estimates are made at a specific point in time, based on available market information and judgments about the financial asset, including estimates of timing, amount of expected future cash flows, and the credit standing of the issuer. In some cases, the fair value estimates cannot be substantiated by comparison to independent markets. In addition, the disclosed fair value may not be realized in the immediate settlement of the financial asset and does not reflect any premium or discount that could result from offering for sale at one time an entire holding of a particular financial asset. Potential taxes and other expenses that would be incurred in an actual sale or settlement are not reflected in amounts disclosed.

Net Asset Value (NAV) is used as a practical expedient for certain commingled funds, privately held investments, and securities held in partnership format for which a readily determinable fair value is not available, unless the Institute believes such NAV calculation is not measured in accordance with fair value. These values may differ significantly from values that would have been used had a readily available market existed for such investments, and that difference could be material to the change in net assets of the Institute.

(f) Plant Assets and Depreciation

Proceeds from the sale of plant assets, if unrestricted, are transferred to operating funds, or, if restricted, to amounts temporarily restricted for plant acquisitions. Depreciation is provided over the estimated useful lives of the respective assets on a straight-line basis (buildings and capital improvements 20-40 years, equipment 3-6 years).

(g) Deferred Revenue

Amounts received on conditional grants are recorded initially as deferred revenue and are reported as revenues when expended in accordance with the terms of the condition.

(h) Split-Interest Agreements

The Institute is the beneficiary of various unitrusts, a pooled income fund, and a gift annuity fund. The Institute's interest in these split-interest agreements is reported as a contribution in the year received and is calculated as the difference between the fair value of the assets contributed to the Institute and the estimated liability to the beneficiary. This liability is computed using actuarially determined rates and is adjusted annually to reflect changes in the life expectancy of the donor or annuitant, amortization of the discount, and other changes in the estimates of future payments. The assets held by the Institute under these arrangements are recorded at fair value as determined by quoted market prices and are included as a component of investments.

(i) Unamortized Debt Issuance Costs

Debt issuance costs represent costs incurred in connection with debt financing. Amortization of these costs is provided on the effective interest method extending over the remaining term of the applicable indebtedness. Debt issuance costs at June 30, 2017 and 2016 were net of accumulated amortization of $621,928 and $680,337, respectively.

In fiscal year 2017, the Institute adopted the provisions of Accounting Standards Update (ASU) No. 2015-03, *Simplifying the Presentation of Debt Issuance Costs*, which requires that debt issuance costs related to the recognized debt liability be presented as a direct reduction from the debt liability on the statement of financial position. As a result of the adoption, the Institute reclassified the amount reported as unamortized debt issuance costs, net of $680,337 to long-term debt, net in the statement of financial position for the year ended June 30, 2016.

(j) Asset Retirement Obligation

The Institute recognizes the fair value of a liability for legal obligations associated with asset retirements in the period in which the obligation is incurred, if a reasonable estimate of the fair value of the obligation can be made. When the liability is initially recorded, the Institute capitalizes the cost of the asset retirement obligation by increasing the carrying amount of the related long-lived asset. The liability is accreted to its present value each period and the capitalized cost associated with the retirement obligation is depreciated over the useful life of the related asset. Upon settlement of the obligation, any difference between the cost to settle the asset retirement obligation and the liability recorded is recognized as a gain or loss in the statements of activities.

(k) Fund Raising Expenses

Fund raising expenses incurred by the Institute amounted to $1,660,098 and $1,974,810 for the years ended June 30, 2017 and 2016, respectively. This amount is included in administration and general expenses in the accompanying statements of activities.

(l) Functional Allocation of Expenses

The costs of providing program services and support services of the Institute have been summarized on a functional basis in the statements of activities. Accordingly, certain operating costs have been allocated among the functional categories.

(m) Tax Status

The Institute is exempt from federal income taxes pursuant to Section 501(c)(3) of the Internal Revenue Code (the Code) and is listed in the Internal Revenue Service Publication 78. The Institute has been classified as a public charity under Section 509(a) of the Code.

There are certain transactions that could be deemed unrelated business income and would result in a tax liability. Management reviews transactions to estimate potential tax liabilities using a threshold of more likely than not. It is management's estimation that there are no material tax liabilities that need to be recorded.

