IAS

Institute for Advanced Study

Faculty and Members 2009–2010

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: Christine Ferrara

Institute for Advanced Study

Contents

Information contained herein is current as of September 21, 2009.

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.

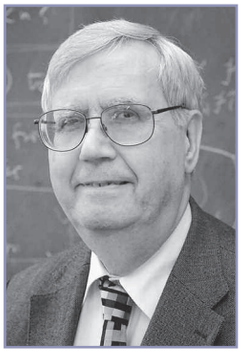
Abraham Flexner was succeeded as Director in 1939 by Frank Aydelotte, in 1947 by J. Robert Oppenheimer, in 1966 by Carl Kaysen, in 1976 by Harry Woolf, in 1987 by Marvin L. Goldberger, and in 1991 by Phillip A. Griffiths. In January 2004, Peter Goddard became the Institute's eighth Director.

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-nine 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 five thousand former Members hold positions of intellectual and scientific leadership in the United States and abroad. Some twenty-two Nobel Laureates and thirty-four out of forty-eight Fields Medalists, as well as many winners of the Wolf and MacArthur prizes, have been affiliated with the Institute.

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 over 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

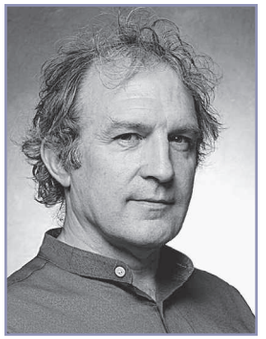
The School of Historical Studies was established in 1949 with the merging of the School of Economics and Politics and the School of Humanistic Studies. It bears no resemblance to a traditional academic history department, but rather supports all learning for which historical methods are appropriate.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

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

INSTITUTE FOR ADVANCED STUDY

SCHOOL OF HISTORICAL STUDIES

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 in the past decade, 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 · Western 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 theories of miracle in medieval theology and on the role of devotional objects in Christianity from the twelfth century to the early years of the sixteenth-century reformations.

Angelos Chaniotis *(from July 1, 2010)*
Professor · Ancient History

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 five books and some 150 articles and book contributions, and the editor of fifteen volumes, he works in innovative ways on a wide variety of topics: war, memory, identity, emotions, the communicative aspects of rituals, and strategies of persuasion in the ancient world. Significant questions and dialogues in the field have grown out of 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.

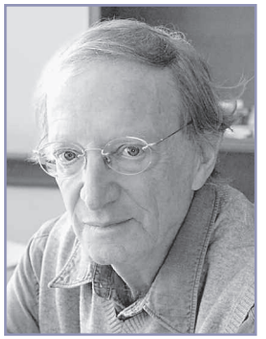
Nicola Di Cosmo
Luce Foundation Professor in East Asian Studies · East Asian Studies

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 the modern ideas of democracy, equality, toleration, freedom of the press, and individual freedom.

Faculty

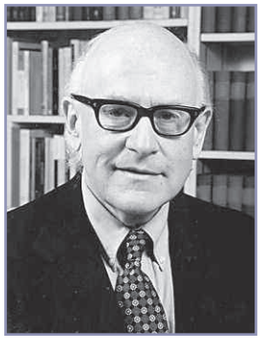


Avishai Margalit
George F. Kennan Professor · Philosophy and Modern International Relations

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.

Heinrich von Staden
Professor · Classics and History of Science

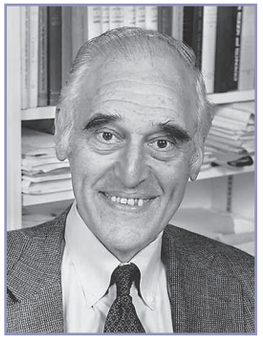
Heinrich von Staden has written on a variety of topics in ancient science, medicine, philosophy, and literary theory, from the fifth century BC to the fifth century AD. Drawing on a wide range of scientific, philosophical, and religious sources, he has contributed to the transformation of the history of ancient science and medicine, particularly of the Hellenistic period. His current projects include a book on Erasistratus (one of the two Hellenistic pioneers of human dissection), a study of the exegesis of scientific texts in antiquity, and further work on the "semantics of matter" in ancient science.



