IAS

# Institute for Advanced Study

## Faculty and Members 2010–2011

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

—Louis Bamberger and Caroline Bamberger Fuld, in a letter dated June 4, 1930, to the Institute's first Board of Trustees

*Cover Photo: Andrea Kane*

# Contents



*Information contained herein is current as of September 20, 2010.*

# Mission and History

The Institute for Advanced Study is one of the world's leading centers for theoretical research and intellectual inquiry. The Institute exists to encourage and support fundamental research in the sciences and humanities—the original, often speculative, thinking that produces advances in knowledge that change the way we understand the world. It provides for the mentoring of scholars by Faculty, and it offers all who work there the freedom to undertake research that will make significant contributions in any of the broad range of fields in the sciences and humanities studied at the Institute.

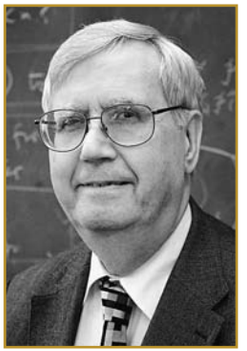
Founded in 1930 by Louis Bamberger and his sister Caroline Bamberger Fuld, the Institute was established through the vision of founding Director Abraham Flexner. Past Faculty have included Albert Einstein, who arrived in 1933 and remained at the Institute until his death in 1955, and other distinguished scientists and scholars such as Kurt Gödel, George F. Kennan, Erwin Panofsky, Homer A. Thompson, John von Neumann, and Hermann Weyl.

Abraham Flexner was succeeded as Director in 1939 by Frank Aydelotte, in 1947 by J. Robert Oppenheimer, in 1966 by Carl Kaysen, in 1976 by Harry Woolf, in 1987 by Marvin L. Goldberger, and in 1991 by Phillip A. Griffiths. In January 2004, Peter Goddard became the Institute's eighth Director.

Dedicated to the disinterested pursuit of knowledge, the Institute has had permanent impact, in both intellectual and practical terms, through the work of its Faculty and Members. One of the Institute's unique strengths is its twenty-eight permanent Faculty, whose broad interests and extensive ties to the larger academic world are reflected in their own work and also in the guidance and direction they provide. The Faculty selects and works closely with visiting Members and defines the major themes and questions that become the focus of each School's seminars and other activities. Small in number and organized in four Schools (Historical Studies, Mathematics, Natural Sciences, and Social Science), the Faculty and Members interact with one another without any departmental or disciplinary barriers. Each year the Institute awards fellowships to some 190 visiting Members from about one hundred universities and research institutions throughout the world. The Institute's more than six thousand former Members hold positions of intellectual and scientific leadership in the United States and abroad. Some twenty-two Nobel Laureates and thirty-eight out of fifty-two Fields Medalists, as well as many winners of the Wolf and MacArthur prizes, have been affiliated with the Institute.

Located in Princeton, New Jersey, the Institute is a private, independent academic institution with no formal links to other educational institutions. However, there is a great deal of intellectual, cultural, and social interaction with other nearby institutions. The Institute's Historical Studies–Social Science Library has a collection of some 120,000 volumes and subscribes to more than 1,000 journals. The Mathematics–Natural Sciences Library contains about 30,000 volumes and an important collection of journals. Institute scholars have full access to the libraries of Princeton University and the Princeton Theological Seminary.

The Institute is situated on eight hundred acres of land, the majority of which is conserved permanently, forming a key link in a network of green spaces in central New Jersey and providing a tranquil environment for Institute scholars and members of the community. The Institute does not receive income from tuition or fees. Resources for operations come from endowment income, grants from private foundations and government agencies, and gifts from corporations and individuals.



**Peter Goddard**
*Director*

Peter Goddard, a mathematical physicist, is distinguished for his pioneering contributions in the areas of string theory, quantum field theory, and conformal field theory. Formerly Master of St. John's College and Professor of Theoretical Physics in the University of Cambridge, England, he played a key role in the establishment of the university's Isaac Newton Institute for Mathematical Sciences, serving as its first Deputy Director, and the University of Cambridge Centre for Mathematical Sciences, one of the world's largest centers for research and teaching in the mathematical sciences.

# School of Historical Studies

Administrative Officer: Marian Gallagher Zelazny

The School of Historical Studies was established in 1949 with the merging of the School of Economics and Politics and the School of Humanistic Studies. It bears no resemblance to a traditional academic history department, but rather supports all learning for which historical methods are appropriate. The School embraces 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. The School has also supported scholars whose work focuses on other regions, including Central Asia, India, Africa, and the Americas.

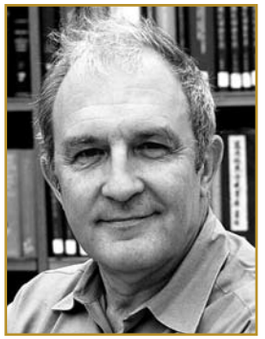
The Faculty and Members of the School do not adhere to any one point of view but practice a range of methods of inquiry and scholarly styles, both traditional and innovative. Uniquely positioned to sponsor work that crosses conventional departmental and professional boundaries, the School actively promotes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







*Faculty*

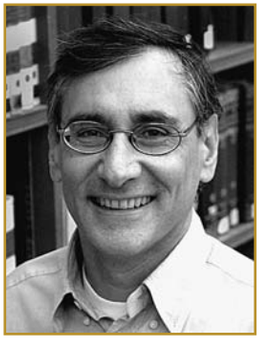


**Yve-Alain Bois**
*Professor* · Art History

A specialist in twentieth-century European and American art, Yve-Alain Bois is recognized as an expert on a wide range of artists, from Henri Matisse and Pablo Picasso to Piet Mondrian, Barnett Newman, and Ellsworth Kelly. The curator of a number of influential exhibitions, he is currently working on several long-term projects, including a study of Barnett Newman's paintings, the catalogue raisonné of Ellsworth Kelly's paintings and sculptures, and the modern history of axonometric projection.

**Caroline Walker Bynum**
*Professor* · European Medieval History

Caroline Bynum studies the social, cultural, and intellectual history of Europe from the early Middle Ages to the early modern period. Her books have created the paradigm for the study of women's piety that dominates the field of medieval studies today and have helped propel the history of the body into a major area of premodern history. She is currently working on the role of devotional objects in Christianity from the twelfth century to the early years of the sixteenth-century reformations.



**Angelos Chaniotis**
*Professor* · Ancient History and Classics

Angelos Chaniotis is internationally regarded for his original and wide-ranging research in the social, cultural, religious, legal, and economic history of the Hellenistic world and the Roman East. The author of many books and articles, he works in innovative ways on a wide variety of topics: war, memory, identity, emotions, the communicative aspects of rituals, and strategies of persuasion in the ancient world. Significant questions and dialogues in the field have grown out of his pioneering contributions, which have helped to advance understanding of previously unexplored aspects of the ancient world.

*Faculty*

**Patricia Crone**
*Andrew W. Mellon Professor* · Islamic History

Patricia Crone's research is focused on the Near East from late antiquity to the coming of the Mongols. She is interested in the delineation of the political, religious, and cultural environment in which Islam began and how it transformed, and was itself transformed by, the regions that the Arabs conquered. Originally a political, social, and military historian (some diversions notwithstanding), she has been steadily moving into the history of ideas. She now works mainly on the Qur'an and the cultural and religious traditions of Iraq, Iran, and the formerly Iranian part of Central Asia.

**Nicola Di Cosmo**
*Luce Foundation Professor in East Asian Studies* · East Asian Studies

Nicola Di Cosmo's research focuses on the history of the relations between China and Inner Asia from prehistory to the early modern period. He is interested in the archaeology of China's northern frontiers, cultural contacts between China and Central Asia, and the military, political, and social history of Chinese dynasties of Inner Asian origin. His most recent and forthcoming works include studies on Chinese military culture, Chinese historiography, the early history of the Manchu state, and relations between Europe and the Mongol empire.

**Jonathan Israel**
*Professor* · Modern European History

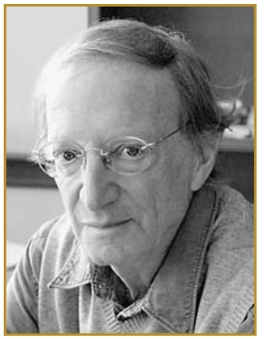
Jonathan Israel's work is concerned with European and European colonial history from the Renaissance to the eighteenth century. His recent work focuses on the impact of radical thought (especially Spinoza, Bayle, Diderot, and the eighteenth-century French materialists) on the Enlightenment and on the emergence of modern ideas of democracy, equality, toleration, freedom of the press, and individual freedom.





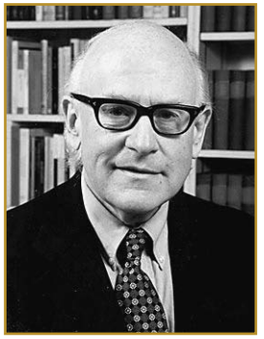


*Faculty*



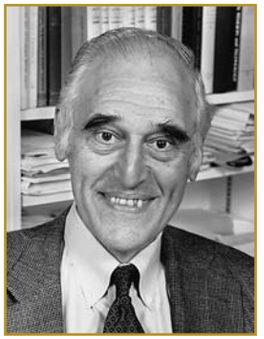
**Avishai Margalit**
*George F. Kennan Professor* · Philosophy and Modern International Relations

Avishai Margalit is one of the foremost thinkers and commentators on the contemporary human condition, the moral issues of our time, and current problems facing Western societies. In addition to his influence as a philosopher, he is highly regarded for his profound and cogent observations of the Israeli-Palestinian conflict and the broader struggle between Islam and the West. The author of a number of influential books, Margalit has transformed philosophical perspectives on a range of political and societal issues.



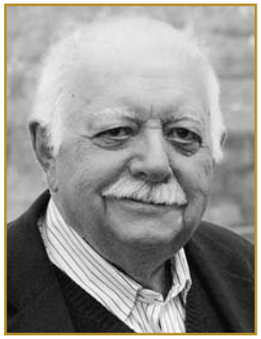
**Glen W. Bowersock**
*Professor Emeritus* · Ancient History

Glen Bowersock is an authority on Greek, Roman, and Near Eastern history and culture as well as the classical tradition in modern literature. The author of numerous important volumes and articles, he uses his exceptional knowledge of classical texts in many languages, together with inscriptions, coins, mosaics, and archaeological remains, to illuminate the mingling of different cultures and to draw unexpected and revelatory conclusions. His research interests include the Greek East in the Roman Empire and late antiquity as well as pre-Islamic Arabia.



**Giles Constable**
*Professor Emeritus* · Medieval History

The medievalist Giles Constable is the author or editor of more than twenty books in the area of medieval religious and intellectual history, concerning, among other subjects, the origins of monastic tithes, Peter the Venerable, people and power of Byzantium, medieval religious and social thought, the reformation of the twelfth century, Renaissance Florence as seen through the case of Antonio Rinaldeschi, twelfth-century crusading, and the history of Cluny. He is currently working on books on the fourteenth-century crusading propagandist William of Adam and on the California Gold Rush.



### Oleg Grabar

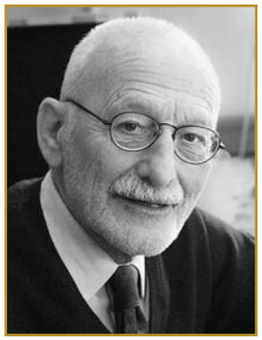
*Professor Emeritus* · Islamic Art and Culture

Oleg Grabar's research has had a profound and far-reaching influence on the study of Islamic art and architecture. In his many authoritative books, he has introduced readers to the formation of Islamic art, the idea of ornament in the context of Islamic art, the physical and ideological influence of early Islam on Jerusalem, and a breadth of other subjects elucidating the history and range of Islamic art, architecture, decorative arts, and manuscripts. His extensive archaeological expeditions and research trips cover the vast expanse of the Islamic world in Africa, the Middle East, and Muslim Asia.

### Christian Habicht

*Professor Emeritus* · Ancient History

Christian Habicht is among the leading historians of the Hellenistic period. He is an authority on Greek epigraphy and on the history of Athens between Alexander the Great and Augustus. He has published books on the Hellenistic ruler-cults, on the Maccabees, on Cicero, and on Pausanias. He has edited hundreds of previously unpublished inscriptions from important sites in Greece and Asia Minor. To a new bilingual edition of Polybius, he contributed the introduction and explanatory notes; the first two of six volumes were published in 2010.



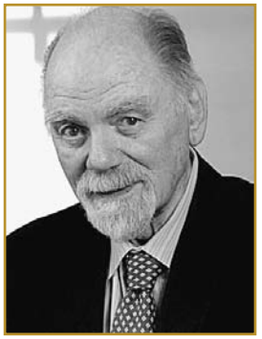
### Irving Lavin

*Professor Emeritus* · Art History

Irving Lavin is one of America's most distinguished art historians. He has written extensively on the history of art from late antiquity to modern times, including numerous studies on Italian painting, sculpture, and architecture of the Renaissance and Baroque periods. His interests have focused primarily on the correlation between form and meaning in the visual arts.







### Peter Paret

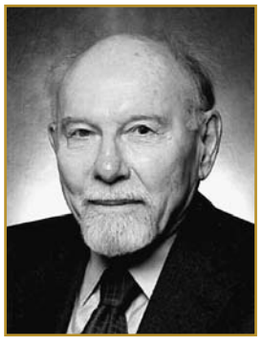
*Professor Emeritus* · Modern European History

Peter Paret is a cultural and intellectual historian with particular interests in the interaction of war and society since the eighteenth century, the manner in which historians integrate war in their interpretation of other historical forces, and the relationship between tradition and modernism in the art of nineteenth- and twentieth-century Central Europe. His most recent book, *The Cognitive Challenge of War* (2009), studies a Napoleonic campaign as it was shaped by the society, military thought, politics, and art of the time, and influenced their further development in turn.

### Heinrich von Staden

*Professor Emeritus* · Classics and History of Science

Heinrich von Staden has written on a variety of topics in ancient science, medicine, philosophy, and literary theory, from the fifth century BC to the fifth century AD. Drawing on a wide range of scientific, philosophical, and religious sources, he has contributed to the transformation of the history of ancient science and medicine, particularly of the Hellenistic period. His current research is on the role of animals in ancient scientific theories and practices, on genres of scientific and medical literature in antiquity, and on the "semantics of matter" in ancient science and medicine.



### Morton White

*Professor Emeritus* · Philosophy and Intellectual History

Morton White is one of America's leading thinkers. In his philosophy of holistic pragmatism, he tries to bridge the positivistic gulf between analytic and synthetic truth as well as that between moral and scientific belief. He maintains that philosophy of science is not philosophy enough, thereby encouraging the examination of other aspects of civilized life—especially art, history, law, politics, and religion—and their relations with science.

**Carolyn Abbate**
*Music History* · University of Pennsylvania · *v*

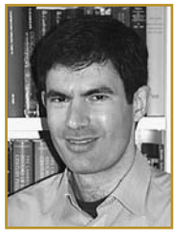
Carolyn Abbate's project centers on the presence and influence of French *opéra-comique* and *opéra-bouffe* in the construction of German modernism from 1890 to 1933: in classical music, in silent and sound film, and in aesthetics and philosophy.

**Asad Q. Ahmed**
*Islamic Studies* · Washington University in St. Louis
*Funding provided by The Andrew W. Mellon Foundation Fellowships for Assistant Professors*

Asad Ahmed is working on a monograph that traces the development of the Graeco-Arabic rationalist strain in the postclassical (ca. 1200–1900 CE) Islamic scholarly tradition, with a focus on the genealogy and legacy of an early modern school of India, called the Khayrabadiyya.