(n) Use of Estimates

The preparation of financial statements in conformity with U.S. generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements. Estimates also affect the reported amounts of revenues and expenses during the reported period. Actual results could differ from those estimates.

(o) Reclassification

Certain prior year amounts have been reclassified to confirm with the current year's presentation.

(2) Contributions Receivable

Unconditional promises to give at June 30, 2017 and 2016 were as follows:

		2017	2016
Unconditional promises to give:			
Less than one year	$	3,859,280	8,116,086
One to five years		8,670,212	12,611,800
		12,529,492	20,727,886
Discount on promises to give		(851,505)	(822,484)
Total	$	11,677,987	19,905,402

At June 30, 2017 and 2016, 92% and 92% of gross contributions receivable and 10% and 34% of contributions revenue are from four donors, respectively.

During fiscal 2011, the Institute received two conditional pledges totaling $100 million to enhance the Institute's endowment fund. The pledges were conditioned on the Institute raising an additional $100 million in cash or pledges from third-party donors in the period January 1, 2011 through June 30, 2015, which have been met. The conditional pledge payments began in June 2011 and will continue through June 30, 2022. As of June 30, 2017 and 2016, the Institute has recorded revenue totaling approximately $93.8 million and $90.4 million, respectively, relating to these conditional pledges.

(3) Investments, Funds Held by Bond Trustee, and Beneficial Interest in Remainder Trust

(a) Overall Investment Objective

The overall investment objective of the Institute is to invest its assets in a prudent manner that will achieve a long-term rate of return sufficient to fund a portion of its annual operating activities and capital preservation. The Institute diversifies its investments among various managers and investment opportunities. Substantially all of the investments are pooled with each individual fund subscribing to or disposing of units on the basis of the market value per unit, determined on a quarterly basis. Major investment decisions are authorized by the Board's Investment Committee, which oversees the Institute's investment program in accordance with established guidelines.

(b) Allocation of Investment Strategies

In addition to traditional stocks and fixed-income securities, the Institute may also hold shares or units in traditional institutional funds as well as in alternative investment funds involving hedged strategies, private equity, and real asset strategies. Hedged strategies involve funds whose managers have the authority to invest in various asset classes at their discretion, including the ability to invest long and short. Funds with hedged strategies generally hold securities or other financial instruments for which a ready market exists and may include stocks, bonds, put or call options, swaps, currency hedges, and other instruments, and are valued accordingly. Private equity funds employ buyout and venture capital strategies and focus on investments in turn-around situations. Real asset funds generally hold interests in public real estate investment trusts (REITS) or commercial real estate through sole-member entities. Private equity and real asset strategies therefore often require the estimation of fair values by the fund managers in the absence of readily determinable market values. Because of the inherent uncertainties of valuation, these estimated fair values may differ significantly from values that would have been used had a ready market existed, and the differences could be material. Such valuations are determined by fund managers and generally consider variables such as operating results, comparable earnings multiples, projected cash flows, recent sales prices, and other pertinent information, and may reflect discounts for the illiquid nature of certain investments held.

The following tables summarize the Institute's investments and other assets at fair value by major category in the fair value hierarchy as of June 30, 2017 and 2016, as well as related strategy, liquidity, and funding commitments:

	June 30, 2017				
	Total	Level 1	Level 2	Level 3	Investments at NAV
Investments:					
Long-term investment strategies:					
Hedge funds—onshore:					
Emerging markets	$ 675,262	—	—	—	675,262
Multiple strategies	56,904,046	—	—	—	56,904,046
Total	57,579,308	—	—	—	57,579,308
Hedge funds—offshore:					
Structured credit	$ 14,265,782	—	—	—	14,265,782
Distressed/high-yield	2,744,308	—	—	—	2,744,308
Emerging markets	49,585	—	—	—	49,585
Equities—long bias	17,878,487	—	—	—	17,878,487
Equities—long/short	63,799,196	—	—	—	63,799,196
Fixed income arbitrage	21,832,494	—	—	—	21,832,494
Multiple strategies	211,369,357	—	—	—	211,369,357
Quantitative/CTA	84,026,742	—	—	—	84,026,742
Quantitative equity long short	10,731,857	—	—	—	10,731,857
Insurance	25,191,951	—	—	—	25,191,951
Bio tech/health care	13,170,260	—	—	—	13,170,260
Discretionary macro	17,592,713	—	—	—	17,592,713
Energy trading	11,005,872	—	—	—	11,005,872
Total	493,658,604	—	—	—	493,658,604
Limited partnerships	161,527,481	—	—	—	161,527,481
Cash and cash equivalents	60,839,644	60,839,644	—	—	—
Other investments:					
Assets held under split-interest agreements:					
Cash and cash equivalents	165,773	165,773	—	—	—
Fixed income securities	3,748,875	—	—	3,748,875	—
Total investments	$ 777,519,685	61,005,417	—	3,748,875	712,765,393
Other assets:					
Beneficial interest in remainder trust	$ 1,061,403	—	—	1,061,403	—
Funds held by bond trustee:					
U.S. government obligations	2,457,470	—	2,457,470	—	—
Total other assets	$ 3,518,873	—	2,457,470	1,061,403	—