Glen W. Bowersock
Professor Emeritus · Ancient History

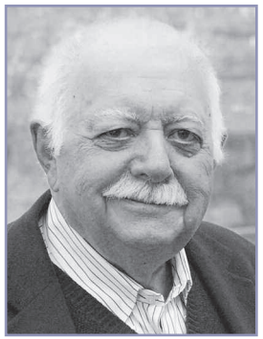
Glen W. Bowersock is an authority on Greek, Roman, and Near Eastern history and culture as well as the classical tradition in modern literature. The author of numerous important volumes and articles, he uses his exceptional knowledge of classical texts in many languages, together with inscriptions, coins, 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.

Faculty



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, and Renaissance Florence as seen through the case of Antonio Rinaldeschi. He has written over a hundred articles, most of which have been reprinted in five volumes, and is currently working on books on twelfth-century crusading and on the early history of Cluny.



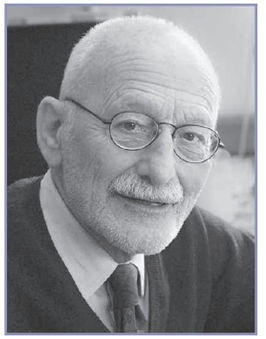
Oleg Grabar
Professor Emeritus · Islamic Art and Culture

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

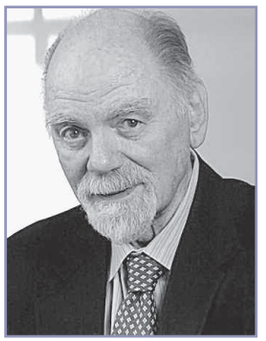
Christian Habicht is among the leading historians of the Hellenistic period. He is an authority on Greek epigraphy and on the history of Athens in the centuries between the fall of the Athenian Empire and the establishment of the Roman Empire. He is also the author of books on the cults of the Hellenistic kings, on the Maccabees, and on Pausanias, among others. For a new bilingual edition of Polybius soon to be published in six volumes by Harvard University Press he recently composed abundant historical notes.

Faculty



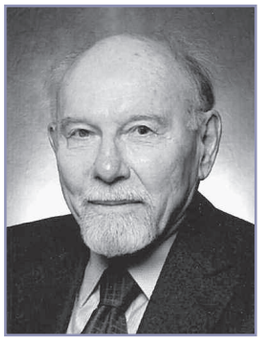
Irving Lavin
Professor Emeritus · Art History

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.



Peter Paret
Professor Emeritus · Modern European History

Peter Paret is both a cultural historian with a particular interest in the relationship of the arts to scholarship, ideology, and politics since the eighteenth century, and a historian of war, especially of military theory and of the manner in which early modern and modern historians have integrated war in their interpretation of other major historical forces. His next book, to appear this autumn, is an interdisciplinary and comparative case study of a Napoleonic campaign, shaped by the society, politics, arts, and military thought of the time, and influencing their further development in turn.



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.

John Baines
Egyptology · University of Oxford
Funding provided by The Andrew W. Mellon Foundation

John Baines works on elite self-presentation in ancient Egypt as manifested in ephemeral activities and enduring products. He is studying the shaping and depiction of the natural environment, biographical monuments, and inscriptions, exploring the interplay of the visual and written in expressing aspects of the social person.

Sandy Bardsley
Medieval History · Moravian College
George William Cottrell, Jr. Member

Sandy Bardsley will examine the effects of the fourteenth-century Black Death on gender systems in England. Some scholars have asserted that women experienced a "Golden Age" after the plague, while others have demurred. She hopes to assess both the resilience and the vulnerability of gender when faced with a large-scale demographic crisis.

Nicole Rachel Belayche
History of Religions (Roman World) · École Pratique des Hautes Études, Paris · *s*
Funding provided by The Andrew W. Mellon Foundation

Nicole Belayche's project is to examine the nature of new, original, and more complex forms of "religiosities" in Roman Anatolia, to assess the importance of their diffusion, to delineate their religio-cultural belongings, and to interpret their significance for the process of religious evolution during the first three centuries of our era.