**Juhn Ahn**
*East Asian Studies* · University of Toronto
*Funding provided by The Andrew W. Mellon Foundation Fellowships for Assistant Professors*

Juhn Ahn is working on the history of medieval Korean Buddhism, focusing on how changing habits of reading and new ways of establishing great family credentials are related to the rise in prominence of new social groups and the concomitant crisis that ensued among more traditional elements of political power.



**Thomas Ahnert**
*Early Modern Intellectual History* · The University of Edinburgh
*Rosanna and Charles Jaffin Founders' Circle Member; additional funding provided by The Herodotus Fund*

The aim of Thomas Ahnert's research is to explain the reception and transformation of Newton's ideas in German Enlightenment thought as part of a broader intellectual history of erudition in the eighteenth century. In doing so, he is focusing on the influence of two key intellectual concerns: philosophical eclecticism and metaphysics.

**Abdulrahman al-Salimi**
*Islamic Studies* · Ministry of Endowments and Religious Affairs, Sultanate of Oman · *s*
*Funding provided by The Patrons Endowment Fund*

Abdulrahman al-Salimi is preparing a comprehensive study of two Northern African manuscripts, which contain a collection of early Islamic theological and legal texts and fragments, in regard to their authorship, authenticity, and contents, in an effort to further the understanding of early Islamic theology.



INSTITUTE FOR ADVANCED STUDY

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**Mehmet-Ali Ataç**
*Art of the Ancient Near East and Egypt* · Bryn Mawr College
*Hetty Goldman Member*

Mehmet-Ali Ataç is studying conceptions of time, history, and eschatology as expressed in the visual arts of the ancient Near East, with special emphasis on the art of the Assyrian Empire and its interconnections and parallels with the artistic traditions of Egypt and Anatolia.

**Dirk Baltzly**
*Ancient Greek Philosophy* · Monash University
*Funding provided by the National Endowment for the Humanities*

Dirk Baltzly will be working on a collaborative project about the way in which the schools of Platonic philosophy adapted to various challenges so as to ensure the continuity of what they deemed important in the Platonic tradition. He focuses in particular on the fourth and fifth centuries CE.

**Yelena Baraz**
*Classics* · Princeton University · *v*

Yelena Baraz's project, a contribution to our understanding of ancient emotions, is a diachronic study of Roman pride through a close analysis of its conceptualization in Roman elite discourse and an engagement with a set of generically varied texts, from historiography to love poetry, in which these concepts play an important role.

**Anton Bierl**
*Classics* · Universität Basel
*Gerda Henkel Stiftung Member*

Anton Bierl is examining the interaction of myths, rituals, and orally transmitted traditional wonder-tales and exploring how the refined literary texts of the Second Sophistic focus upon, rework, circulate around, and help to overcome the central crisis of marriage as well as the discovery of sexuality of young people.

**Constance Brittain Bouchard**
*Medieval History* · The University of Akron · *v*

Constance Bouchard is studying the changes in medieval family consciousness between the sixth and twelfth centuries, using the sources of three Burgundian monasteries where early medieval documents were preserved and interpreted in twelfth-century narratives: Flavigny, St.-Pierre-le-Vif of Sens, and Beze.

**Daniela L. Caglioti**
*Modern Sociopolitical History* · Università degli Studi di Napoli Federico II · *s*
*Elizabeth and J. Richardson Dilworth Fellow in Historical Studies*

Daniela Caglioti is studying the change in the notion of citizen and citizenship during, and immediately after, World War I. Focusing on the treatment of enemy aliens, she is exploring how belligerent countries "racialized" citizenship, built the image of the internal and the external enemy, and dealt with civilians and minorities.

**Peter R. Campbell**
*Early Modern French History* · Institut d'Études Culturelles, Université de Versailles Saint-Quentin-en-Yvelines · *f*
*Elizabeth and J. Richardson Dilworth Fellow in Historical Studies*

Peter Campbell is studying the relationship between ideology and politics in France from Louis XIV to the Revolution. He is particularly interested in patriotic ideas and rhetoric and is completing a book that offers a new take on the origins of the French Revolution.

**Joan Breton Connelly**
*Classical Archaeology* · New York University
*Hetty Goldman Member; additional funding provided by The Andrew W. Mellon Foundation*

Joan Connelly is examining landscape, myth, memory, monuments, rituals, and performance in the forging of Athenian identity, particularly the powerful foundation myth depicted on the Parthenon frieze and the ways in which it underscores the special relationship between democracy and sacrifice and the rituals that reflected and sustained Athenian social values.

**François de Blois**
*History of the Near East and Central Asia* · School of Oriental and African Studies, University of London · *s*
*The Gladys Krieble Delmas Foundation Member*

François de Blois, a specialist on Semitic and Iranian languages and literatures and on the history and cultures of the Near East and Central Asia in premodern times, is working on a new critical edition and translation of al-Biruni's classic book known in English as "The Chronology of Ancient Nations."

**Janet Downie**
*Classics* · Princeton University · *v*

Janet Downie is currently working on a book about the rhetorical strategies and cultural significance of Aelius Aristides's *Sacred Tales*, a memoir of illness, divine healing, and professional self-presentation from the second century CE. She also plans to investigate the intersections of mythic, cultural, and intellectual geography in the physical landscape of imperial-era Asia Minor.



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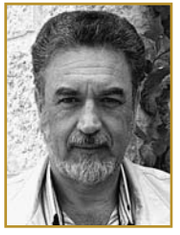
**Glenn Dynner**
*Early Modern European History* · Sarah Lawrence College
*Hans Kohn Member*

Glenn Dynner is studying the modernization of the Jews in the Kingdom of Poland by focusing on the nineteenth-century liquor trade, wherein most noble-owned taverns and distilleries were traditionally leased to Jews, to gauge how the partitions of Poland and the introduction of absolutist rule affected this noble–Jewish symbiosis and other features of the feudal economy.

**Darby English**
*Art History* · The University of Chicago
*Funding provided by the National Endowment for the Humanities*

Darby English is working on a book that studies cultural experiments with modernism in the late-twentieth-century United States and has two 1971 exhibitions of abstract art as its principal foci.



**Menachem Fisch**
*History and Philosophy of Science* · Tel Aviv University
*Friends of the Institute for Advanced Study Member; additional funding provided by The Andrew W. Mellon Foundation*

Menachem Fisch studies major upheavals in science and mathematics from the perspective of those who set them in motion. In a series of related early Victorian case studies, he shows how leading practitioners come to doubt heartfelt commitments, and groping toward new possibilities, produce hybrid, yet highly transformative works.

**Sharon E. J. Gerstel**
*Medieval History* · University of California, Los Angeles
*Funding provided by the Fund for Historical Studies and The Andrew W. Mellon Foundation*

A social historian, Sharon Gerstel is completing a study that focuses on Orthodox Christian villagers between the thirteenth and fifteenth centuries and is the culmination of a decade of archaeological and ethnographic fieldwork in Greece.

**Robert Gerwarth**
*Modern European History* · University College Dublin · *s*
*William D. Loughlin Member; additional funding provided by The Herodotus Fund*

Robert Gerwarth is thinking afresh about the immediate aftermath of the Great War and its legacies by investigating the often violent (and sometimes peaceful) global paths of transition from war to "peace" during one of the most formative, yet surprisingly understudied, periods in modern history: the years between 1917 and 1923.

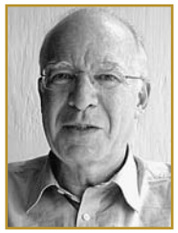
*f* First Term · *s* Second Term · *v* Visitor · *a* Research Assistant

**Jessica L. Goldberg**
*Medieval History* · University of Pennsylvania · *v, f*

Jessica Goldberg uses mercantile records to explore medieval geography not from the high culture of the literary record but as a practical problem. The business records of two twelfth-century communities—Jewish businessmen of Cairo and merchants of Genoa—show the Mediterranean from the eyes of those whose professions depended on the connections between places.

**Jack Goody**
*Social Anthropology* · University of Cambridge · *v, s*

Jack Goody is completing an autobiography and editing a book on his contribution to the study of myth and oral literature. He is also writing on the migration of peoples, religions, and literacy from the Middle East through the Mediterranean.



**Gabriel Gorodetsky**
*Russian and British History* · All Souls College, University of Oxford
*Funding provided by The Andrew W. Mellon Foundation Fund*

Gabriel Gorodetsky is engaged in preparing the publication in three volumes by Yale University Press of the unique and rare diary of Ivan Maisky, the Soviet ambassador to London in 1932–43. His candid and revealing writing will be crossed with corresponding archival material from both the British and the Russian archives.

**Laurie Green**
*Modern U.S. History* · The University of Texas at Austin
*Martin L. and Sarah F. Leibowitz Member*

Laurie Green explores dynamics of consciousness, culture, and politics in the twentieth-century United States, in relation to conflicts over race, gender, and freedom. Her project considers outcry over the "discovery" of hunger and malnutrition in 1960s America in order to analyze the politics of race following the formal achievement of equality.

**John Herman**
*Late Imperial China* · Virginia Commonwealth University
*The Starr Foundation East Asian Studies Endowment Fund Member*

John Herman's research project examines Qing dynasty (1636–1912) expansion into China's southwest frontier from roughly 1650 to 1750. He is interested in the relationship between state-sponsored land reclamation policies, provincial officials tasked to carry out reclamation projects, Chinese settlers in search of land, and the indigenous non-Chinese.

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



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**Regina Höschele**
*Classics* · University of Toronto · *s*
*Funding provided by The Andrew W. Mellon Foundation Fellowships for Assistant Professors*

Regina Höschele is writing a book on Greek epigrams in the Roman Empire, focusing on how the poetic production of the age relates to the culture of rhetoric in the Second Sophistic, situates itself in the prevalent cross-cultural discourse, and reflects the repercussions that the Roman conquest had on the Hellenic sense of identity.

**Padma Kaimal**
*History of South Asian Art* · Colgate University
*Louise and John Steffens Founders' Circle Member; additional funding provided by The Starr Foundation East Asian Studies Endowment Fund*

Padma Kaimal will be reading an eighth-century Hindu temple from the city of Kanchipuram in southern India. In the monument's visual and physical languages, she sees gendered metaphors teaching visitors of the mutual dependence between things that may seem to be opposites.

**Katrin Kogman-Appel**
*Art History* · Ben-Gurion University of the Negev · *v*

Katrin Kogman-Appel is a scholar of Hebrew manuscript painting. Her work focuses on the historical, social, and cultural context of Jewish book art. Her current project discusses fifteenth-century Jewish book culture and the ways the transition to print culture affected the illustration of Hebrew books from that period.

**Denis Kozlov**
*Russian History* · Dalhousie University
*Funding provided by The Andrew W. Mellon Foundation Fellowships for Assistant Professors*

Denis Kozlov is working on a book about reading audiences, historical consciousness, and mechanisms of intellectual change in the Soviet Union during the 1950s and 1960s. Based on the archival evidence of readers' letters to literary periodicals, he explores how several thousand Soviet readers comprehended their life experiences in the framework of twentieth-century history.

**Thomas Kühne**
*Cultural History* · Clark University · *v*

Questioning myths of a universal ideal of beauty, Thomas Kühne is exploring the conflict-riddled interaction of hegemonic and non-hegemonic discourses on body aesthetics from the eighteenth century to now. His work shows how beauty, whether gendered, racialized, or commodified, has based social distinction and propelled struggles for identity—all over the world.

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

*Members, Visitors, and Research Staff*

**Norman Kutcher**
*Late Imperial China* · Syracuse University
*Funding provided by the Fund for Historical Studies*

Norman Kutcher studies the imperial household in late imperial China. He is writing a book about the lives of eunuchs, focusing on their crimes and minor transgressions. His goal is to understand eunuchs' practical and symbolic relationship to the exercise of imperial power in eighteenth- and nineteenth-century China.

**Margaret Larkin**
*Arabic Literary History* · University of California, Berkeley
*The Gladys Krieble Delmas Foundation Member; additional funding provided by the Elizabeth and J. Richardson Dilworth Fund*

Margaret Larkin is studying the panegyric poems of the tenth-century Arab poet Abu'l-Tayyib al-Mutanabbi that were composed in honor of two Buyid patrons, Ibn al-'Amid and 'Adud al-Dawla, as part of a book project on Mutanabbian poetics.

**Eléonore Le Jallé**
*Philosophy* · Université Lille 3 · *v, f*

Eléonore Le Jallé intends to complete the third and last part of a book, "Hume et la philosophie contemporaine," which deals with Hume's theory of justice, convention, and social order, and its impact on contemporary political philosophers, especially Rawls, Hayek, and David Gauthier.

**Wilferd Madelung**
*Islamic Studies* · University of Oxford · *s*
*Funding provided by The Andrew W. Mellon Foundation Fund*

Wilferd Madelung is a historian of early Islam. His research has focused on the rise of the caliphate, sectarian schisms, religious movements, and theological schools in medieval Islam. He is currently editing and studying Ibadi theological texts of the eighth century.

**Stephen Menn**
*Ancient and Medieval Philosophy and Science* · McGill University · *v, f*

Stephen Menn is revising a book manuscript, "The Aim and the Argument of Aristotle's *Metaphysics*," addressing the old question of the object of metaphysics for Aristotle and tracing the main argument through the fourteen books. He is also working on medieval reception of the *Metaphysics*, especially the impact of al-Farabi's analysis of judgments of existence.

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







*Members, Visitors, and Research Staff*

**Micah S. Muscolino**
*Chinese History* · Georgetown University
*Funding provided by The Andrew W. Mellon Foundation Fellowships for Assistant Professors and the National Endowment for the Humanities*

Micah Muscolino's research focuses on the environmental history of modern China. His time at the Institute will be devoted to working on a book project examining the environmental history of World War II in North China.

**Stefania Pastore**
*Early Modern History* · Scuola Normale Superiore di Pisa · *f*
*Funding provided by The Herodotus Fund*

Stefania Pastore, who has worked on the Spanish Inquisition and on Spanish religious and cultural history, is re-reading the history of skepticism in Europe, focusing on the Spanish contribution and tracing the flow and evolution of various forms of eclecticism and comparativism between the late 1400s and the late 1500s.

**Susan Pedersen**
*Modern International History* · Columbia University · *s*
*Funding provided by the Association of Members of the Institute for Advanced Study (AMIAS); additional funding provided by The Andrew W. Mellon Foundation*

Susan Pedersen is writing a history of the mandates system of the League of Nations. Based on reading and archival research across four continents, this study examines the practices, limits, and consequences of international supervision of the imperial powers in the years between the wars.

**Marcus Plested**
*Medieval History and Theology* · University of Cambridge
*George William Cottrell, Jr. Member*

Marcus Plested's research to date has largely focused on patristics and Eastern Orthodox Christianity, with special emphasis on the interaction between Greek East and Latin West. At the Institute, he shall be working principally on Byzantine readings of the works of Thomas Aquinas.

**Alessio Ponzio**
*Modern European History* · Università degli Studi Roma Tre · *s*
*Funding provided by The Herodotus Fund*

Alessio Ponzio is exploring how Fascist Italy and Nazi Germany tried to transform their youths into "blind believers" and "obedient fighters." He will analyze the relationships and cultural exchanges that took place from 1933 to 1943 between Italian and German youth organizations.

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

### Himanshu Prabha Ray

*Ancient Indian History and Archaeology* · Jawaharlal Nehru University
*Felix Gilbert Member*

Himanshu Ray is investigating the extent to which the introduction of new disciplines, such as art history and archaeology, in the nineteenth and twentieth centuries in South and Southeast Asia altered our understanding of Buddhist monuments.

### Ricardo Salles

*Ancient Greek Philosophy* · Instituto de Investigaciones Filosóficas, Universidad Nacional Autónoma de México
*Funding provided by the Willis F. Doney Membership*

Ricardo Salles's research covers the history of ancient Stoic philosophy. He is currently working on a book on Stoic cosmology and, in particular, the doctrine of conflagration and everlasting recurrence. He is also especially interested in ancient logic and the concept of conditional.