	June 30, 2016				
	Total	Level 1	Level 2	Level 3	Investments at NAV
Investments:					
Long-term investment strategies:					
Hedge funds—onshore:					
Emerging markets	$ 1,504,761	—	—	—	1,504,761
Equities—long/short	5,579,633	—	—	—	5,579,633
Multiple strategies	62,415,272	—	—	—	62,415,272
Total	69,499,666	—	—	—	69,499,666
Hedge funds—offshore:					
Structured credit	11,990,576	—	—	—	11,990,576
Distressed/high-yield	5,021,666	—	—	—	5,021,666
Emerging markets	39,227	—	—	—	39,227
Equities—long bias	14,627,017	—	—	—	14,627,017
Equities—long/short	84,284,222	—	—	—	84,284,222
Event driven strategies	20,541,876	—	—	—	20,541,876
Multiple strategies	209,508,982	—	—	—	209,508,982
Quantitative/CTA	55,898,287	—	—	—	55,898,287
Quantitative equity long short	10,675,606	—	—	—	10,675,606
Insurance	21,716,573	—	—	—	21,716,573
Bio tech/health care	11,836,093	—	—	—	11,836,093
Discretionary macro	13,334,616	—	—	—	13,334,616
Energy trading	15,000,000	—	—	—	15,000,000
Total	474,474,741	—	—	—	474,474,741
Limited partnerships	157,237,113	—	—	—	157,237,113
Cash and cash equivalents	60,158,644	60,158,644	—	—	—
Other investments:					
Assets held under split-interest agreements:					
Cash and cash equivalents	69,755	69,755	—	—	—
Fixed income securities	3,729,096	—	—	3,729,096	—
Total investments	$ 765,169,015	60,228,399	—	3,729,096	701,211,520
Other assets:					
Beneficial interest in remainder trust	$ 2,613,469	—	—	2,613,469	—
Funds held by bond trustee:					
U.S. government obligations	2,426,873	—	2,426,873	—	—
Total other assets	$ 5,040,342	—	2,426,873	2,613,469	—

The following tables present the Institute's activities for the years ended June 30, 2017 and 2016 for investments classified in Level 3:

	2017		
	Assets held under split-interest agreement		
Level 3 roll forward	Fixed income securities	Beneficial interest in remainder trust	Total
Fair value at June 30, 2016	$ 3,729,096	2,613,469	6,342,565
Acquisitions	—	—	—
Dispositions	(265,346)	(1,750,000)	(2,015,346)
Transfers in/out of Level 3	—	—	—
Net realized and unrealized gains	285,125	197,934	483,059
Fair value at June 30, 2017	$ 3,748,875	1,061,403	4,810,278

	2016		
	Assets held under split-interest agreement		
Level 3 roll forward	Fixed income securities	Beneficial interest in remainder trust	Total
Fair value at June 30, 2015	$ 4,033,210	2,629,823	6,663,033
Acquisitions	8,068	—	8,068
Dispositions	(279,083)	—	(279,083)
Transfers in/out of Level 3	—	—	—
Net realized and unrealized gains	(33,099)	(16,354)	(49,453)
Fair value at June 30, 2016	$ 3,729,096	2,613,469	6,342,565

The Institute's accounting policy is to recognize transfers between levels of the fair value hierarchy on the date of the event or change in circumstances that caused the transfer. There were no transfers between investments classified as Level 1 and Level 2 for the years ended June 30, 2017 or 2016. There were no transfers in or out of investments classified as Level 3 for the years ended June 30, 2017 or 2016.