Ruth Bielfeldt
Classical Art and Archaeology · Harvard University
Hetty Goldman Member

Ruth Bielfeldt plans to explore the notion of thing-enlivenment in Hellenistic and Roman antiquity. Her goal is to develop a new hermeneutic (i.e., phenomenological) approach to a "culture of the thing," drawing upon textual and visual sources, and the objects themselves. The focus is a group of domestic implements, which stand out because of their experimentation with figural, anthropomorphic, zoomorphic, and floral decoration.

Daniel Vernon Botsman
Japanese History · University of North Carolina at Chapel Hill · *s*
The Starr Foundation East Asian Studies Endowment Fund Member

Daniel Botsman's project examines the reception of Western ideas about freedom, slavery, and emancipation in Japan in the years following the Meiji Restoration of 1868 and the role that they played in reshaping Japanese society at the dawn of the modern era.

Alan C. Bowen
Classics, History of Science . Institute for Research in Classical Philosophy and Science, Princeton, New Jersey . *v*

Alan Bowen's research covers the history of the exact sciences (especially astronomy and harmonic science) in Greco-Roman antiquity. He is currently writing a monograph on Simplicius's commentary on Aristotle, *De Caelo* 2.10–12, and the historical significance of the digression on earlier astronomy.

Amy Nelson Burnett
Early Modern European History . University of Nebraska–Lincoln . *v, f*

Amy Burnett is working on an intellectual history of the eucharistic controversy from 1525–1549, focusing on the changing nature and content of the public debate as it spread outward from the centers of Wittenberg and Zurich. She will also be looking at measures introduced to inculcate new understandings of the Lord's Supper among the laity and to counter views deemed heretical.

Stephen George Burnett
Jewish History . University of Nebraska–Lincoln . *f*
Hans Kohn Member; additional funding provided by the Willis F. Doney Membership

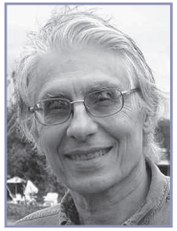
Stephen Burnett examines why Jewish learning became attractive and important to Christians during the Reformation era (ca. 1500–1660) and how it was used to meet Christian cultural and religious needs. He considers how the development of distinctly different Christian confessions during the Reformation (Catholic, Lutheran, and Reformed) affected the reception of Jewish thought and the Jewish-Christian relationship.

Kevin Clinton
Classics . Cornell University . *v, f*

Kevin Clinton will be working on an edition of one volume of the third edition of *Inscriptiones Graecae II* and the publication of an up-to-date monograph on the Eleusinian Mysteries.

Serena Connolly
Classics . Rutgers, The State University of New Jersey
Funding provided by The Andrew W. Mellon Foundation Fellowships for Assistant Professors

Serena Connolly's project is a book-length study of Cato's *Dicta*, a late Roman collection of maxims. She aims to demonstrate the value to Roman historians of using this overlooked source for reconstructing social history and to help scholars interested in its impressive *nachleben* understand better its original cultural context.



Frank Costigliola
International Relations · University of Connecticut
Funding provided by the National Endowment for the Humanities and The Andrew W. Mellon Foundation

Frank Costigliola's first aim is finishing a book that examines how personal politics and cultural perceptions and identities conditioned the emotions and the contingencies forming the Cold War. The second is launching a biography of George Kennan that focuses on his conflicted yearnings for community in the United States and in Russia.

Alexandra F. C. Cuffel
Medieval History · Macalester College · *v, s*

Alexandra Cuffel is analyzing the meanings that Jews, Christians, and Muslims in the medieval Mediterranean ascribed to the presence of the religious other at "shared" festivals and saints' shrines.

Yingcong Dai
Late Imperial China · William Paterson University of New Jersey · *f*
The Starr Foundation East Asian Studies Endowment Fund Member

Yingcong Dai is working on a book that examines the state's suppression war against a sectarian rebellion in China at the turn of the nineteenth century, the White Lotus Rebellion, and explores the "dynastic decline" of the Qing empire from the perspective of the conflict between the central government and the military elite.