### Martha A. (Marni) Sandweiss

*American History and Visual Culture* · Princeton University · *v, f*

Marni Sandweiss is working to uncover the deeper family stories and personal histories embedded in five photographs made during the 1860s by Alexander Gardner, in the hope of knitting together more closely the narratives of the Civil War, Reconstruction, and westward expansion.

### Paul Schubert

*Classics, Papyrology* · Université de Genève · *v, f*

Paul Schubert's primary area of interest is the study of Greek texts on papyrus found in the sand of Egypt. He is currently preparing an edition of the fragments of Anubion, a poet and astrologer active in the early Roman empire whose work is lost for the most part.

### Justin E. H. Smith

*History of Early Modern Philosophy* · Concordia University, Montreal · *s*
*Funding provided by the Willis F. Doney Membership and The Herodotus Fund*

Justin Smith is currently researching the full impact on early modern philosophy of Europe's still recent encounter with variations in the natural world (from exotic plants to astronomical variations) that could not have presented themselves prior to the age of exploration; knowledge systems of non-European cultures; and the physical and cultural variety of humanity itself.



INSTITUTE FOR ADVANCED STUDY

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SCHOOL OF HISTORICAL STUDIES

### Kirill Solonin

*Buddhism, East Asian Studies* · Fo Guang University · *s*
*The Starr Foundation East Asian Studies Endowment Fund Member*

Kirill Solonin's research is currently devoted to the contextualizing of several Tangut Buddhist texts, belonging to the domain of Chinese Buddhism, within a more general framework of Buddhism of Northern China in the tenth through the thirteenth centuries.

### Rachel St. John

*North American History* · Harvard University · *f*
*Agnes Gund and Daniel Shapiro Member*

Rachel St. John's research focuses on the history of the United States and North America in the nineteenth and twentieth centuries. While at the Institute, she will be working on a book, "The Imagined States of America: Nation-Building in Nineteenth-Century North America."

### Dimitris Stamatopoulos

*Balkan History, Late Ottoman History* · University of Macedonia

Dimitris Stamatopoulos's work is concerned with the relationship between religion and politics in the Ottoman and post-Ottoman Balkans. His recent work focuses on the impact of the Orthodox churches on the emergence of the private sphere as well as the rise of civil society in nineteenth- and twentieth-century southeastern Europe.

### Richard Taws

*Art History* · University College London · *f*
*Funding provided by The Herodotus Fund*

Richard Taws works on eighteenth- and nineteenth-century European art, with a particular interest in the visual culture of the French Revolution. At the Institute, he will be completing a book that examines how ephemeral images and objects made in 1790s France were involved in new ways of imagining time.

### Stephen V. Tracy

*Greek History, Epigraphy* · The American School of Classical Studies at Athens · *v*

Stephen Tracy is currently involved in preparing for the Berlin Academy a new edition of the decrees of Athens and Attica that date to the years 229 to 168 BC. He is also preparing a study of Athenian inscriptions of the early fourth century BC.

*Members, Visitors, and Research Staff*

**Karl Ubl**
*Medieval History* · Eberhard Karls Universität Tübingen
*Edwin C. and Elizabeth A. Whitehead Fellow; additional funding provided by The Herodotus Fund*

Karl Ubl is currently working on a project that aims to explore the relation between systems of punishment and the political order in general, and the practice and conceptualization of guilt, merit, and punishment in the Carolingian empire in particular.

**Peter Urquhart**
*Renaissance Music* · University of New Hampshire · *f*
*Edward T. Cone Member in Music Studies*

Peter Urquhart will be completing a book on the issues of pitch, structure, and intention of notation in Franco-Flemish music ca. 1500, a topic widely referred to as *musica ficta*.

**Peter van Alfen**
*Numismatics, Ancient Monetary Systems* · American Numismatic Society · *s*
*Elizabeth and J. Richardson Dilworth Fellow in Historical Studies; Agnes Gund and Daniel Shapiro Member*

Peter van Alfen's current research examines the nexus of political and economic forces in the production of archaic Greek coinage. Drawing on theoretical tools developed in political science and economic studies, he seeks to understand the decision processes of coin administration, including the roles of elites, agents, institutions, and regime types.

**Joseph Witztum**
*Islamic History* · Princeton University · *a*

Joseph Witztum, a Research Assistant to Professor Patricia Crone, is studying the Qur'an and its exegesis, Syriac homilies, and rabbinic literature. He is especially interested in the Qur'anic retellings of Biblical narratives.

**Andrea Worm**
*Art History, Visual Studies* · Universität Augsburg
*Funding provided by the Willis F. Doney Membership*

Andrea Worm will work on a group of printed universal chronicles of the late fifteenth century, which take the form of genealogical history diagrams. Her study will focus on how chronicles on the threshold of the early modern period rendered time, history, and geography as visual categories.

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







# School of Mathematics

Administrative Officer: Mary Jane Hayes

The School of Mathematics, established in 1933, was the first School at the Institute for Advanced Study. Oswald Veblen, Albert Einstein, John von Neumann, and Hermann Weyl were the first Faculty appointments. Kurt Gödel, who joined the Faculty in 1953, was one of the School's first Members.

Today, the School is an international center for research in mathematics and computer science. Members discover new mathematical results and broaden their interests through seminars and interactions with the Faculty and with each other. Several central themes in mathematics in the last seventy-five years owe their major impetus to discoveries that took place at the Institute. As an example, the creation of one of the first stored-program computers, which von Neumann built on the Institute's campus, influenced the development of today's computers and formed the mathematical basis for computer software.

During the 2010–11 academic year, Richard Taylor of Harvard University will be the School's Distinguished Visiting Professor. He will lead a program on Galois representations and automorphic forms. The program will embrace all aspects of the conjectural relationship between automorphic forms and Galois representations: functoriality and Langlands's conjectures, analytic approaches (in particular the trace formula), algebraic approaches (those growing out of Wiles's work on Fermat's Last Theorem), p-adic Hodge theory (the so-called p-adic Langlands program), and applications to other problems in number theory. There will be a weekly seminar and a week-long workshop during the week of March 21, 2011, highlighting recent developments connected with the program.

Other programs associated with the School are the Institute for Advanced Study/Park City Mathematics Institute (PCMI), an innovative program integrating mathematics research and mathematics education, and the Program for Women and Mathematics, jointly sponsored with Princeton University, which brings together research mathematicians with women undergraduate and graduate students for an intensive ten-day workshop held on campus.

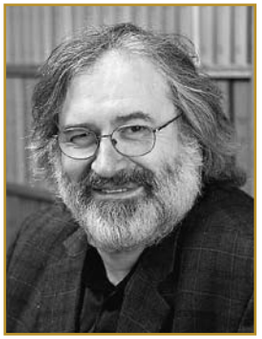
*Faculty*

**Enrico Bombieri**
*IBM von Neumann Professor*

Enrico Bombieri, a Fields Medalist for his work on the large sieve and its application to the distribution of prime numbers, is one of the world's leading authorities on number theory and analysis. His work ranges from analytic number theory to algebra and algebraic geometry, and the partial differential equations of minimal surfaces. In the past decade, his main contributions have been in the active area of Diophantine approximation and Diophantine geometry, exploring questions on how to solve equations and inequalities in integers and rational numbers.

**Jean Bourgain**
*Professor*

Jean Bourgain's work touches on many central topics of mathematical analysis: the geometry of Banach spaces, harmonic analysis, ergodic theory, spectral problems, and nonlinear partial differential equations from mathematical physics and combinatorial number theory. His contributions solved longstanding problems in convexity theory and harmonic analysis such as Mahler's conjecture and the lambda-p set problem. His work also had important consequences in theoretical computer science and on exponential sums in analytic number theory. In Hamiltonian dynamics, he developed the theory of invariant Gibbs measures and quasi-periodicity for the Schrödinger equation.



**Helmut Hofer**
*Professor*

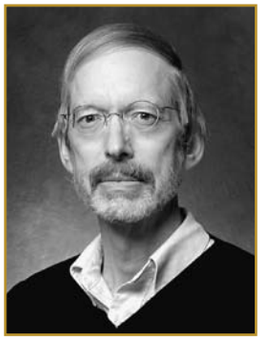
One of the founders of the area of symplectic topology, Helmut Hofer works on symplectic geometry, dynamical systems, and partial differential equations. His fundamental contributions to the field have led to a new area of mathematics known as "Hofer geometry."







*Faculty*

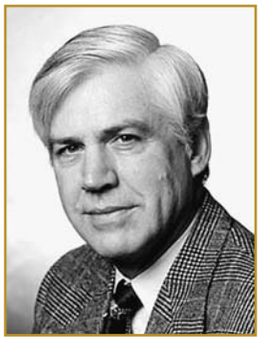


**Robert MacPherson**
*Hermann Weyl Professor*

Robert MacPherson's work has introduced radically new approaches to the topology of singular spaces and promoted investigations across a great spectrum of mathematics. He works in several fields of geometry-topology, algebraic geometry, differential geometry, and singularity theory. He is especially interested in aspects of geometry that interact with other areas of mathematics, such as the geometry of spaces of lattices, which interacts with modular forms, and the geometry of toric varieties, which interacts with combinatorics.

**Peter Sarnak**
*Professor*

Peter Sarnak has made major contributions to number theory and to questions in analysis motivated by number theory. His interest in mathematics is wide-ranging, and his research focuses on the theory of zeta functions and automorphic forms with applications to number theory, combinatorics, and mathematical physics.



**Thomas Spencer**
*Professor*

Thomas Spencer has made major contributions to the theory of phase transitions and the study of singularities at the transition temperature. In special cases, he and his collaborators have proved universality at the transition temperature. Spencer has also worked on partial differential equations with stochastic coefficients, especially localization theory. He is presently developing a mathematical theory of supersymmetric path integrals to study the quantum dynamics of a particle in random media. His other interests include random matrices, chaotic behavior of dynamical systems, and nonequilibrium theories of turbulence.

*Faculty*

### Vladimir Voevodsky

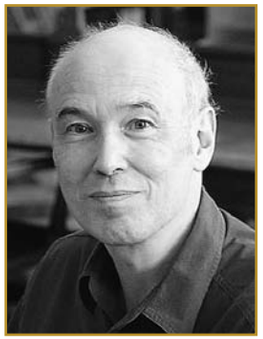
*Professor*

Vladimir Voevodsky is known for his work in the homotopy theory of schemes, algebraic K-theory, and interrelations between algebraic geometry and algebraic topology. He made one of the most outstanding advances in algebraic geometry in the past few decades by developing new cohomology theories for algebraic varieties. Among the consequences of his work are the solutions of the Milnor and Bloch-Kato conjectures. Currently, he is interested in type-theoretic formalizations of mathematics and automated proof verification. He is working on new foundations of mathematics based on homotopy-theoretic semantics of Martin-Lof type theories.

### Avi Wigderson

*Herbert H. Maass Professor*

Avi Wigderson is a widely recognized authority in the diverse and evolving field of theoretical computer science. His main research area is computational complexity theory. This field studies the power and limits of efficient computation and is motivated by such fundamental scientific problems as: Does P=NP? [Can mathematical creativity be efficiently automated?] Can every efficient process be efficiently reversed? [Is electronic commerce secure?] Can randomness enhance efficient computation? Can quantum mechanics enhance efficient computation? How do we learn, and can machines be taught to learn like us (or better)?



### Pierre Deligne

*Professor Emeritus*

Pierre Deligne is known for his work in algebraic geometry and number theory. He pursues a fundamental understanding of the basic objects of arithmetical algebraic geometry—motive, L-functions, Shimura varieties—and applies the methods of algebraic geometry to trigonometrical sums, linear differential equations and their monodromy, representations of finite groups, and quantization deformation. His research includes work on Hilbert's twenty-first problem, Hodge theory, the relations between modular forms, Galois representations and L series, the theory of moduli, tannakian categories, and configurations of hyperplanes.





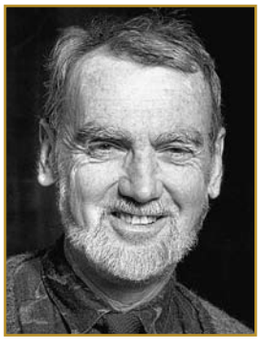


*Faculty*

### Phillip A. Griffiths

*Professor Emeritus*

Phillip Griffiths initiated with his collaborators the theory of variation of Hodge structure, which has come to play a central role in many aspects of algebraic geometry and its uses in modern theoretical physics. In addition to algebraic geometry, he has made contributions to differential and integral geometry, geometric function theory, and the geometry of partial differential equations. A former Director of the Institute (1991–2003), Griffiths chairs the Science Initiative Group, which fosters science in the developing world through programs such as the Carnegie-IAS African Regional Initiative in Science and Education.



### Robert P. Langlands

*Professor Emeritus*

Robert Langlands's profound insights in number theory and representation theory include the formulation of general principles relating automorphic forms and algebraic number theory; the introduction of a general class of L-functions; the construction of a general theory of Eisenstein series; the introduction of techniques for dealing with particular cases of the Artin conjecture (which proved to be of use in the proof of Fermat's theorem); the introduction of endoscopy; and the development of techniques for relating the zeta functions of Shimura varieties to automorphic L-functions. Mathematicians have been working on his conjectures, the Langlands Program, for the last three decades. He has spent some of his time in recent years studying lattice models of statistical physics and the attendant conformal invariance.

### Noga Alon

*Combinatorics* · Tel Aviv University · *vp, f*
*Funding provided by the Bell Companies Fellowship and The Oswald Veblen Fund*

Noga Alon will work on questions in discrete mathematics and theoretical computer science, focusing on problems in extremal and probabilistic combinatorics, information theory, combinatorial number theory, and discrete probability. He expects to combine combinatorial tools with algebraic and probabilistic techniques.

### John Arthur Baldwin

*Knot Theory, Low-dimensional Topology* · Institute for Advanced Study and Princeton University · *vri*

At the Institute, John Baldwin plans to continue a study of contact and symplectic geometry through the lens of Heegaard Floer homology. He also plans to investigate new connections between Khovanov (-Rozansky) homology and Heegaard Floer homology, especially as they pertain to the study of Legendrian and transverse links.

### Paul Beame

*Computational Complexity* · University of Washington
*Funding provided by The Ellentuck Fund and the National Science Foundation*

Paul Beame's research focuses on lower bounds on the complexity of solving concrete computational problems. He plans to study several such lower bound questions involving time-space tradeoffs, proof complexity (particularly the complexity of semi-algebraic inference), and communication complexity.

### Jonathan William Bober

*Number Theory* · Institute for Advanced Study · *f*
*Funding provided by the National Science Foundation*

Jonathan Bober has recently been studying the integrality of certain ratios of products of factorials, with applications to the distribution of prime numbers and the classification of cyclic quotient singularities. He expects to continue working on this and other areas of number theory.

### Barney Bramham

*Symplectic Geometry* · Institute for Advanced Study
*Funding provided by the National Science Foundation*

Barney Bramham will continue developing a new framework for studying the dynamics of area-preserving disc maps, using the theory of foliations by pseudoholomorphic curves. During his stay, he also hopes to learn more about such successful theories as those of Aubry-Mather and KAM.





### Francesco Calegari

*Number Theory* · Northwestern University · *vnf*
*Funding provided by the National Science Foundation and The James D. Wolfensohn Fund*

Frank Calegari studies the relationship between Galois representations and automorphic forms using tools from homology, commutative algebra, and group theory, in the context of the Langlands program. During his stay at the Institute, he plans to work toward proving modularity lifting theorems for two-dimensional representations over imaginary quadratic fields.