Private equity and venture capital investments are generally made through limited partnerships. Under the terms of such agreements, the Institute may be required to provide additional funding when capital or liquidity calls are made by fund managers. These partnerships have a limited existence, and they may provide for annual extensions for the purpose of disposing portfolio positions and returning capital to investors. However, depending on market conditions, the inability to execute the fund's strategy, or other factors, a manager may extend the terms of a fund beyond its originally anticipated existence or may wind the fund down prematurely. The Institute cannot anticipate such changes because they generally arise from unforeseeable events, but should they occur they could reduce liquidity or originally anticipated investment returns. Accordingly, the timing and amount of future capital or liquidity calls in any particular future year are uncertain. As of June 30, 2017, the Institute is obligated under certain limited partnership agreements to advance additional funding in the amount of $94,121,839, which is anticipated to be called over the next 10 years.

Investment liquidity as of June 30, 2017 is aggregated below based on redemption or sale period:

	Investment fair values
Investment redemption or sale period:	
Daily	$ 60,839,644
Monthly	115,500,307
Quarterly	126,345,231
Semi-annually	100,328,449
Annually	58,419,189
Subject to rolling lock ups or other restrictions	143,899,368
Illiquid	172,187,497
Total as of June 30, 2017	$ 777,519,685

(c) Funds Held by Bond Trustee

Funds held by bond trustee represent funds held for debt service payments to be made for the various bond indentures. These funds are being held in trust by The Bank of New York.

(d) Redemption Restrictions—Hedge Funds

At June 30, 2017, the Institute had hedge fund investments of approximately $551,237,900, of which approximately $57,769,100 was restricted from redemption for lock-up periods. At June 30, 2016, the Institute had hedge fund investments of approximately $543,974,400, of which approximately $43,631,900 was restricted from redemption for lock-up periods. Some of the investments with redemption restrictions allow early redemption for specified fees. The terms and conditions upon which an investor may redeem an investment vary, usually with the majority requiring 30 to 180 days' notice after the initial lock-up period.

The expirations of redemption lock-up periods are summarized in the table below:

	Amount
Fiscal year:	
2018	$ 43,981,100
2019	8,019,400
2020 and thereafter	5,768,600
Total	$ 57,769,100

(e) Redemption Restrictions—Limited Partnerships

At June 30, 2017 and 2016, the Institute had limited partnership investments of approximately $161,527,500 and $157,237,100, respectively, which were restricted from redemption for lock-up periods. Some of the investments with redemption restrictions allow early redemption for specified fees. The terms and conditions upon which an investor may redeem an investment vary, usually with the majority requiring 30 to 180 days' notice after the initial lock-up period.

The expirations of redemption lock-up periods are summarized in the table below:

	Amount
Fiscal year:	
2018	$ 30,558,700
2019	9,771,200
2020	3,437,200
2021	3,813,900
2022	41,638,700
2023 and thereafter	72,307,800
Total	$ 161,527,500

(4) Investment Return and Endowment Spending Policy

Investment return consists of interest, dividends, and realized and unrealized gains and losses on investments. Each year, the Institute includes a portion of its endowment return in its operating budget, with the amount of such planned support determined using its spending policy. The policy of the Institute is to distribute for current spending a percentage of the fair value of pooled investments which is determined by the Board of Trustees annually. The spending rate for operating and capital purposes was 6.06% and 6.11% for 2017 and 2016, respectively.

The following tables summarize the investment return and its classification in the statements of activities for the years ended June 30, 2017 and 2016:

	2017		
	Unrestricted	Temporarily restricted	Total
Dividends and interest, net of investment expenses	$ (1,342,054)	(1,949,063)	(3,291,117)
Net appreciation on investments	24,721,569	28,879,238	53,600,807
Total investment return	23,379,515	26,930,175	50,309,690

	2016		
	Unrestricted	Temporarily restricted	Total
Dividends and interest, net of investment expenses	$ (1,271,514)	(1,664,070)	(2,935,584)
Net depreciation on investments	(2,760,848)	(2,982,087)	(5,742,935)
Total investment return	(4,032,362)	(4,646,157)	(8,678,519)

Total investment management and advisory fees were $3,359,045 and $3,185,474 for the years ended June 30, 2017 and 2016, respectively.