Charles de Miramon
Medieval History · CNRS and École des Hautes Études en Sciences Sociales, Paris · *s*
Willis F. Doney Member

Charles de Miramon is working on a book about the intertwined growth of secular clergy and canon law in the twelfth century. He explores how new concepts and norms shaped the secular clerical identity and how canon law was perceived as a clerical public space.

Marilynn Robin Desmond
Medieval Studies · Binghamton University, State University of New York · *v, s*

While Greek texts of the Homeric epics did not circulate in the medieval West, the Troy story pervaded the textual traditions of Western Europe. Marilynn Desmond is examining the medieval traditions of the Troy story.

Emma Dillon
Musicology · University of Pennsylvania · *v, s*

Emma Dillon's research concerns medieval music, with a focus on French music of the thirteenth and fourteenth centuries and the history of nonmusical sound in the Middle Ages. At the Institute, she is exploring the emotional experience of music in medieval France and working on a book about the motet.

Fa-Ti Fan
Chinese History, History of Science · Binghampton University, State University of New York
Funding provided by the National Endowment for the Humanities; additional funding provided by the Willis F. Doney Membership

Fa-Ti Fan is currently working on two book projects: one examines the intersection of science, nation, and empire in China and Inner Asia, 1900s–1950s; the other investigates the relationships between science, earthquakes, and politics in communist China.

Marie Favereau-Doumenjou
History of the Mongol Empire, Islamic History · Institut Français d'Archéologie Orientale · *v*
Fulbright Visiting Scholar

Marie Favereau-Doumenjou is preparing a book in which she intends to gather all the texts produced by the Golden Horde Chancellery. She will give priority to the historical perspective by focusing on the production context of these documents. She hopes to highlight three essential components of the state structure: trade, diplomacy, and the tax system.

Carlos Fraenkel
History of Philosophy · McGill University
Martin L. and Sarah F. Leibowitz Member

Carlos Fraenkel will be completing a book on philosophical religions from Plato to Spinoza in which he examines a distinctive way of conceiving the relationship between reason, religion, and autonomy proposed by philosophers from antiquity to the early modern period, in particular Plato, Philo, Clement, Origen, al-Fârâbî, Averroes, Maimonides, and Spinoza.

Sarah Elizabeth Fraser
History of Chinese Art · Northwestern University
Frederick Burkhardt Fellowship funded by the American Council of Learned Societies

Sarah Fraser's research concerns transformative changes to Chinese painting through the collaborations of Zhang Daqian (1899–1983) and Tibetan artists. In her book-length study, Fraser is examining Zhang's ethnographic impulse and his efforts to invent a modern, purely "Chinese" form of expression through copies of Buddhist murals on the frontier.

Ginger Suzanne Frost
Modern British History · Samford University
Hans Kohn Member

Ginger Frost is a historian of the Victorian family in Britain. In addition to historical concerns, her work touches on studies of women, law, and childhood, and has included a book on breach of promise of marriage cases and one on cohabitation. Her current project focuses on the legal and social consequences of growing up illegitimate in England and Wales from 1860 to 1939.

David Michael Ganz
Medieval History, Latin Palaeography · King's College London · *f*
Hetty Goldman Member

David Ganz is investigating how Roman books were transformed into medieval books. He will use the evidence of surviving manuscripts to explore how classical Latin authors were copied and studied, and the creation of new kinds of text and new ways of presenting and understanding texts.

Jessica L. Goldberg
Medieval History · University of Pennsylvania
Funding provided by The Andrew W. Mellon Foundation Fellowships for Assistant Professors

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 profession depended on the connections between places.

Thomas Hegghammer
Middle Eastern Studies · Harvard University
William D. Loughlin Member

Thomas Hegghammer works on violent Islamist movements in the twentieth century. He is writing a book about the Islamist ideologue Abdallah Azzam (d. 1989) and the Arab involvement in the 1980s Afghan jihad. He will try to show that this unprecedented mobilization reflected a resurgence of pan-Islamism starting in the 1970s.

Sabine R. Huebner
Ancient History · Columbia University · *s*
Funding provided by The Herotodus Fund

Sabine Huebner is working on the completion of a cultural, social, and demographic history of household life cycles in Graeco-Roman Egypt.