### Inna Capdeboscq

*Group Theory* · University of Warwick
*Funding provided by the National Science Foundation*

Inna Capdeboscq's research lies in the area of group theory. She is particularly interested in the questions related to the generation-2 proof of the classification of finite simple groups.

### Yves Capdeboscq

*Partial Differential Equations* · University of Oxford · *vnf*
*Funding provided by the National Science Foundation*

Yves Capdeboscq's research activities concern the asymptotic analysis of partial differential equations, with a focus on homogenization, from a theoretical or numerical point of view, and on inverse problems.

### Laurent Clozel

*Automorphic Forms, Galois Representations* · Université Paris-Sud 11 · *s*
*Neil Chriss and Natasha Herron Chriss Founders' Circle Member; additional funding provided by the Ellentuck Fund, the Florence Gould Foundation Fund, and The James D. Wolfensohn Fund*

Laurent Clozel's research focuses on automorphic forms, Galois representations, and the trace forumula.

### Frederick R. Cohen

*Topology* · University of Rochester · *s*

Frederick Cohen plans to work on moment-angle complexes as well as configurations spaces. He also plans to finish a book on configuration spaces in joint work with Samuel Gitler and Laurence Taylor.

**Alina Cojocaru**
*Number Theory* · University of Illinois at Chicago · *f*
*Funding provided by the National Science Foundation*

Alina Cojocaru's current research lies at the intersection of analytic number theory with arithmetic geometry. In particular, she studies questions concerning distributions of primes that arise in the context of elliptic curves and Drinfeld modules and are motivated by conjectures of Lang and Trotter from the 1970s.

**Pierre Colmez**
*Number Theory* · CNRS and Institut de Mathématiques de Jussieu, Université Paris Diderot · *f*
*Ralph E. and Doris M. Hansmann Member; additional funding provided by the Florence Gould Foundation Fund*

Pierre Colmez plans to continue his work on the p-adic local Langlands correspondence, and try to see if it can be extended to other cases than the one known so far.

**Jean-Francois Dat**
*Arithmetic Geometry, Representation Theory* · Université Pierre et Marie Curie · *vnf, f*
*Funding provided by the National Science Foundation*

Jean-Francois Dat is studying the mod l cohomology of some moduli spaces due to Drinfeld. He hopes to show how this realizes the mod l Langlands correspondence for general linear groups over p-adic fields. This involves derived category arguments and bears some resemblance with the mod l Deligne-Lusztig theory for finite Lie groups.

**Mike Davis**
*Topology, Geometric Group Theory* · The Ohio State University

Mike Davis works on groups and spaces related to abstract reflection groups (also called Coxeter groups). Currently, he is working on a problem about Artin groups as well as problems concerning automorphism groups of certain nonclassical buildings.

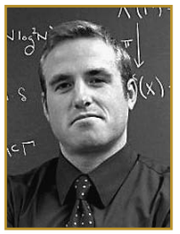
**Fred Diamond**
*Galois Representations, Automorphic Forms* · King's College London · *v, s*

Fred Diamond works in the area of modular forms and Galois representations. His main current research interests are generalizations of Serre's Conjecture and mod p Langlands correspondences.

*f* First Term · *s* Second Term · *m* Long-term Member · *v* Visitor
*dvp* Distinguished Visiting Professor · *vp* Visiting Professor · *j* Joint Member School of Natural Sciences
*vri* Veblen Research Instructorship · *vnf* von Neumann Fellowship

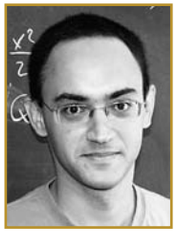






**Dominic Dotterrer**
*Combinatorial Geometry* · Institute for Advanced Study · *v, s*

Dominic Dotterrer is studying isoperimetric properties of cellular complexes. His interests include the concentration of measure phenomenon in combinatorics and randomized algorithms, harmonic analysis, discrete and convex geometry, and contractive diffusions.



**Zeev Dvir**
*Computer Science* · Institute for Advanced Study · *v*

Zeev Dvir is interested in many problems related to computational complexity, with an emphasis on derandomization and algebraic methods.

**Richard Ehrenborg**
*Algebraic Combinatorics* · University of Kentucky

Richard Ehrenborg plans to work on three topics in algebraic combinatorics: poset topology of partition lattices and interaction with permutation statistics, Kazhdan–Lusztig polynomials of balanced graphs, and inequalities among the entries of the flag f-vector of polytopes and manifolds.

**Pierluigi Falco**
*Mathematical Physics* · Institute for Advanced Study
*Funding provided by the Giorgio and Elena Petronio Fellowship Fund*

Pierluigi Falco's research focuses on critical phenomena in two-dimensional statistical mechanics as well as scaling limits and quantum field theories.

**Jean-Marc Fontaine**
*Algebraic Geometry, Number Theory* · Université Paris-Sud 11 · *f*
*Funding provided by the Florence Gould Foundation Fund*

Jean-Marc Fontaine is working on p-adic Hodge theory, a useful tool in arithmetic geometry. With Laurent Fargues, he recently reinterpreted this theory in terms of equivariant vector bundles over a suitable curve. He will focus on the further developments of this work.

*f* First Term · *s* Second Term · *m* Long-term Member · *v* Visitor
*dvp* Distinguished Visiting Professor · *vp* Visiting Professor · *j* Joint Member School of Natural Sciences
*vri* Veblen Research Instructorship · *vnf* von Neumann Fellowship

**Elena Fuchs**
*Number Theory* · Institute for Advanced Study
*Funding provided by the National Science Foundation*

Integer orbits of certain thin groups (groups acting on hyperbolic n-space with a fundamental domain of infinite volume) have been difficult to handle until recently, as classical tools such as automorphic forms do not apply to them. Even though they come from thin groups, these orbits often possess rich arithmetic properties. The aim of Elena Fuchs's work is to gain a better understanding of this phenomenon.

**David Geraghty**
*Number Theory* · Institute for Advanced Study and Princeton University · *vri*
*Funding provided by the National Science Foundation*

David Geraghty's research to date has been concerned with modularity of Galois representations, particularly modularity lifting and potential modularity. He plans to continue working on such questions as well as applications to proving instances of Serre type conjectures on the weights of mod p Galois representations.

**Samuel Gitler**
*Algebraic Topology, Toric Topology* · Centro de Investigación del Instituto Politécnico Nacional, Mexico City

With his collaborators, Samuel Gitler has defined an infinite number of simple polytopes associated to a given one. These give infinite families of moment angle manifolds, toric manifolds, and small abelian covers of polytopes associated to a corresponding such space. Many problems arise in the study of these manifolds.

**Mark Goresky**
*Geometry, Automorphic Forms* · Institute for Advanced Study · *m*
*Funding provided by the Bell Companies Fellowship*

Mark Goresky's main interest this year concerns a book, written jointly with Jayce Getz (McGill University), on Hilbert modular forms with coefficients in intersection homology, generalizing some well-known classical results of Fritz Hirzebruch and Don Zagier.

**Anna Gourevitch**
*Algebraic Geometry, Singularity Theory* · Institute for Advanced Study · *v, f*

Anna Gourevitch works in singularity theory and algebraic geometry. Currently, she studies geometry of equisingular families of algebraic curves and hypersurfaces.

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*vri* Veblen Research Instructorship · *vnf* von Neumann Fellowship



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**Thomas Graber**
*Algebraic Geometry* · California Institute of Technology
*Funding provided by the National Science Foundation*

Tom Graber is interested in the algebraic geometry of moduli spaces with applications to numerical invariants of algebraic varieties, problems in birational geometry, and arithmetic over function fields.

**Zihua Guo**
*Harmonic Analysis, Partial Differential Equations* · Institute for Advanced Study
*Zurich Financial Services Member; additional funding provided by the S. S. Chern Foundation for Mathematics Research Fund and the National Science Foundation*

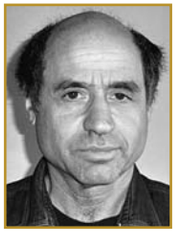
Zihua Guo is working in the area of nonlinear dispersive equations, including KdV, KP, Schrödinger, etc. His main interest is in the well-posedness theory and the harmonic analysis methods in this field, in particular the tools in the low regularity problem.

**Larry Guth**
*Geometry, Harmonic Analysis* · University of Toronto
*Funding provided by the Ambrose Monell Foundation and the National Science Foundation*

Larry Guth is a geometer who studies isoperimetric inequalities, systolic inequalities, and other kinds of estimates about surface areas. Recently, he has become interested in Kakeya-type problems in harmonic analysis. In particular, he is working on understanding how much Dvir's polynomial method can tell us about Kakeya-type problems in Euclidean space.

**Thomas J. Haines**
*Representation Theory, Arithmetic Algebraic Geometry* · University of Maryland · *vnf*
*Funding provided by the National Science Foundation*

Thomas Haines studies Shimura varieties, automorphic forms, the trace formula, representation theory of p-adic groups, and their interactions. His recent work has been on the connection between bad reduction of Shimura varieties and the Bernstein center of a p-adic group, and the "endoscopic transfer" of the latter.



**Michael Harris**
*Number Theory, Automorphic Forms* · Université Paris Diderot · *s*
*Funding provided by the Association of Members of the Institute for Advanced Study (AMIAS)*

With Richard Taylor and colleagues in France, Michael Harris has been studying the Galois representations attached to automorphic forms. While at the Institute, he plans to address questions that remain open, notably those related to irreducibility of these Galois representations, and relations with p-adic L-functions.

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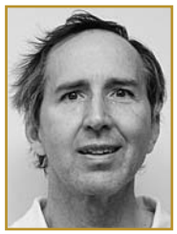
**Florian Herzig**
*Number Theory* · Institute for Advanced Study
*Funding provided by the National Science Foundation*

Florian Herzig studies generalizations of Serre's conjecture, in particular the possible weights of global mod p Galois representations. Another aspect of his work is motivated by the hypothetical mod p and p-adic Langlands correspondences (so far only understood in a very special case).

**David Huse**
*Theoretical Condensed Matter Physics, Statistical Physics* · Princeton University · *v, f*

David Huse is studying the quantum many-body physics of ultracold atoms, both in and out of equilibrium; the many-body localization at nonzero temperature; and other topics in phase transitions and quantum and classical statistical physics.



**John Z. Imbrie**
*Mathematical Physics* · University of Virginia

John Imbrie's research focuses on critical phenomena in probability and statistical mechanics. He is interested in renormalization group methods for supersymmetric models. He is also studying mathematical models of the ice ages.

**Russell Impagliazzo**
*Computational Complexity* · University of California, San Diego · *vp*
*Friends of the Institute for Advanced Study Member; additional funding provided by The Ellentuck Fund and the National Science Foundation*

Russell Impagliazzo specializes in computational complexity, the role of randomness in computation, proof complexity, average-case complexity, the foundations of cryptography, and the exact complexity of NP-complete problems.

**Nathan Jones**
*Number Theory* · The University of Mississippi · *v, f*

Nathan Jones is interested in the theory of elliptic curves. He will work on projects concerning the image of their associated Galois representations, and applications.

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**Andrei Jorza**
*Number Theory* · Institute for Advanced Study · *f*
*Funding provided by the National Science Foundation*

Andrei Jorza will be studying the interaction between automorphic forms and Galois representations, and their relation to p-adic Hodge Theory. In particular, over complex multiplication fields, he will focus on congruences between modular forms, and their effect on the properties of the associated local Galois representations.

**Matthew Kahle**
*Topology, Probability, Combinatorics* · Institute for Advanced Study

Matthew Kahle is interested in various interactions of probability and statistical mechanics with topology, geometry, and combinatorics. He is currently working on understanding the topology of configuration spaces of hard spheres.

**Tasho Kaletha**
*Group Theory, Automorphic Forms* · The University of Chicago · *vri*
*Funding provided by the National Science Foundation*

Tasho Kaletha's main research interests include the stable topological trace formula on the one hand, and the local Langlands correspondence and endoscopy for p-adic groups on the other hand. Another of his interests is the asymptotic behavior of divisibility functions for arithmetic groups. Currently, he is focusing on endoscopic character identities for L-packets on p-adic groups.

**Ralph Kaufmann**
*Algebraic Topology, Algebraic Geometry* · Purdue University · *f*
*Funding provided by the National Science Foundation*

Ralph Kaufmann's research focus is the development and use of algebraic structures in topology and geometry. His special interests lie in moduli spaces, stringy geometry, and mirror symmetry, in particular Gromov-Witten and stringy K-theory for stacks as well as string topology, operadic structures, and stringy geometry of singularities with symmetries.

**Chandrashekhar Khare**
*Number Theory* · University of California, Los Angeles
*Funding provided by the National Science Foundation*

Chandrashekhar Khare is a number theorist interested in the relationship between Galois theory and modular forms. He hopes to work on some applications of the theory of modular forms to problems in algebraic number theory while at the Institute.

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**Menachem Kojman**
*Combinatorics* · Ben-Gurion University of the Negev

Menachem Kojman's research involves problems in finite and infinite combinatorics in modern set-theoretic context. Metamathematical means are useful in addressing problems in convexity theory and graph theory, which generalize well-known finite combinatorial problems. Such is the classification of continuous graph structures to "ransom" and "perfect" graphs.

**Swastik Kopparty**
*Theoretical Computer Science* · Institute for Advanced Study
*Funding provided by the National Science Foundation*

Within theoretical computer science, Swastik Kopparty is interested in coding theory, pseudorandomness, and complexity theory. While at the Institute, he plans to think about ways we can cope with, benefit from, and understand randomness in computation.

**Gabor Kun**
*Discrete Mathematics, Computer Science, Number Theory* · Institute for Advanced Study · *v*

Gabor Kun's research primarily focuses on probabilistic methods in combinatorics and the application of pseudorandomness in computer science and additive number theory.

**Kai-Wen Lan**
*Number Theory, Shimura Varieties* · Institute for Advanced Study and Princeton University · *vri*

Kai-Wen Lan plans to study cohomologies of Shimura varieties and related locally symmetric spaces with methods related to arithmetic toroidal compactifications. One of his aims is to understand relations between automorphic forms coming from geometric objects of very different natures.

**Thái Hoàng Lê**
*Additive and Combinatorial Number Theory* · Institute for Advanced Study
*Funding provided by the National Science Foundation*

Thái Hoàng Lê plans to investigate some questions regarding structures in subsets of positive density of the integers and additive properties of the primes, as well as their function field analogs.



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**Victor Daniel Lie**
*Analysis* · Institute for Advanced Study and Princeton University · *vri*
*Funding provided by the National Science Foundation*

Victor Lie's main area of interest is harmonic analysis. More specifically, his work has developed in the subfields of time-frequency analysis and subjects related to the Kakeya problem. Additionally, he plans to explore the rich connections between harmonic analysis and ergodic theory, partial differential equations, and additive combinatorics.

**Ruochuan Liu**
*p-adic Hodge Theory, p-adic Local Langlands Program* · Institute for Advanced Study · *f*
*Funding provided by the National Science Foundation*

Ruochuan Liu is trying to relate Colmez's construction of p-adic local Langlands correspondence for $GL_2(\mathbb{Q}_p)$ to the de Rham cohomology of Drinfeld covering spaces.

**Tong Liu**
*Arithmetic Geometry, Galois Representations, p-adic Hodge Theory* · Purdue University · *s*
*Funding provided by the National Science Foundation*

Tong Liu is studying the properties of p-adic Galois representations coming from geometry and automorphic forms.

**Shachar Lovett**
*Computer Science* · Institute for Advanced Study
*Funding provided by the National Science Foundation*

Shachar Lovett is interested in all aspects of theoretical computer science, and in particular in computational complexity, pseudorandomness, coding theory, algebraic constructions, and lower bounds. He is also interested in additive combinatorics and its connections to theoretical computer science.