(5) Endowment

The Institute's endowment consists of approximately 120 individual funds established for a variety of purposes including both donor-restricted endowment funds and funds designated by the Board of Trustees to function as endowments. Net assets associated with endowments, including funds designated by the Board of Trustees to function as endowments, are classified and reported based on the existence or absence of donor-imposed restrictions.

(a) Interpretation of Relevant Law

The Institute has interpreted the New Jersey-enacted version of the Uniform Prudent Management of Institutional Funds Act (UPMIFA) as allowing the Institute to appropriate for expenditure or accumulate so much of a donor-restricted endowment fund as the Institute determines is prudent for the uses, benefits, purposes, and duration for which the endowment fund is established, subject to the intent of the donor as expressed in the gift instrument. Unless stated otherwise in the gift instrument, the assets in a donor-restricted endowment fund are donor-restricted assets until appropriated for expenditure by the Board of Trustees of the Institute. As a result of applicable accounting guidance, the Institute classifies as permanently restricted net assets (a) the original value of gifts donated to the permanent endowment, (b) the original value of subsequent gifts to the permanent endowment, and (c) accumulations to the permanent endowment made in accordance with the direction of the applicable donor gift instrument at the time the accumulation is added to the fund. The remaining portion of the donor-restricted endowment fund that is not classified as permanently restricted net assets is classified as temporarily restricted net assets until those amounts are appropriated for expenditure in a manner consistent with the standard of prudence prescribed by UPMIFA.

From time to time, the fair value of assets associated with individual donor-restricted endowments may fall below the original corpus the fund included in permanently restricted net assets due to unfavorable market fluctuations subsequent to the investment of the gift. Deficiencies of this nature, which are reported in unrestricted net assets,

totaled approximately $2,012,000 and $2,212,000, at June 30, 2017 and 2016, respectively. Subsequent gains that restore the fair value of the assets of the donor-restricted endowment fund are classified as an increase in unrestricted net assets.

Endowment net assets consisted of the following at June 30, 2017 and 2016:

	2017			
	Unrestricted	Temporarily restricted	Permanently restricted	Total
Donor restricted	$ (2,012,026)	166,280,649	253,953,479	418,222,102
Board designated	347,628,313	—	—	347,628,313
	$ 345,616,287	166,280,649	253,953,479	765,850,415

	2016			
	Unrestricted	Temporarily restricted	Permanently restricted	Total
Donor restricted	$ (2,212,010)	159,961,990	252,888,632	410,638,612
Board designated	343,959,621	—	—	343,959,621
	$ 341,747,611	159,961,990	252,888,632	754,598,233

Changes in endowment net assets for the fiscal years ended June 30, 2017 and 2016 were as follows:

	Unrestricted	Temporarily restricted	Permanently restricted	Total
Net assets, June 30, 2015	$ 371,650,375	182,062,449	232,692,973	786,405,797
Dividends and interest income, net	(1,271,514)	(1,665,225)	—	(2,936,739)
Net depreciation on investments	(2,760,848)	(2,891,611)	—	(5,652,459)
Contributions	115,750	303,476	20,195,659	20,614,885
Appropriation for expenditure—operations	(20,986,932)	(17,867,268)	—	(38,854,200)
Appropriation for expenditure—capital and other	(4,999,220)	—	—	(4,999,220)
Additions to temporarily restricted funds	—	20,169	—	20,169
Net assets, June 30, 2016	$ 341,747,611	159,961,990	252,888,632	754,598,233
Dividends and interest income, net	(1,564,907)	(1,741,293)	—	(3,306,200)
Net appreciation on investments	24,721,569	28,344,865	—	53,066,434
Contributions	137,595	17,788	1,064,847	1,220,230
Appropriation for expenditure—operations	(19,425,581)	(20,302,701)	—	(39,728,282)
Net assets, June 30, 2017	$ 345,616,287	166,280,649	253,953,479	765,850,415

(b) Return Objectives and Risk Parameters

The Institute has adopted investment and spending policies for endowment assets that attempt to provide a predictable stream of funding to programs supported by its endowment while seeking to maintain the purchasing power of the endowment assets.