Sarah Hutton
History of Philosophy · Aberystwyth University
The Gladys Krieble Delmas Foundation Member

Sarah Hutton is working on a history of seventeenth-century British philosophy. This will be a contextualized study of developments in British philosophy that will incorporate both marginal and "major" thinkers, acknowledging continuities in the thought of the period, as well as the changes.

Sandy Isenstadt
Art History · Yale University
Elizabeth and J. Richardson Dilworth Fellow in Historical Studies

Sandy Isenstadt is working on a project that concerns "electric modernism," which extends ideas of modernism in architecture to include the new perceptual settings and new visual habits that resulted from the spread of electric lighting in the early twentieth century.

Igor Khristoforov
Modern Russian History · Russian Academy of Sciences, Moscow
Felix Gilbert Member

Igor Khristoforov is currently working on a social and cultural history of aristocracy and its role in the construction of Russian modernity. His project focuses on the transformation of public and private behavior of traditional noble elite in the new political and social landscape of fin-de-siècle Russia.

Jinah Kim
Art History · Vanderbilt University
Funding provided by The Andrew W. Mellon Foundation Fellowships for Assistant Professors

Jinah Kim is examining the history of the Buddhist book-cult in South Asia, focusing on the cultural and historical significance of the Buddhist manuscripts as three-dimensional sacred objects. By examining the social and religious history woven from the illustrated manuscripts, she will also address an important historical question of how and why Buddhism disappeared in the land of its origin.

Inna Veniaminovna Kupreeva
Ancient Philosophy · The University of Edinburgh
The Gladys Krieble Delmas Foundation Member

The subject of Inna Kupreeva's current research is Aristotelian psychology in the second to third centuries, particularly the psychological writings of Alexander of Aphrodisias (fl. c. 200 CE) and their place in philosophical and medical tradition. She is studying the doctrinal and textual sources of his interpretation of Aristotle's *De Anima*.

Thomas W. Laqueur
European Cultural History · University of California, Berkeley · *v, f*

Thomas Laqueur will be completing a book about how burying, burning, and commemorating—specifically naming—bodies is a central aspect of the making of what we call modernity.

Susan Laxton
Art History · University of California, Riverside
Elizabeth and J. Richardson Dilworth Fellow in Historical Studies; additional funding provided by the Willis F. Doney Membership

Susan Laxton is researching the motivations and implications of the specifically ludic strategies deployed by the European avant-gardes of the interwar period, and alternative art practices that affected the de-instrumentalization of visual language central to modernism.

Michael Lurie
Classics · The University of Edinburgh
Friends of the Institute for Advanced Study Member

The project Michael Lurie is currently working on aims to explore the history of interpretation of Greek tragedy in general and Sophocles in particular from 1500 to the end of the nineteenth century as one of the central intellectual contests in the cultural history of Europe.

Thomas Maissen
Early Modern History · Universität Heidelberg · *v, s*

Thomas Maissen is working on a project that shows how the (theological) ideas of virginity and related marital status were used in pictures and text to represent the body politic and in particular the concept of sovereignty, especially in early modern Europe.

Nicholas McDowell
Early Modern Cultural History · University of Exeter · *f*
Funding provided by The Herotodus Fund

Nicholas McDowell is working on ideas about the mortality of the soul in Britain ca. 1550–1700, exploring their manifestations in poetry (Donne, Milton, Dryden) as much as in theology and philosophy (Hobbes, Locke) to reflect on the tensions between a tradition of poetic idealism and the rise of a materialistic modernity.

INSTITUTE FOR ADVANCED STUDY

Members and Visitors

SCHOOL OF HISTORICAL STUDIES

Eric Olivier Michaud
Historiography of Art · École des Hautes Études en Sciences Sociales, Paris · *s*
Funding provided by the Florence Gould Foundation Fund

Eric Michaud is examining the deep connections between the constructions of art history and the creation of modern nation-states in Europe, which fashioned a nationalistic and racist reception of artistic objects while producing and sustaining a nationalist cult of art.