**Elena Mantovan**
*Arithmetic Geometry* · California Institute of Technology · *vnf*
*Funding provided by the National Science Foundation*

Elena Mantovan works in arithmetic geometry. Her research focuses on the theory of Shimura varieties and their local models. She is mostly interested in questions that arise within the framework of the Langlands program.

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**Simon Marshall**
*Number Theory* · Institute for Advanced Study
*Funding provided by the National Science Foundation*

Simon Marshall studies arithmetic manifolds, with an emphasis on their cohomology and quantum ergodic properties. He is interested in using the theory of automorphic forms to gain a better understanding of them.

**Jeremy Mason**
*Mathematical Physics* · Institute for Advanced Study

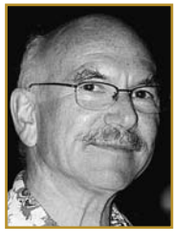
Jeremy Mason plans on exploring the implications of the recently formulated analytical solution for grain growth in three-dimensional polycrystalline materials, as well as developing more comprehensive models for microstructural evolution.

**Guowu Meng**
*Mathematical Physics* · The Hong Kong University of Science and Technology · *j*
*Qiu Shi Science and Technologies Foundation Member*

Guowu Meng discovered a vast family of super-integrable models that resemble the Kepler problem. He has explored the connection of these models with symmetric domains, Jordan algebras, and theta-correspondences. He will continue (and possibly expand) this exploration during his stay at the Institute.

**Sophie Morel**
*Shimura Varieties* · Harvard University
*Funding provided by the Minerva Research Foundation; additional funding provided by the Friends of the Institute for Advanced Study*

Sophie Morel is studying the automorphic representations appearing in the intersection cohomology of the Baily-Borel compactification of Shimura varieties. One of her main tools will be Arthur's stable trace formula.



**Walter Neumann**
*Geometry, Topology* · Barnard College · *s*

Walter Neumann's research is mostly in low-dimensional topology and geometric group theory and the topology and geometry of isolated singularities of complex varieties.





**James Newton**
*Number Theory* · Institute for Advanced Study · *s*
*Funding provided by the National Science Foundation*

James Newton is interested in the study of the p-adic properties of automorphic forms and Galois representations. He plans to work on problems related to eigenvarieties, p-adic Langlands functoriality, and p-adic Hodge theory.

**Ryan O'Donnell**
*Theoretical Computer Science* · Carnegie Mellon University · *vnf*
*Funding provided by the National Science Foundation*

Ryan O'Donnell's research interests include analysis of boolean functions, approximability of optimization problems, computational learning theory, complexity theory, property testing, and probability.

**Alvaro Pelayo**
*Symplectic Geometry, Special Theory of Integrable Systems* · Institute for Advanced Study · *s*
*Funding provided by the National Science Foundation*

Alvaro Pelayo is researching completely integrable systems, Hamiltonian dynamics and symplectic geometry, and geometric aspects of partial differential equations.

**Nigel J. E. Pitt**
*Automorphic Forms, Analytic Number Theory* · University of Brasilia · *s*

Nigel Pitt is interested in harmonic analysis and automorphic functions, and their uses in analytic number theory. While at the Institute, he will study links to hyperbolic geometry, including interactions between pairs of closed geodesics, and hopes to learn more about connections with other areas of mathematics.

**Margaret A. Readdy**
*Algebraic Combinatorics* · University of Kentucky

Margaret Readdy will continue her work on Kazhdan-Lusztig polynomials, study the topology of the Rees product and related poset products, and initiate a study of flag vectors of non-Eulerian posets. She will write a research monograph on coalgebraic techniques and polytopes with Louis Billera and Richard Ehrenborg.

**Igor Rivin**
*Geometry, Computation, Number Theory, Geometric Group Theory, Physics, Chemistry* · Temple University

Igor Rivin works in hyperbolic geometry and related areas of geometric group theory; generic phenomena in group theory; numerical optimization; and computer system design, probability, and number theory.

**Guy Nathanel Rothblum**
*Computer Science* · Institute for Advanced Study · *v*

Guy Rothblum's research focuses on foundational cryptography. Recently he has been especially interested in studying methods for protecting individuals' privacy, for reliably delegating computations, and for obfuscation and software protection.

**Yiannis Sakellaridis**
*Automorphic Forms, Representation Theory, Number Theory* · Institute for Advanced Study · *s*
*Funding provided by the National Science Foundation*

Yiannis Sakellaridis is interested in the interplay between *L*-functions, functoriality, and analytic constructions such as period integrals. He has been using the theory of spherical varieties to obtain some understanding of these topics, and will attempt to apply it to the relative trace formula during his stay at the Institute.

**Shubhangi Saraf**
*Complexity Theory, Pseudorandomness* · Institute for Advanced Study · *v*

Shubhangi Saraf's research focuses on complexity theory and pseudorandomness.

**Mira Shamis**
*Mathematical Physics* · Institute for Advanced Study · *f*
*Funding provided by the National Science Foundation*

Mira Shamis is currently interested in the spectral theory of Jacobi operators, particularly operators with periodic and almost periodic potentials.

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**Sug Woo Shin**
*Number Theory, Shimura Varieties* · Institute for Advanced Study
*Funding provided by the National Science Foundation*

Sug Woo Shin would like to investigate the Langlands correspondence as realized in the cohomology of Shimura varieties (global) or Rapoport-Zink spaces (local). The techniques will range from arithmetic geometry to the trace formula and endoscopy.

**Christopher Skinner**
*Number Theory* · Princeton University

Christopher Skinner's research focuses mainly on Galois representations and automorphic forms and their applications to algebraic number theory, especially special values of L-functions.

**Anders Södergren**
*Number Theory* · Institute for Advanced Study · *s*
*Funding provided by the National Science Foundation*

Anders Södergren works in analytic number theory and dynamical systems on homogeneous spaces. His current research focus is on understanding the value distribution of the Epstein zeta function in large dimensions. At the Institute, he further plans to work on equidistribution problems motivated by number theory.

**Sasha Sodin**
*Mathematical Physics* · Institute for Advanced Study
*Funding provided by the National Science Foundation*

Sasha Sodin works on random matrices. He is currently trying to study the local spectral properties of band matrices using a perturbation expansion.

**Srikanth Srinivasan**
*Computational Complexity* · Institute for Advanced Study
*Funding provided by the National Science Foundation*

Srikanth Srinivasan's research is mainly focused on topics in computational complexity, particularly on problems motivated by questions in arithmetic and boolean circuit complexity and pseudorandomness.

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**Nikhil Srivastava**
*Theoretical Computer Science* · Institute for Advanced Study
*Funding provided by the National Science Foundation*

Nikhil Srivastava is interested in spectral graph theory and linear algebra. He is working on problems regarding cuts and distances in spanning trees of graphs, and on constructing matrices with various kinds of desirable spectral properties.

**Junecue Suh**
*Algebraic Geometry, Number Theory* · Institute for Advanced Study
*Funding provided by the National Science Foundation*

During his stay at the Institute, Junecue Suh plans to continue to study the liftability and torsion-freeness properties of the cohomology groups of Shimura varieties with p-torsion and integral coefficients.

**Melissa Tacy**
*Analysis* · Institute for Advanced Study
*Funding provided by the National Science Foundation*

Melissa Tacy works on problems related to the concentration of eigenfunctions of semiclassical pseudodifferential operators. Her work focuses on connecting the size of restrictions of eigenfunctions to submanifolds with the properties of the associated classical flow.

**A. Shadi Tahvildar-Zadeh**
*Mathematical Physics, Partial Differential Equations* · Rutgers, The State University of New Jersey · *s*

Shadi Tahvildar-Zadeh is studying the interface between general relativity and nonlinear electrodynamics: point-charge metrics, Goldilocks singularities, and the ontology of nothingness.

**Christine J. Taylor**
*Evolutionary Game Theory, Evolution of Cooperation* · Harvard University
*Funding provided by the Minerva Research Foundation*

Christine Taylor is studying the act of cooperation, which is abundant in nature ranging from microbial colonies to animal and human societies. She is investigating different mechanisms for the evolution of cooperation, a conundrum and a central pillar of evolutionary biology, under deterministic and stochastic game dynamics.

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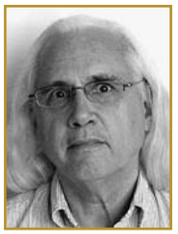

**Laurence R. Taylor**
*Algebraic and Geometric Topology* · University of Notre Dame · *s*

Laurence Taylor will work on the topology of configuration spaces, especially of manifolds. His general interests include geometric and algebraic approaches to the study of spaces related to manifolds, including function spaces, L-theory, and K-theory, amongst others. He also has an interest in the area of four-dimensional manifolds.

**Richard Taylor**
*Number Theory* · Harvard University · *dvp*
*Funding provided by The Charles Simonyi Endowment and the Oswald Veblen Fund*

Richard Taylor is interested in the relationship between l-adic representations and automorphic forms—how to construct l-adic representations for automorphic forms and how to prove given l-adic representations that arise in this way, at least after a finite base change (potential automorphy).

**Yichao Tian**
*Arithmetic Algebraic Geometry* · Institute for Advanced Study and Princeton University · *vri*

Yichao Tian is currently interested in the integral p-adic Hodge theory and ramification theory. He plans to study the relation between Kisin's S-modules and the canonical filtration for finite and flat group schemes over a discrete valuation ring.

**Jacques Tilouine**
*Number Theory, Galois Representations, p-adic Modular Forms, Modularity* · Université Paris 13 · *v, s*

Jacques Tilouine is interested in modularity problems, in particular for Galois representations with nonregular Hodge-Tate weights. The techniques involved include p-adic families of automorphic forms and deformations of Galois representations.

**Madhur Tulsiani**
*Theoretical Computer Science* · Institute for Advanced Study · *v*

Madhur Tulsiani is interested in complexity theory, particularly in hardness of approximation and convex relaxations of optimization problems. He has also been trying to understand some connections between complexity theory and arithmetic combinatorics.

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**Eric Jean-Paul Urban**
*Number Theory* · CNRS and Columbia University · *s*
*Funding provided by the Florence Gould Foundation Fund*

Eric Urban is interested in the so-called Bloch-Kato and Iwasawa main conjectures, which establish a deep relationship between special values of L-functions and Selmer groups attached to geometric Galois representations similar to the well-known (p-adic) Birch and Swinnerton-Dyer conjecture.

**Sophia Vassiliadou**
*Complex Variables, Complex Geometry* · Georgetown University
*Funding provided by the National Science Foundation*

Sophia Vassiliadou studies complex analytic spaces with singularities. She is interested in connections between analysis and complex geometry. Her recent work concerns L2 Dolbeault cohomology groups on complex spaces with singularities.

**Claude Viterbo**
*Symplectic Geometry* · École Polytechnique, Palaiseau, France · *f*
*Funding provided by the National Science Foundation*

Claude Viterbo is studying Floer homology, symplectic invariants, and connections of symplectic geometry with algebraic geometry and partial differential equations.

**Fang Wang**
*Microlocal Analysis, Geometric Scattering Theory, General Relativity, Partial Differential Equations* · Institute for Advanced Study and Princeton University · *vri*

Fang Wang is currently working on the asymptotic behavior of solutions to Einstein vacuum equations by applying the geometric scattering theory.

**Jared Weinstein**
*Number Theory* · Institute for Advanced Study

Jared Weinstein is studying modular forms and automorphic forms, the local Langlands correspondence, and the geometry of Lubin-Tate spaces.



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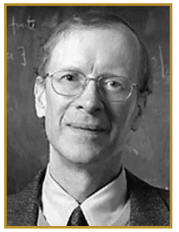
**Anna Wienhard**
*Geometry* · Princeton University · *v*

Anna Wienhard plans to investigate higher Teichmüller spaces. For higher Teichmüller spaces many potentially interesting structures are yet to be discovered, and the relation to the moduli space of Riemann surfaces still needs to be clarified.



**Andrew Wiles**
*Algebraic Number Theory* · Princeton University · *v*

Andrew Wiles is working primarily on two projects at the moment. The first concerns the solvability of equations in more than one variable. In one variable, Abel proved that most equations are not solvable, but the corresponding result in more than one variable is unknown. The second is a long-term project to understand the problem of functoriality in Langlands's theory of automorphic representations.

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# School of Natural Sciences

Administrative Officer: Michelle Sage

Executive Director and Administrator,
The Simons Center for Systems Biology: Suzanne P. Christen

The School of Natural Sciences, established in 1966, provides a unique atmosphere for research in broad areas of theoretical physics, astronomy, and systems biology.

Areas of current interest in theoretical physics include elementary particle physics, particle phenomenology, string theory, and quantum theory and quantum gravity and their relationship to geometry. The astrophysics group combines theory with modern observational studies to understand a wide variety of astrophysical phenomena. The research in mathematical physics and string theory benefits from synergistic collaborations with the School of Mathematics. The programs in physics and astronomy are closely integrated with corresponding activities at Princeton University via joint seminars and lunches, as well as frequent informal contacts.

The Simons Center for Systems Biology takes an interdisciplinary approach to biology, conducting research at the interface of molecular biology and the physical sciences and drawing researchers from an array of disciplines, including mathematics, physics, astrophysics, molecular biology, and chemistry. The Center encourages collaborations with other academic and clinical groups as well as with research scientists from pharmaceutical, biotechnology, and computer companies, to pool biological data and to confirm theoretical models. The Center hosts a variety of joint "lab meetings," seminars, symposia, and public lectures that take place during the year.

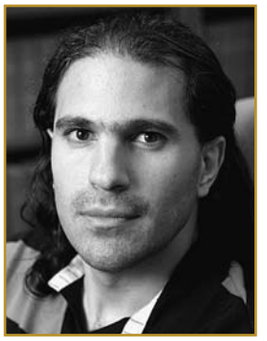
The School also sponsors Prospects in Theoretical Physics, a two-week residential summer program held at the Institute for promising graduate students and postdoctoral scholars, who attend lectures and sessions on the latest advances and open questions in the field of theoretical physics.





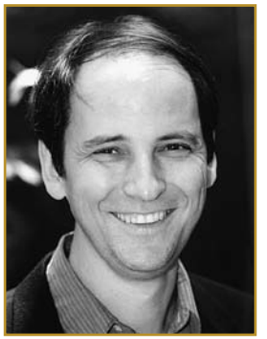


*Faculty*



**Nima Arkani-Hamed**
*Professor* · Particle Physics

One of the leading particle physics phenomenologists of his generation, Nima Arkani-Hamed is concerned with the relation between theory and experiment. His research has shown how the extreme weakness of gravity, relative to other forces of nature, might be explained by the existence of extra dimensions of space, and how the structure of comparatively low-energy physics is constrained within the context of string theory. He has taken a lead in proposing new physical theories that can be tested at the Large Hadron Collider at CERN in Switzerland.

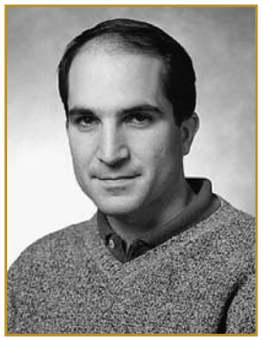


**Stanislas Leibler**
*Professor* · Biology

Stanislas Leibler has made important contributions to theoretical and experimental biology, successfully extending the interface between physics and biology to develop new solutions and approaches to problems. Interested in the quantitative description of microbial systems, both on cellular and population levels, Leibler is developing the theoretical and experimental methods necessary for studying the collective behavior of biomolecules, cells, and organisms. By selecting a number of basic questions about how simple genetic and biochemical networks function in bacteria, he and his laboratory colleagues are beginning to understand how individual components can give rise to complex, collective phenomena.