(c) Strategies Employed for Achieving Objectives

The Institute manages its investments in accordance with a total return concept and the goal of maximizing returns within acceptable levels of risk. The Institute relies on a total return strategy in which investment returns are achieved through both capital appreciation (realized and unrealized) and current yield (dividends and interest). The Institute's spending policy is designed to provide a stable level of financial support and to preserve the real value of its endowment.

(6) Physical Plant

Physical plant and equipment are stated at cost at date of acquisition, less accumulated depreciation.

A summary of plant assets at June 30, 2017 and 2016 is as follows:

	2017	2016
Land	$ 377,470	377,470
Land improvements	2,652,268	2,503,680
Buildings and improvements	152,314,153	136,904,499
Equipment	35,964,619	34,575,593
Rare book collection	203,508	203,508
Joint ownership property	4,728,370	5,176,376
	196,240,388	179,741,126
Accumulated depreciation	(93,689,384)	(89,067,373)
Net book value	$ 102,551,004	90,673,753

(7) Long-Term Debt

A summary of long-term debt at June 30, 2017 and 2016 is as follows:

	2017	2016
2006 Series B—NJEFA	22,300,000	23,400,000
2006 Series C—NJEFA	15,500,000	16,000,000
2008 Series C—NJEFA	2,730,000	3,335,000
2012 Taxable	15,730,000	16,130,000
2015 Taxable	14,990,000	15,300,000
Long-term debt	71,250,000	74,165,000
Less:		
Unamortized bond discount	(240,322)	(262,679)
Unamortized debt issuance costs	(621,928)	(680,337)
Total long-term debt	$ 70,387,750	73,221,984

Interest expense on long-term debt for the years ended June 30, 2017 and 2016 was $2,702,522 and $2,150,287, respectively.

(a) 2006 Series B

In July 2006, the Institute received proceeds of the Authority offering of $29,600,000 Revenue Bonds, 2006 Series B of the Institute for Advanced Study Issue. The 2006 Series B Bonds were issued to finance the advance refunding of the outstanding 1997 Series G Bonds, the partial advance refunding

of the 2001 Series A Bonds, and to pay a portion of certain costs incidental to the sale and issuance of the 2006 Series B Bonds.

(b) 2006 Series C

In March 2007, the Institute received proceeds of the Authority offering of $20,000,000 Revenue Bonds, 2006 Series

C of the Institute for Advanced Study Issue. Proceeds are being used to finance the costs of construction, renovating, and equipping certain educational facilities of the Institute, to fund capitalized interest on the 2006 Series C Bonds during the renovation and construction, and to pay certain costs incidental to the sale and issuance of the 2006 Series C Bonds.

(c) 2008 Series C

In March 2008, the Institute received proceeds of the Authority offering of $11,255,000 Revenue Bonds, 2008 Series C of the Institute for Advanced Study Issue. The 2008 Series C Bonds were issued to finance the advance refunding of outstanding 1997 Series F Bonds, the advance refunding of outstanding 1997 Series G, and to pay a portion of certain costs incidental to the sale and issuance of the 2008 Series C Bonds.

(d) 2012 Taxable

In December 2012, the Institute received proceeds of $17,320,000 Taxable Bonds, 2012 Series of the Institute for Advanced Study Issue, which were issued at a discount of approximately $92,000. The 2012 Taxable Bonds were used to finance the advance refunding of outstanding 2001 Series A Bonds, to fund renovations to the Members Housing facility and the costs of renovation and equipping certain educational facilities of the Institute, and to pay certain costs incidental to the sale and issuance of the 2012 Taxable Bonds.

(e) 2015 Taxable

In November 2015, the Institute received proceeds of $15,300,000 Taxable Bonds, 2015 Series of the Institute for Advanced Study Issue, which were issued at a discount of approximately $80,000. The 2015 Taxable Bonds were used to fund capital projects at the Institute and for other corporate purposes of the Institute, and to pay certain costs incidental to the sale and issuance of the 2015 Taxable Bonds.