**Arnold J. Levine**
*Professor* · Biology

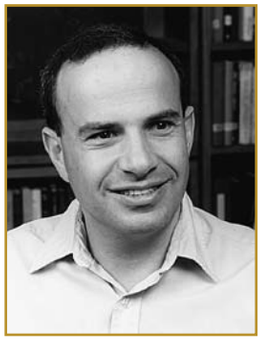
Arnold Levine is a widely acclaimed leader in cancer research. In 1979, Levine and others discovered the p53 tumor suppressor protein, a molecule that inhibits tumor development. He established and heads the Simons Center for Systems Biology at the Institute, which concentrates on research at the interface of molecular biology and the physical sciences: on genetics and genomics, polymorphisms and molecular aspects of evolution, signal transduction pathways and networks, stress responses, and pharmacogenomics in cancer biology.



### Juan Maldacena

*Professor* · Theoretical Physics

Juan Maldacena's work focuses on quantum gravity, string theory, and quantum field theory. He has proposed a relationship between quantum gravity and quantum field theories that elucidates various aspects of both theories. He is studying this relationship further in order to understand the deep connection between black holes and quantum field theories, and he is also exploring the connection between string theory and cosmology.



### Nathan Seiberg

*Professor* · Mathematical Physics

Nathan Seiberg's research focuses on various aspects of string theory, quantum field theory, and particle physics. His work has shed light on the worldsheet description of string theory as a two-dimensional conformal field theory and its space-time manifestations. Seiberg has contributed to the understanding of the dynamics of quantum field theories, especially supersymmetric quantum field theories. His exact solutions of such theories have uncovered many new and unexpected insights, including the fundamental role of electric-magnetic duality in these theories. These exact solutions have led to many applications in physics and in mathematics. He has also clarified how supersymmetry can be dynamically broken, and has explored the phenomenological consequences of supersymmetry breaking. These consequences will be tested at the Large Hadron Collider.

### Scott Tremaine

*Richard Black Professor* · Astrophysics

Scott Tremaine has made seminal contributions to understanding the formation and evolution of planetary systems, comets, black holes, star clusters, galaxies, and galaxy systems. He predicted the Kuiper belt of comets beyond Neptune and, with Peter Goldreich, the existence of shepherd satellites and density waves in Saturn's ring system, as well as the phenomenon of planetary migration. He interpreted double-nuclei galaxies, such as the nearby Andromeda galaxy, as eccentric stellar disks, and elucidated the role of dynamical friction in galaxy evolution.





### Edward Witten

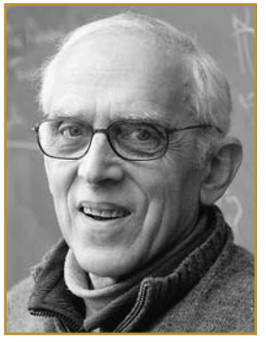
*Charles Simonyi Professor* · Mathematical Physics

Edward Witten's work exhibits a unique combination of mathematical power and physics insight, and his contributions have significantly enriched both fields. He has greatly contributed to the modern interest in superstrings as a candidate theory for the unification of all known physical interactions. Most recently, he has explored quantum duality symmetries of field theories and string theories, opening significant new perspectives on particle physics, string theory, and topology.

### Matias Zaldarriaga

*Professor* · Astrophysics and Cosmology

Matias Zaldarriaga has made many influential and creative contributions to our understanding of the early universe, particle astrophysics, and cosmology as a probe of fundamental physics. Much of his work centers on understanding the clues about the earliest moments of our universe encoded in the Cosmic Microwave Background, the faint glow of radiation generated by the Big Bang. His recent research has focused on intergalactic hydrogen gas in the early universe, and he is at the forefront of developing machinery to study this gas using the spectral line from neutral hydrogen at 21-centimeter wavelength.

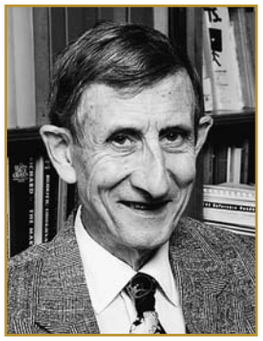


### Stephen L. Adler

*Professor Emeritus* · Particle Physics

In a series of remarkable, difficult calculations, Stephen Adler demonstrated that abstract ideas about the symmetries of fundamental interactions could be made to yield concrete predictions. The successful verification of these predictions was a vital step toward the modern Standard Model of particle physics. In some of his more recent work, he has been exploring generalized forms of quantum mechanics, both from a theoretical and a phenomenological standpoint.

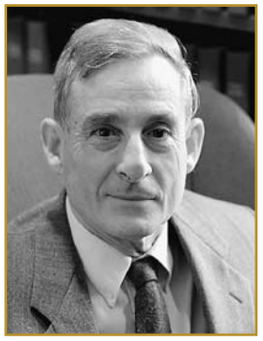
## *Faculty*



### Freeman J. Dyson

*Professor Emeritus* · Mathematical Physics and Astrophysics

Freeman Dyson's work on quantum electrodynamics marked an epoch in physics. The techniques he used in this domain form the foundation for most modern theoretical work in elementary particle physics and the quantum many-body problem. He has made highly original and important contributions to an astonishing range of topics, from number theory to adaptive optics. His current research tries to answer the question of whether any conceivable thought-experiment could detect a single graviton.



### Peter Goldreich

*Professor Emeritus* · Astrophysics

Peter Goldreich has made profound and lasting contributions to planetary science and astrophysics, providing fundamental theoretical insights for understanding the rotation of planets, the dynamics of planetary rings, pulsars, astrophysical masers, the spiral arms of galaxies, oscillations of the sun and white dwarfs, turbulence in magnetized fluids, and planet formation. His current research is focused on the production of impact spherules.







## *Members and Visitors*

### Prashanth AK

*Biology* · Institute for Advanced Study
*Helen and Martin Chooljian Founders' Circle Member*

Prashanth AK's research program aims to elucidate general principles underlying complex behavior of biological systems. He focuses on how DNA structural properties (specifically, destabilization of the DNA duplex) determine fundamental biological mechanisms by examining the interaction of such properties with other biological features to mediate biological system-level behavior.

### Luis Fernando Alday

*Particle Physics* · Institute for Advanced Study
*Funding provided by the United States Department of Energy*

Luis Fernando Alday is mainly interested in topics related to the string/gauge theory correspondence. By means of the correspondence, he is planning to gain a better understanding of gauge theory scattering amplitudes as well as gravitational objects, such as black holes.

### Thomas Banks

*High-Energy Theoretical Physics, Cosmology* · University of California, Santa Cruz, and Rutgers, The State University of New Jersey · *f*
*Funding provided by The Ambrose Monell Foundation*

Most of Thomas Banks's recent research has been devoted to his ideas of connecting the scale of supersymmetry breaking to the cosmological constant. He will also study finite dimensional noncommutative geometries in the context of the holographic theory of space-time and may also return to the study of Regge behavior in conformal field theory.

### Daniel Baumann

*Cosmology, Astrophysics, String Theory* · Institute for Advanced Study
*William D. Loughlin Member; additional funding provided by the National Science Foundation*

Daniel Baumann's work on the microscopic origin of inflation in string theory remains one of his primary research interests. In addition, he works on a wide range of topics in theoretical physics and cosmology with the aim to provide contact between modern ideas in fundamental particle theory and cosmological observations.

### Vladimir Belyi

*Biology* · Institute for Advanced Study · *m*
*Martin A. and Helen Chooljian Member in Biology*

Vladimir Belyi is interested in the study of genome evolution, structure-sequence relation, and optimization of genomic code. While at the Institute, he will be working on combining tools of statistical mechanics and comparative genomics to test for novel gene functions, look for pressures associated with genetic drift, and study evolution of the transcriptional regulation.

*f* First Term · *s* Second Term · *m* Long-term Member
*v* Visitor · *vp* Visiting Professor · *j* Joint Member School of Mathematics

**David E. Berenstein**
*High-Energy Theoretical Physics* · University of California, Santa Barbara · *f*

David Berenstein's work deals primarily with the understanding of gravitational holography: how gravity in higher dimensions can be encoded in quantum field theories in low dimensions. In particular, he is interested in understanding the emergence of higher dimensional geometry from collective phenomena in quantum field theories.

**Simon Caron-Huot**
*Mathematical Physics, Statistical Mechanics, String Theory, Supersymmetry* · Institute for Advanced Study
*Funding provided by the National Science Foundation*

Simon Caron-Huot is studying very hot and dense systems such as the quark-gluon plasma and is also interested in gravitational, especially black hole, physics.

**Chang Chan**
*Biology* · Institute for Advanced Study
*Charles L. Brown Member in Biology*

Chang Chan is interested in the use of mathematics to analyze large datasets toward the goal of understanding the genetics of human diseases. Two diseases he is focusing on are autism and cancer. He is also interested in the regulation of microRNAs and the role they play in diseases.

**Simona Cocco**
*Biology* · Laboratoire de Physique Statistique, École Normale Supérieure, Paris

Simona Cocco works on statistical mechanics applied to inverse problems related to biophysical systems. Two examples are the extraction of information on the DNA sequence from the mechanical separation of the complementary strands and the inference of the couplings between neural cells from their spiking activity observed in multielectrode recordings.

**Nathaniel Craig**
*Particle Physics* · Institute for Advanced Study
*Funding provided by the National Science Foundation*

Nathaniel Craig's research concerns high-energy theoretical physics. He is principally interested in studying connections between quantum field theory, string theory, and particle phenomenology, with an eye toward their potential experimental signatures.





**Tudor Dan Dimofte**
*Mathematical and Particle Physics* · Institute for Advanced Study · *s*
*Funding provided by the National Science Foundation*

Tudor Dan Dimofte studies various topics in string theory and quantum field theory, ranging from quantum states of black holes to dynamics of gauge theories. He is interested in building new, mutually beneficial connections between physics and mathematics, especially in the fields of algebraic geometry and knot theory.

**Subo Dong**
*Astrophysics* · Institute for Advanced Study
*Funding provided by the National Aeronautics and Space Administration, Exoplanet Science Institute, Carl Sagan Fellowship Program*

Subo Dong works on extrasolar planet searches with gravitational microlensing. While at the Institute, he plans to develop new numerical techniques for interpreting microlensing observations, as well as explore the frequency and distribution of planets. He also hopes to study other areas of astrophysics with an emphasis on dynamics.

**Anatoly Dymarsky**
*Cosmology, String Theory, Supersymmetry, Particle Physics* · Institute for Advanced Study
*Funding provided by the United States Department of Energy*

Anatoly Dymarsky's research is primarily focused on the gauge/string theory correspondence that provides a novel approach to address long-standing open questions in field theory. He is planning to apply this technique while working on the contemporary problems of cosmology and particle physics.

**Henriette Elvang**
*Theoretical Physics* · University of Michigan · *f*
*Funding provided by the United States Department of Energy*

Henriette Elvang works in theoretical physics, in particular gravity and quantum field theory. At the Institute, she is interested in continuing her current work on black holes, supersymmetric gauge theories, and supergravity, while also broadening into new areas of research.

**Rodrigo Fernandez**
*Astrophysics* · Institute for Advanced Study
*Funding provided by the National Aeronautics and Space Administration, Einstein Fellowship Program*

Rodrigo Fernandez is interested in theoretical astrophysics at the stellar scale, with a focus on using numerical simulations to understand complex systems. His current research topics include the explosion mechanism of core-collapse supernovae and the physics of neutron stars.

**Guido Festuccia**
*High-Energy Theoretical Physics* · Institute for Advanced Study
*Funding provided by the National Science Foundation*

Guido Festuccia's primary interest is quantum field theory. Recently he has worked on supersymmetry, its breaking, and applications to particle physics phenomenology. He also plans to study the correspondence between string and gauge theory, particularly its consequences for black hole physics.

**Patrick Fox**
*Particle Physics* · Fermilab · *f*

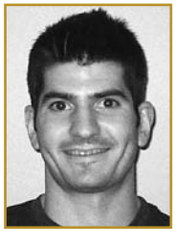
Patrick Fox's research is focused on understanding models of new physics that may soon be discovered at various collider experiments. He is also interested in testing these models using astrophysics and cosmology.

**Matthias Gaberdiel**
*String Theory* · Eldgenössische Technische Hochschule Zürich · *f*
*Funding provided by The Ambrose Monell Foundation*

Matthias Gaberdiel is interested in conformal field theory and its application to string theory. More specifically, he intends to work on aspects of the AdS/CFT correspondence.

**Davide Gaiotto**
*Particle Physics* · Institute for Advanced Study · *m*
*Roger Dashen Member; additional funding provided by the National Science Foundation*

The semiclassical description of black holes in quantum gravity predicts some surprising facts and some sharp contradictions. String theory potentially provides a detailed explanation of both. At the Institute, Davide Gaiotto will continue his work on black hole physics and join the investigations of the surprising connections to field theory.

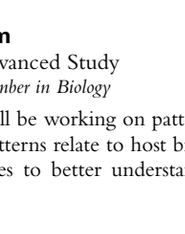


**Daniel Green**
*Cosmology, String Theory, Supersymmetry, Phenomenology, Mathematical Physics, Statistical Mechanics* · Institute for Advanced Study
*Funding provided by the United States Department of Energy*

Daniel Green's research concerns quantum field theory and string theory. He is interested in both the formal developments of these fields and their connections to particle physics and cosmology. He is currently interested in nonperturbative solutions to theoretical problems in both particle physics and cosmology.

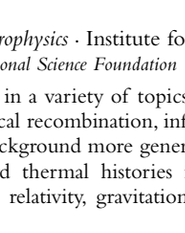






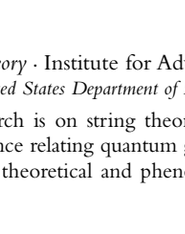
**Benjamin Greenbaum**
*Biology* · Institute for Advanced Study
*Eric and Wendy Schmidt Member in Biology*

Benjamin Greenbaum will be working on patterns in the evolution of viruses and how those patterns relate to host biology. Specifically, he is interested in using viruses to better understand the innate immune system.



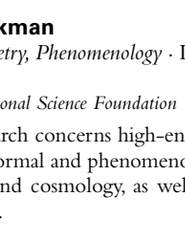
**Daniel Grin**
*Cosmology, Theoretical Astrophysics* · Institute for Advanced Study
*Funding provided by the National Science Foundation*

Daniel Grin is interested in a variety of topics in theoretical cosmology, including cosmological recombination, inflationary perturbations, the cosmic microwave background more generally, axions, dark matter halo profiles, nonstandard thermal histories for the early universe, modifications to general relativity, gravitational lensing, and Lyman limit absorbers.



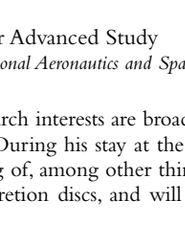
**Thomas Hartman**
*Particle Physics, String Theory* · Institute for Advanced Study
*Funding provided by the United States Department of Energy*

Thomas Hartman's research is on string theory, black holes, and the holographic correspondence relating quantum gravity to gauge theory. He is interested in both theoretical and phenomenological questions in quantum gravity.



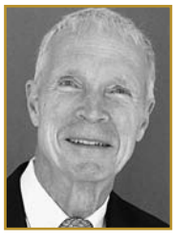
**Jonathan Jacob Heckman**
*String Theory, Supersymmetry, Phenomenology* · Institute for Advanced Study
*Funding provided by the National Science Foundation*

Jonathan Heckman's research concerns high-energy theoretical physics. He is interested in both formal and phenomenological aspects of string theory, particle physics, and cosmology, as well as potential interrelations between these areas.



**Tobias Heinemann**
*Astrophysics* · Institute for Advanced Study
*Funding provided by the National Aeronautics and Space Administration and the National Science Foundation*

Tobias Heinemann's research interests are broadly in the field of astrophysical fluid dynamics. During his stay at the Institute, he intends to further the understanding of, among other things, wave dynamics and dynamo processes in accretion discs, and will do so from an applied mathematics perspective.



### John J. Hopfield

*Biology* · Princeton University · *vp*

Physical systems with a large number of simple interacting parts typically exhibit robust collective dynamics. Brains are large systems whose cellular properties and interactions have evolved to yield activity dynamics that solve computational problems relevant to survival. John Hopfield's current research examines issues such as "thinking" and "perception" in the intersection between these two ideas.

### Daniel Louis Jafferis

*Particle Physics* · Institute for Advanced Study

*Funding provided by the United States Department of Energy*

Daniel Jafferis works on string theory, quantum field theory, and quantum gravity. His research has focused on the string/gauge theory correspondence, the conformal field theory on M2 branes, and counting supersymmetric states in field theory and supergravity.

### Boaz Katz

*Astrophysics* · Institute for Advanced Study · *m*

*Funding provided by the National Aeronautics and Space Administration, Einstein Fellowship Program*

While at the Institute, Boaz Katz plans to work on various problems within the field of high-energy astrophysics. In particular, he intends to continue his study of the early emission from supernovae and the origin of cosmic rays.

### Zohar Komargodski

*String Theory, Supersymmetry, Phenomenology* · Weizmann Institute of Science · *m*

*Funding provided by the National Science Foundation*

Zohar Komargodski's research concerns quantum field theories. He is interested in their connection to string theory and to particle physics phenomenology. In particular, he intends to work on supersymmetry and its breaking.

### Vinod Krishna

*Biology* · The University of Texas Southwestern Medical Center

Vinod Krishna is generally interested in understanding the relationship between protein structural dynamics, sequence, and function. In particular, his work attempts to explain the structural mechanisms of allosteric regulation in proteins and to infer the relationship between sequence, structure, and function through an analysis of sequence statistics and common structural features shared within protein families.

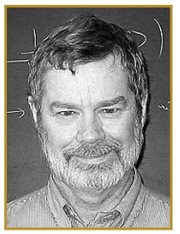
*f* First Term · *s* Second Term · *m* Long-term Member
*v* Visitor · *vp* Visiting Professor · *j* Joint Member School of Mathematics



Institute for Advanced Study

Members and Visitors

School of Natural Sciences



### Paul Langacker

*Particle Physics* · Institute for Advanced Study · *m*

*Funding provided by the National Science Foundation*

Paul Langacker will explore the physics implications of concrete string constructions. This will include possibilities for extended gauge, Higgs, fermion, and quasi-hidden sectors for collider physics, and nonstandard mechanisms for generating neutrino mass. He is also completing an advanced textbook on "The Standard Model and Beyond."

### Ning Lei

*Biology* · Institute for Advanced Study

*Qiu Shi Science and Technologies Foundation Member*

Autism is a clinically and etiologically heterogeneous developmental disorder. Genetics plays a major role in the etiology of autism as evidenced from twin and family studies. Ning Lei is carrying out a family-based association study using the Autism Genetic Resource Exchange database to identify specific genes with a major effect on disease risk.

### Albert Libchaber

*Biology* · The Rockefeller University · *vp*

Albert Libchaber studies mathematical patterns in biology at the molecular, cellular, and organismal levels. His work examines RNA molecular structure; the minimal conditions needed to produce an artificial cell; and the interactions and dynamics between organism and environment, including the effects of moving boundary conditions on fluid flow.

### Marilena LoVerde

*Cosmology, Astrophysics* · Institute for Advanced Study

*Martin A. and Helen Chooljian Member; additional funding provided by the National Science Foundation*

Marilena LoVerde is interested in all topics related to the origin and evolution of structure in the universe. At the Institute, she plans to develop techniques to study gravitational lensing and non-Gaussianity and to explore astrophysical probes of fundamental physics.

### Elke Katrin Markert

*Biology* · Institute for Advanced Study

Elke Markert's research background is in algebraic topology, where she has been studying structures emerging from mathematical quantum field theory. She is working on the analysis of higher-level structures in biological systems using the mathematical framework of hyperstructures. She will also begin to study the influence of gene regulation in cancer and other diseases.

*f* First Term · *s* Second Term · *m* Long-term Member
*v* Visitor · *vp* Visiting Professor · *j* Joint Member School of Mathematics

**Guowu Meng**
*Mathematical Physics* · The Hong Kong University of Science and Technology · *j*
*Qiu Shi Science and Technologies Foundation Member*

Guowu Meng discovered a vast family of super-integrable models that resemble the Kepler problem. He has explored the connection of these models with symmetric domains, Jordan algebras, and theta-correspondences. He will continue (and possibly expand) this exploration during his stay at the Institute.

**Rémi Monasson**
*Biology* · Laboratoire de Physique Théorique, École Normale Supérieure, Paris

Rémi Monasson is studying computational problems in biological systems using tools from the statistical physics of disordered systems and statistical infere

**Arvind Murugan**
*Biology* · Institute for Advanced Study

Arvind Murugan plans to work on problems in biophysics, from problems involving the thermal nature of biochemistry to evolution and population dynamics.

**Asad Naqvi**
*Biology* · Swansea University

Asad Naqvi's research background is in string theory, where he has been recently studying aspects of the gauge/gravity duality at finite temperature. At the Institute, he plans to use his background in physics and mathematics to study problems in systems biology.

**Rafael A. Porto**
*Theoretical Physics* · Institute for Advanced Study

Broadly speaking, Rafael Porto is a theoretical physicist working on the fundamental and observational aspects of gravity and quantum field theory. His interests include black holes, gravitational waves, cosmology, high-energy physics, and all the connections between them.



Institute for Advanced Study

*Members and Visitors*

School of Natural Sciences

**Hanno Rein**
*Theoretical Astrophysics* · Institute for Advanced Study
*Funding provided by the National Aeronautics and Space Administration and the National Science Foundation*

Hanno Rein is studying the formation and evolution of planetary systems. During his stay at the Institute, he intends to work on analytic models and large-scale numerical simulations to explain the dynamical configuration of exoplanets and our own solar system.

**Soo-Jong Rey**
*String Theory, High-Energy Theoretical Physics* · Seoul National University

Soo-Jong Rey is studying fundamental quantum gravitational questions in string theory; open theoretical questions in high-energy physics; the interplay between string or M-theory and quantum field theories; and string or M-theoretic and field theoretic methods to open problems in condensed matter and cosmological physics.

**Douglas Richstone**
*Astronomy* · University of Michigan
*Corning Glass Works Foundation Fellow*

Douglas Richstone's interests include stellar dynamics; galaxy structure, formation, and evolution; and measuring black hole masses at the centers of galaxies. He expects to continue that work at the Institute and to think about electromagnetic signatures of black hole mergers.

**Philip Schuster**
*Particle Physics* · Perimeter Institute for Theoretical Physics · *s*
*Funding provided by the United States Department of Energy*

Over the next year, the Large Hadron Collider, satellite, and new low-energy experiments will provide valuable data that we can use to probe the weak scale, dark matter, and weakly coupled forces. Philip Schuster's primary focus while visiting the Institute is to explore promising theories of nature as these experiments reveal evidence for new physics.

**Tracy Slatyer**
*Particle Physics, Astrophysics* · Institute for Advanced Study
*Funding provided by the United States Department of Energy and the National Science Foundation*

At the Institute, Tracy Slatyer will continue her work on novel models of dark matter and their astrophysical and cosmological consequences. She is also interested in model-building and experimental probes for physics beyond the Standard Model more generally, and in exploring new research directions in high-energy theoretical physics.

*f* First Term · *s* Second Term · *m* Long-term Member
*v* Visitor · *vp* Visiting Professor · *j* Joint Member School of Mathematics

**Aristotle Socrates**
*Astrophysics* · Institute for Advanced Study
*John N. Bahcall Fellow; additional funding provided by the Corning Glass Works Foundation Fellowship and the National Science Foundation*

Aristotle Socrates is interested in high-energy astrophysics, particularly the physical processes that underlie accretion onto black holes and neutron stars. He plans to further explore the effects of cosmic ray production on the mass and luminosity of galaxies and their respective black holes, as well as study the tidal and thermal evolution of extrasolar giant planets.

**Marcus Spradlin**
*Theoretical Physics* · Brown University · *s*

Marcus Spradlin studies the application of string theory to problems in quantum field theory and gravitational physics. At the Institute, he will continue his recent work exploring the rich mathematical structure of scattering amplitudes in gauge theory and gravity.

**Rashid Sunyaev**
*Astrophysics* · Max-Planck-Institut für Astrophysik · *vp*
*Maureen and John Hendricks Visiting Professor*

Rashid Sunyaev has made major contributions in the fields of physical cosmology and high-energy astrophysics. His current research interests include the cosmological recombination of hydrogen and helium, the physics of gas accretion onto neutron stars and black holes, the problem of matter and radiation interaction under extreme astrophysical conditions.

**Yuji Tachikawa**
*Mathematical and Particle Physics* · Institute for Advanced Study · *m*
*Marvin L. Goldberger Member; additional funding provided by the National Science Foundation*

Yuji Tachikawa continues his study of the dynamics of gauge theories and gravity in the presence of eight and more supercharges, both from a purely field-theoretical perspective and from the point of view of string duality. He is also interested in various geometrical structures that naturally accompany these theories.

**Natalia Toro**
*Particle Physics* · Perimeter Institute for Theoretical Physics · *s*
*Funding provided by the United States Department of Energy*

Natalia Toro's interests include the data-driven study of fundamental interactions and the nature of dark matter. In particular, she is leading an experiment at Jefferson Lab searching for very weak forces, and she is developing techniques for learning about TeV-scale physics from Large Hadron Collider data.





**Christopher Tully**
*Experimental Particle Physics* · Princeton University
*IBM Einstein Fellow*

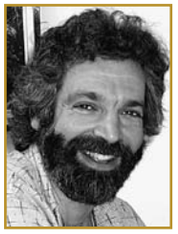
Christopher Tully's research focuses on experimental searches for new physics at high-energy colliders, including the Large Hadron Collider, the Tevatron, and the Large Electron-Positron collider. He is also investigating signatures of supersymmetry, Higgs boson production, leptoquarks, and newly predicted phenomena such as lepton jets originating from a hidden sector.

**Alexei Vazquez**
*Biology* · The Cancer Institute of New Jersey · *v*

At the Institute, Alexei Vazquez will continue to work on developing statistical frameworks to analyze large biological datasets and understanding the organization of biological systems. He will also study the metabolism of cancer cells.

**Anastasia Volovich**
*High-Energy Theory* · Brown University · *s*

Anastasia Volovich's research focuses on string theory and related areas in particle physics, general relativity, and mathematics.



**Martin D. Weinberg**
*Astrophysics* · University of Massachusetts · *f*

Martin Weinberg is studying the physics driving the evolution of galaxies, with emphasis on multiscale evolution and the galactic environment. His current interests include Direct Simulation Monte Carlo studies of multiphase gas and strategies for scientific understanding.

**Neal Weiner**
*Particle Physics* · New York University
*Funding provided by The Ambrose Monell Foundation*

Neal Weiner is studying new phenomena beyond the Standard Model. Of late, his research has focused on dark matter and collider physics, but other areas of interest include neutrino physics, dark energy, cosmic rays, supersymmetry, and extra dimensions.

*Members, Visitors, and Research Staff*

**Amit Pratap Singh Yadav**
*Cosmology, Astrophysics* · Institute for Advanced Study
*Funding provided by the National Aeronautics and Space Administration and the National Science Foundation*

Amit Yadav's research focuses on the Cosmic Microwave Background (CMB) temperature and polarization, and the early universe. Specific topics of his research include connecting primordial non-Gaussian signatures in CMB to specific classes of inflationary models, weak gravitational lensing, and extracting primordial B-modes.

*f* First Term · *s* Second Term · *m* Long-term Member
*v* Visitor · *vp* Visiting Professor · *j* Joint Member School of Mathematics







# School of Social Science

Administrative Officer: Donne Petito

Founded in 1973, the School of Social Science at the Institute for Advanced Study takes as its mission the analysis of societies and social change. It is devoted to a multidisciplinary, comparative, and international approach to social research.

Professors of the School have participated actively in the most important contemporary debates about the meaning of the "interpretive turn" in anthropology, history, and political theory; about the centrality of culture, language, ritual, and moral understandings in the study of society; about the character and direction of social change; and about the explanatory power of rational choice in the analysis of political decision-making and economic exchange. Although each is rooted in his or her own discipline, all do work that transcends disciplinary boundaries.

The School operates under the guiding principles of informality and collegiality and with a shared understanding that the social sciences are not to be narrowly defined. Each year, the School brings together scholars from various fields—including political science, economics, law, psychology, sociology, anthropology, history, philosophy, and literary criticism—to examine historical and contemporary problems.

In an attempt to create a sense of community among the Members, the School designates an annual theme, which is neither exclusive nor excluding. The theme for the 2010–11 academic year, under the direction of Joan Wallach Scott, Harold F. Linder Professor in the School, is "Secularism." In the light of what, for many, is being defined as a world-wide resurgence of religiosity both as a spiritual and political force, attention has been drawn to the question of the secular. Although the question of secularism is a broad one, recent discussions have focused on Islam, on its compatibility with the practice of state religious neutrality; on the assimilability of Muslim minorities in the nominally secular nations of Western Europe; and on the relationship between democratic elections and the coming to power of Islamic religious parties in North Africa and the Middle East.

**Danielle S. Allen**
*UPS Foundation Professor*

Danielle Allen is a political theorist who has published broadly in democratic theory, political sociology, and the history of political thought. As a democratic theorist and historian of political thought, she investigates core values such as equality, non-domination or freedom, and trustworthiness. As a political sociologist, she analyzes relations among legal structures, political values, and power dynamics, as well as foundational practices such as punishment, deliberation, opinion formation, and citizenship generally. She is currently working on books on the Declaration of Independence, citizenship in the digital age, and education and equality.

**Didier Fassin**
*James D. Wolfensohn Professor*

Didier Fassin, an anthropologist and a sociologist, trained as a physician in internal medicine and public health. He dedicated his early research to medical anthropology, illuminating important issues about the AIDS epidemic, social inequalities in health, and the changing landscape of global health. More recently, he has developed a new domain of inquiry he terms "political and moral anthropology," analyzing the reformulation of injustice and violence as suffering and trauma, the expansion of an international humanitarian government, and the contradictions in the contemporary politics of life. His present project explores the political and moral treatment of disadvantaged groups, including immigrants and refugees, through an ethnography of police, justice, and prison.

**Eric S. Maskin**
*Albert O. Hirschman Professor*

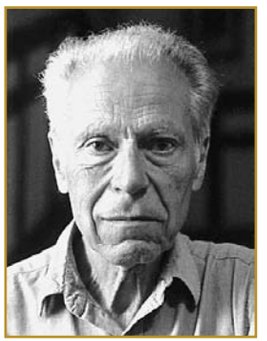
Eric Maskin is probably best known for his work on the theory of mechanism design, for which he shared the 2007 Nobel Memorial Prize in Economics. He has made contributions to many other areas of economics as well, including game theory, social choice theory, and political economy.





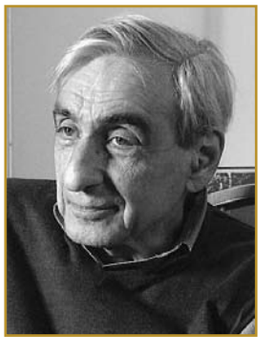
**Joan Wallach Scott**
*Harold F. Linder Professor*

Joan Scott's groundbreaking work has challenged the foundations of conventional historical practice, including the nature of historical evidence and historical experience and the role of narrative in the writing of history. Her recent books have focused on the vexed relationship of the particularity of gender to the universalizing force of democratic politics. More broadly, the object of her work is the question of difference in history: its uses, enunciations, implementations, justifications, and transformations in the construction of social and political life.