(f) Interest Rates

The 2006 Series B and C Bonds bear interest at variable rates. The bonds were issued in the weekly mode with weekly rates determined by Lehman Brothers Inc, as Remarketing Agent and paid monthly. The maximum interest rate on the 2006 Bonds shall be twelve percent (12%) per annum. The 2006 bonds are subject to redemption at various prices and require principal payments and sinking fund installments through July 1, 2031 (Series B) and July 1, 2036 (Series C). The obligation to pay the Authority on a periodic basis, in the amounts sufficient to cover principal and interest due on the bonds, is a general obligation of the Institute. On September 18, 2008, the Institute entered into a contract with JPMorgan Chase Bank to take over as Remarketing Agent, replacing Lehman Brothers Inc.

The 2008 Series C Bonds bear interest at rates ranging from 3% to 5% per annum, payable semi-annually, are subject to redemption at various prices and require principal payments and sinking fund installments through July 1, 2021. The obligation to pay the Authority on a periodic basis, in the amounts sufficient to cover principal and interest due on the bonds, is a general obligation of the Institute.

The 2012 Taxable bonds bear interest at rates ranging from 0.388% to 3.892% per annum, payable semi-annually, are subject to redemption at various prices and require principal payments and sinking fund installments through December 1, 2042. The obligation to make the interest payments on a periodic basis, in the amounts sufficient to cover principal and interest due on the bonds, is a general obligation to the Institute.

The 2015 Taxable bonds bear interest at rates ranging from 0.906% to 4.394% per annum, payable semi-annually, are subject to redemption at various prices and require principal payments and sinking fund installments through December 1, 2045. The obligation to make the interest payments on a periodic basis, in the amounts sufficient to cover principal and interest due on the bonds, is a general obligation to the Institute.

(g) Bond Swap Agreement

On December 22, 2008, the Institute entered into a swap agreement with Wells Fargo Bank covering $28,900,000 of outstanding 2006 Series B Bonds that required the Institute to pay a fixed rate of 3.7702% to Wells Fargo Bank in exchange for Wells Fargo Bank agreeing to pay the Institute a variable rate equal to 67% of the USD-LIBOR-BBA rate with a term of three months, payable monthly, on an identical notional amount. The notional value of the 2006

Series B Bond is $23,400,000. The effective date of the swap was December 22, 2008 and the termination date of the swap agreement coincides with the maturity of the bonds, which is July 1, 2031.

The Institute entered into this swap agreement with the intention of lowering its effective interest rate. At June 30, 2017 and 2016, the fair value of the interest rate swap was ($3,477,319) and ($5,127,858), respectively. The unrealized gain (loss) recognized during the years ended June 30, 2017 and 2016 in the amount of $1,680,539 and ($996,198), respectively, is reported in the statements of activities in change in fair value of bond swap liability. The swap agreement utilizes Level 2 inputs to measure fair value. The fair value of the interest rate swap was determined using pricing models developed based on the LIBOR swap rate and other market data. Under the swap agreement, the Institute may be required to post collateral to the counterparty if certain triggering events (rates and dollar thresholds) are met. As of June 30, 2017 and 2016, there was no requirement to post collateral imposed by the swap counterparty.

The bonds are repayable as follows at June 30, 2017:

	Amount
Year ending June 30:	
2018	$ 3,160,000
2019	3,600,000
2020	3,740,000
2021	3,780,000
2022	3,175,000
2023 through 2046	53,795,000
Total	$ 71,250,000

The 2006 Series B, 2006 Series C, and 2008 Series C bonds are secured by a pledge of revenues pursuant to the respective Loan Agreements.

(h) Lines of Credit

As of June 30, 2017 and 2016, the Institute had unsecured loan agreements representing a line of credit. As of June 30, 2017, the agreement provides for borrowings up to $50,000,000, and $30,000,000 is available through June 2020 and $20,000,000 is available through April 2019. Interest payments are due on demand and interest accrues for the $20,000,000 line of credit at the LIBOR rate plus 90 basis points, which was 2.63% as of June 30, 2017 and for the $30,000,000 line of credit at LIBOR rate plus 50 basis points, which is 2.23% as of June 30, 2017. There were no borrowings in fiscal year 2017 or 2016 against the lines of credit. No interest expense was incurred for the years ended June 30, 2017 and 2016.