**Albert O. Hirschman**
*Professor Emeritus*

During his retirement years, Albert Hirschman continued to work and write on problems of economic development in Latin America as well as on more general social-science subjects. Lately, health problems have forced him to retire from active academic work.



**Michael Walzer**
*Professor Emeritus*

One of America's foremost political thinkers, Michael Walzer has written about a wide variety of topics in political theory and moral philosophy, including political obligation, just and unjust war, nationalism and ethnicity, economic justice, and the welfare state. In addition to writing frequently about war and terrorism, he is currently addressing questions of pluralism, ethnicity, cultural rights, and multiculturalism. He continues to work on volumes three and four of a major collaborative project focused on the history of Jewish political thought.

**Gil Anidjar**
*Religion* · Columbia University

Gil Anidjar's interest in medieval Spain and Arab Jewish letters expanded into a study of political theology, of "the enemy's two bodies." Out of something that would improperly be called a "semitic" perspective, he seeks lines of continuities and transformations in and of the Christian West, the possibility of a critique of Christianity.

**Markus K. Brunnermeier**
*Economics* · Princeton University · *v*

Markus Brunnermeier's economic research focuses on financial crisis, bubbles, and significant mispricings due to institutional frictions, strategic considerations, and behavioral trading. During his visit at the Institute, he will study the impact of financial frictions on the macroeconomy.

**Rita Chin**
*History* · University of Michigan
*Frederick Burkhardt Fellowship funded by the American Council of Learned Societies*

Rita Chin is examining how leftist intellectuals, political parties, and grassroots organizations in Germany, Britain, and France have wrestled with the question of "difference" as raised by millions of postwar migrants. Tracing this history of engagement with race and immigration, she seeks to explain why some leftists now doubt the viability of multiethnic coexistence in contemporary Europe.

**E. Gabriella Coleman**
*Anthropology* · New York University
*Ginny and Robert Loughlin Founders' Circle Member*

Gabriella Coleman is finishing a book, "Coding Freedom: The Pleasures and Ethics of Computer Hacking," that examines the intersections between liberalism, pleasure, and free and open-source software production. She has also started a project on hacker protests against the Church of Scientology and the role of disability in computer hacking.

**James W. Cook**
*History* · University of Michigan · *v*

James Cook is completing a book on African-American performers and the making of global mass culture. At the center of the story is a major surprise: many decades before the Harlem Renaissance, African-American performers became major stars across much of the United States, Europe, the Caribbean, and the Pacific.





**Kathleen Davis**
*Literature* · University of Rhode Island

Kathleen Davis's research suggests that the claim to separate out the "religious" and the "secular" is above all a bid for sovereignty, one that the narrative of periodization often obscures. Her current project turns to the history of natural rights, which is likewise inflected by the narrative of periodization and the politics it serves.

**Geoffroy de Clippel**
*Economics* · Brown University
*Deutsche Bank Member*

Geoffroy de Clippel aims to better understand cooperation in situations where the participants do not share the same information by extending the axiomatic theory of social choice, and understanding the meaning of egalitarianism and its variants under asymmetric information. He will then apply the resulting selection criteria to classical problems in economics and political science.

**Amrita Dhillon**
*Economics* · University of Warwick
*Roger W. Ferguson, Jr. and Annette L. Nazareth Member*

Amrita Dhillon is studying how markets and institutions interact, specifically how formal and informal contract enforcing institutions interact with each other as well as informal (reputation based) methods of contract enforcement when legal institutions are weak, e.g., in the sovereign debt context and in the recruitment of labor in low end markets.

**Avinash Dixit**
*Economics* · Princeton University · *v*

Avinash Dixit constructs game-theoretic models of the design and functioning of institutions that govern economic activity, especially international trade and investment, economic growth, and development. Currently, he is examining purposive formation of pro-social preferences, asking how far this can resolve dilemmas of collective action including social insurance and climate change.

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

James Doyle is working on a book on Plato's *Gorgias*. This will give an analysis of the main arguments of the dialogue, and an account of the use to which Plato puts the dialogue form, as leveling an implicit critique of Socrates' conception of philosophical method and his associated doctrine of "intellectualism."

**Tanya Erzen**
*Religion* · The Ohio State University

Tanya Erzen is studying faith-based forms of imprisonment in the United States, how and why an increasingly punitive system of incarceration and programs of religious discipline and transformation converge in the present, how men and women practice religion in the coercive spaces of prison, and the broader implications for faith-based policy in the United States.

**Henry S. Farber**
*Economics* · Princeton University · *v*

Henry Farber is working on several projects: the impact of declining job security and the recession on the shape of careers and the advancement of workers; the effect of liquidity constraints on labor supply with application to New York City taxi drivers; and appeals of U.S. federal district court cases to the U.S. circuit courts of appeals.

**Mayanthi L. Fernando**
*Anthropology* · University of California, Santa Cruz

Mayanthi Fernando is working on a book on contemporary Muslim piety and French secularity (*laïcité*). It analyzes emergent pious-Muslim ethical and political subjectivities as well as tensions within *laïcité* that emerge in its encounter with Islam, tensions that are deferred onto Muslim citizens who are put at risk as viable ethical and political subjects.

**Martin Gilens**
*Political Science* · Princeton University
*Richard B. Fisher Member*

Martin Gilens is examining the interplay of public preferences, social and political contexts, and government policy in the United States, particularly how representational inequalities in responsiveness to the preferences of more and less advantaged citizens are mediated by factors like state campaign finance regulations, partisan polarization, and the degree of party competition.

**Manu Goswami**
*History* · New York University
*The Wolfensohn Family Member*

Manu Goswami is researching the nature and trajectory of internationalism in interwar colonial India and Britain. Her book seeks to show how and why internationalism animated a range of intellectual projects, achieved a genuinely global purchase, and garnered an intensity of lived attachment comparable only to modern nationalism.



INSTITUTE FOR ADVANCED STUDY

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SCHOOL OF SOCIAL SCIENCE

**Kimberly Hart**
*Anthropology* · Buffalo State College

Kimberly Hart's research is on the dichotomy between secularism and Islam in rural western Turkey. Ethnographically, her work will demonstrate how by combining and synthesizing practices, villagers raise questions about the relationship between secularism and state constructions of religion, contemporary transformations in orthodoxy, and interpretations of the Ottoman past.

**Mark Hewitson**
*History* · University College London

Mark Hewitson is studying German images and experiences of conflict between 1806–1968 and investigating the tension between the persistent, supposedly heroic, and increasingly unlimited use of violence abroad and the expanding regulation and prohibition of violent acts and killing at home.

**Sheena Kang**
*Political Theory* · The University of Chicago · *a*

Sheena Kang is interested in the relationship between language and politics, especially the role of official apologies in addressing historic injustice. She will explore themes such as recognition, responsibility, and political forgiveness in looking at states' willingness or reluctance to apologize.

**Cécile Laborde**
*Political Science* · University College London
*Funding provided by the Florence Gould Foundation Fund*

Cécile Laborde plans to write a book that will assess the cogency of the philosophy of secularism, understood as implying a form of political agnosticism (or "neutrality") toward conceptions of the good life. The central question that she aims to address is whether the secular state can avoid being biased against religion.

**Tomoko Masuzawa**
*History* · University of Michigan

Tomoko Masuzawa is examining the legacy of William Robertson Smith (1846–94), the celebrated Biblical scholar, Arabist, mathematician, and encyclopedist. His heresy trial in the tribunal of the Free Church of Scotland marked an important moment in the advent of academic secularity, with a broad implication to the study of religion.

**Stelios Michalopoulos**
*Economics* · Tufts University
*Deutsche Bank Member*

Stelios Michalopoulos is examining how the Muslim world's highly unequal agricultural endowments have determined the economic principles embedded in the Islamic religious doctrine. He aims to use the geographical origins of Islam to enhance understanding of the emergence, spread, and persistence of Islamic institutions and its implications for comparative economic development.

**Mohamed Nachi**
*Sociology* · Institut des Sciences Humaines et Sociales, Université de Liège

Mohamed Nachi's current interests bear on controversy issues, agreement, and compromise that underlie new forms of political regulation. The aim of his project is to study conceptions of justice in Islamic thought, beginning with the question: "What is justice in Islam?" He will discuss answers to this question in different domains, including theological (*kalâm*), philosophical, political, and legal ones.

**Steven T. Pierce**
*History* · The University of Manchester

Steven Pierce is considering the cultural history of corruption as an idiom for describing governmental conduct in Nigeria. Based on fieldwork in Hausa-speaking regions of northern Nigeria, his project locates corruption at the intersection between longstanding forms of political culture and the more recently imposed structures of the modern Nigerian state.

**Laura Secor**
*Journalist* · *v*

Laura Secor, an independent journalist who writes on the intersection of intellectual life and politics, is currently working on a book about Iran that will trace the intellectual history of Iran's democracy movement, from revolution to Islamic reform and beyond, through the lives of some of its protagonists.

**Rohini Somanathan**
*Economics* · University of Delhi
*Leon Levy Foundation Member*

Rohini Somanathan's research explores the mechanisms through which historically determined social identities influence the emergence of political institutions and through them determine present-day patterns of inequality. This includes studies on the shifting boundaries of caste identities in India and on racial segregation in the United States.



INSTITUTE FOR ADVANCED STUDY

*Members, Visitors, and Research Staff*

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**Jeffrey L. Stout**
*Religion* · Princeton University

Jeffrey Stout is finishing a book on the cinematic sacred, with attention to films by Brakhage, Capra, Dorsky, Hitchcock, Markopoulos, Ozu, and others. He is also beginning a skeptical study of the idea of a common, secular standpoint for public reasoning.

**Winnifred Fallers Sullivan**
*Religion and Law* · University at Buffalo, The State University of New York
*Friends of the Institute for Advanced Study Member*

Winnifred Sullivan studies the intersection of religion and law, particularly the phenomenology of modern religion as it is shaped in its encounter with law. During her year at the Institute, she will be working on a book about the public/private partnerships that regulate religion in the United States.

**Anna Sun**
*Sociology* · Kenyon College

Anna Sun is studying the changing boundaries between the secular and the religious. Using Confucianism as a case study, she argues that we need to reconsider the very definition of the "religious" and "secular" in order to understand the changing nature of religious life in modern societies, especially non-Western societies such as China.

**Judith Surkis**
*History* · The Minda de Gunzburg Center for European Studies, Harvard University

Judith Surkis is writing a book about how ideas of religious and sexual difference underwrote the plural and hierarchical juridical system that operated in colonial Algeria. Her project offers a new vantage from which to understand the entangled history of French and "Muslim" law.

**Yang Xiao**
*Philosophy* · Kenyon College · *v*

Yang Xiao's research focuses on the origin of the debate in early China between the first Confucians (Confucius and Mencius) and their Legalist critics (Shen Dao and Han Fei), and also discusses its implications in the current debates regarding the so-called "political Confucianism" in contemporary China.

# Program in Interdisciplinary Studies

The Program in Interdisciplinary Studies explores different ways of viewing the world, spanning a range of disciplines from physics—especially computational astrophysics, geology, and paleontology—to artificial intelligence, cognitive psychology, and philosophy. The program is headed by Professor Piet Hut.

## *Faculty*

**Piet Hut**
*Professor*

The focus of Piet Hut's research is computational astrophysics, in particular multiscale multiphysics simulations of dense stellar systems. In addition, he is actively involved in interdisciplinary explorations in the areas of cognitive science and philosophy of science centered around questions involving the nature of knowledge. In both areas he has recently started to explore the use of virtual worlds to enable remote online collaborative research through simultaneous "lab meetings" with colleagues from Europe, Japan, the United States, and elsewhere.

## *Visitors*

**Jeff Ames**
*Computer Science* · Genkii, Tokyo

Jeff Ames is interested in the potential of virtual worlds in education, to facilitate experiential learning and add an element of play, and in scientific research, especially for collaborative data visualization and simulation.

**Siobhan Roberts**
*Writer, journalist*

Siobhan Roberts is a Toronto-based science journalist and the author of *King of Infinite Space: Donald Coxeter, The Man Who Saved Geometry*, which won the 2009 Euler Prize. While at the Institute, she is completing the manuscript of her biography on Princeton mathematician John Horton Conway.







## *Visitors*

**Edwin Turner**
*Astrophysics* · Princeton University

Edwin Turner will be working on statistical biases and estimators for samples of exoplanets detected using various techniques; on the SEEDS project (Subaru exoplanet studies); and on implications of complexity in cellular automata systems for the limits of reductionism, as well as related topics in the philosophy of science.

# Director's Visitors

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

**Graham Farmelo**
*Writer; Adjunct Professor of Physics, Northeastern University; Bye-Fellow, Churchill College, University of Cambridge*

Graham Farmelo is working on his next book. Its theme is Winston Churchill's role in developing the first nuclear weapons and his relationship with his nuclear scientists and the American government, until he left office in 1955. Farmelo will also be taking the opportunity to visit the relevant archives in Washington, D.C.

**Paul Hodgson**
*Artist*

Paul Hodgson combines painting and photography to explore different kinds of uncertainty. Following a recent solo exhibition at Marlborough Fine Art in London, his work continues to examine the value of a subjective response, by placing both gestural painting and photographic material within a single picture.

**Fiona Maddocks**
*Writer*

Fiona Maddocks's research interests include the portrayal of women in opera and how that relates to score, libretto, historical source, and cultural background. She hopes to continue exploring aspects of this topic at a more extended level than the weekly demands of being chief music critic for *The Observer* permit.

**Tarik O'Regan**
*Composer; Fellow in Creative Arts, Trinity College, University of Cambridge*

Tarik O'Regan is completing a commission for Paul Hillier and the National Chamber Choir of Ireland: *Colloquy of the Ancients*, an hour-long chamber rendering for sixteen solo voices of the *Acallam na Senórach*, an important Middle Irish narrative dating from the twelfth century. The new work tours the United States in September 2011.

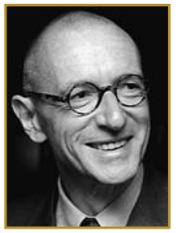






**Tom Phillips**
*Painter, writer, composer*

Tom Phillips will be working on a series of books he is doing with the Bodleian Library and attending the opening of his exhibition in New York but has never yet done quite what he had planned; for time at the Institute has always provoked new schemes and ideas.



**Ulrich Raulff**
*Director, Deutsches Literaturarchiv Marbach*

Ulrich Raulff is planning to write a history of the Institute for Advanced Study from its beginnings to the mid-sixties. He will make extensive use of the Institute's archives and research the papers of the "founding fathers" and the first two or three generations of fellows.

# Artist-in-Residence Program

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.

Composer and clarinetist Derek Bermel continues as Artist-in-Residence, organizing "The Harmonic Series," the 2010–11 Edward T. Cone Concert Series, while pursuing his scholarly and creative interests and developing major work.

**Derek Bermel**
*Composer, clarinetist, conductor, and jazz and rock musician*

Derek Bermel, who was nominated for a Grammy Award in 2010, will direct the Institute concert series and continue to arrange his music theater work "Golden Motors" with lyricist/librettist Wendy S. Walters. He will compose a new work for the Los Angeles Chamber Orchestra's 2010–11 season featuring Brazilian jazz singer Luciana Souza. He has completed a set of three études for the violinist Midori, to be premiered in October 2010 in San Francisco. In addition, a new disc of his music, recorded by the award-winning ensemble Alarm Will Sound, will be released in spring 2011.

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*SHS* School of Historical Studies · *SM* School of Mathematics · *SNS* School of Natural Sciences · *SSS* School of Social Science

INSTITUTE FOR ADVANCED STUDY



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