(8) Pension Plans and Other Postretirement Benefits

Separate voluntary defined contribution retirement plans are in effect for faculty members and eligible staff personnel, both of which provide for annuities, which are funded, to the Teachers Insurance and Annuity Association and/or the College Retirement Equities Fund. Contributions are based on the individual participant's compensation in accordance with the formula set forth in the plan documents on a nondiscriminatory basis. Contributions for the years ended June 30, 2017 and 2016 totaled approximately $2,250,588 and $2,220,500, respectively.

In addition to providing pension benefits, the Institute provides certain health care and life insurance benefits for retired employees and faculty. Substantially, all of the Institute's employees may become eligible for these benefits if they meet minimum age and service requirements. The Institute accrues these benefits over a period in which active employees become eligible under existing benefit plans.

The following table provides a reconciliation of the change in benefit obligation of the plan at June 30, 2017 and 2016. There are no plan assets at June 30, 2017 and 2016.

		2017	2016
Postretirement benefit obligation:			
Retirees	$	6,411,773	5,748,176
Fully eligible active plan participants		2,519,942	3,013,153
Other active plan participants		8,900,928	9,712,039
Postretirement benefit obligation	$	17,832,643	18,473,368
Change in benefit obligation:			
Benefit obligation at beginning of year	$	18,473,368	15,262,863
Service cost		868,823	731,336
Interest cost		658,434	671,036
Benefits paid		(404,078)	(371,378)
Actuarial (gain) loss		(1,763,904)	2,179,511
Benefit obligation at end of year	$	17,832,643	18,473,368
Components of net periodic benefit cost:			
Service cost	$	868,823	731,336
Interest cost		658,434	671,036
Amortization of net (gain) loss		(1,763,904)	2,179,511
Net periodic postretirement benefit cost	$	(236,647)	3,581,883

	2017	2016
Benefit obligation weighted average assumptions at June 30, 2017 and 2016:		
Discount rate	3.87%	3.61%
Periodic benefit cost weighted average assumptions for the years ended June 30, 2017 and 2016:		
Discount rate	3.61	4.46

The healthcare trend rate is assumed to be 6.0% in fiscal 2017 and 6.0% in fiscal 2016, trending to an ultimate rate of 5.0% in 2027 and thereafter.

The effects of a 1% increase or decrease in trend rates on total service and interest cost and the postretirement benefit obligation are as follows:

		2017		2016	
		Increase	Decrease	Increase	Decrease
Effect on total service and interest cost	$	497,021	(345,716)	458,444	(304,768)
Effect on the postretirement benefit obligation		4,262,282	(3,072,704)	4,633,598	(3,319,381)

Projected payments for each of the next five fiscal years and thereafter through 2026 are as follows:

	Amount
Year ending June 30:	
2018	$ 507,000
2019	513,000
2020	526,000
2021	534,000
2022	551,000
2023 through 2027	3,234,000

The Institute funds claims as they are incurred. The Institute does not expect to contribute any amounts in fiscal 2017 or 2016, except as needed to provide for benefit payments.

(9) Temporarily and Permanently Restricted Assets

Restricted net assets are available for the following purposes at June 30, 2017 and 2016:

	2017	2016
Temporarily restricted net assets are restricted to:		
School of Mathematics	$ 29,824,606	29,821,537
School of Natural Sciences	17,772,836	15,514,305
School of Historical Studies	37,110,599	36,682,351
School of Social Science	57,676,462	56,720,143
Libraries and other academic	6,026,748	5,624,983
Administration and general	28,650,680	26,130,123
	$ 177,061,931	170,493,442
Permanently restricted net assets are restricted to:		
Investments to be held in perpetuity, the income from which is expendable to support academic services	$ 253,953,479	252,888,632

(10) Subsequent Events

On July 17, 2017, in connection with the substitution of the Standby Bond Purchase Agreements, the 2006 Bonds were subject to mandatory tender for purchase, and were remarketed with an Alternate Liquidity Facility on July 17, 2017. The 2006 Bonds continue to be in the Weekly Mode, with J.P. Morgan Securities LLC serving as Remarketing Agent for the Bonds. Each Series of the 2006 Bonds are secured by a new Standby Bond Purchase Agreement issued by TD Bank, N.A.

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