Christopher Minkowski
Sanskrit and Indian Studies · University of Oxford · *s*
Funding provided by The Andrew W. Mellon Foundation

Christopher Minkowski is writing a book about a Sanskrit author of the seventeenth century called Nīlakaṇtha Caturdhara, who is best remembered for his commentary on the Sanskrit epic, the *Mahābhārata*. The intellectual energies distinctive to India's early modern period are captured in Nīlakaṇtha's idiosyncratic works and career in Banaras.

Lauren Nauta Minsky
South Asian History of Science and Medicine · New York University Abu Dhabi
Funding provided by The Andrew W. Mellon Foundation Fellowships for Assistant Professors

Lauren Minsky studies the history of health and healing in South Asia. She is writing a book that explores how agrarian lower classes in Punjab experienced the commercialization of agricultural production through changing patterns of human and animal sickness and how these groups shaped regional healing practices as they struggled to survive.

Frances Nethercott
Russian History · University of St Andrews
Funding provided by the Patrons' Endowment Fund

Frances Nethercott's project addresses the centrality of historical consciousness in Russian culture. She is focusing on the distinctive modes of scholarly, amateur, and ideological discourse as a means to explore intellectual allegiances and legacies as well as the wider sociopolitical ramifications of historical knowledge before and after 1917.

Nicholas Lithgow Paul
Medieval History · Fordham University
Funding provided by The Andrew W. Mellon Foundation Fellowships for Assistant Professors

Nicholas Paul's project is a comparative study of the dynastic commemorative traditions of the medieval nobility. He is exploring the mechanisms through which families recalled and understood their ancestors, and how this process of remembrance may have shaped or been shaped by contemporary social, political, and cultural factors.

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

David Petrain
Art History, Classics · Vanderbilt University
Funding provided by The Andrew W. Mellon Foundation Fellowships for Assistant Professors

David Petrain studies visual communication in the ancient world, particularly its capacity to convey complex arguments and even convert text into a purely graphic element. He is currently working on the *Tabulae Iliacae*, carved stone plaques from imperial Rome that retell the story of Troy through a series of images.

Judith Pfeiffer
Islamic History · University of Oxford
Gerda Henkel Stiftung Member

Judith Pfeiffer works on the intellectual history of the Middle East in the thirteenth and fourteenth centuries, with a particular focus on the religious, political, and legal changes under Mongol rule. At the Institute, she will work on the biography of the Ilkhanid physician, vizier, and intellectual Rashid al-Din (d. 718/1318).

Verity Jane Platt
Classical Art History · The University of Chicago · *s*
Funding provided by The Andrew W. Mellon Foundation Fellowships for Assistant Professors

Verity Platt is writing a book on Graeco-Roman intaglios, which brings together visual, literary, and philosophical evidence in order to relate the form, function, and application of ancient seal-stones to their broader cultural reception, focusing on the object's self-replicatory power and the appropriation of the sealing metaphor in Hellenistic epistemology and aesthetics.

Christine Proust
History of Science · CNRS and Université Paris Diderot · *f*
Funding provided by the Otto Neugebauer Fund

Christine Proust's work will focus on mathematical series texts, a homogenous corpus of twenty cuneiform tablets from Mesopotamia. Series texts are probably the most accomplished production of the Mesopotamian scholars in the art of list making. They raise a great number of crucial questions in various fields, namely linguistics, history, mathematics, and historiography.

Susan K. Rankin
Musicology · University of Cambridge · *f*
Edward T. Cone Member in Music Studies; additional funding provided by The Andrew W. Mellon Foundation

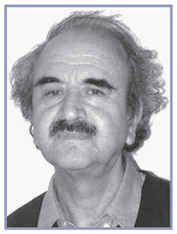
Susan Rankin will explore ninth-century musical notations, focusing on the interaction of script and memory. Music was held to be an integral part of the enterprise to sing "with sense and understanding," providing a frame of reference for interpreting the creation of notations for Gregorian chants.

James Boykin Rives
Ancient History · University of North Carolina at Chapel Hill
Funding provided by the National Endowment for the Humanities and The Andrew W. Mellon Foundation

James Rives is investigating the cultural meaning of animal sacrifice in the Roman Empire in the first three centuries CE, focusing on its role in the articulation of social hierarchies, the negotiation of cultural identity, the development of philosophical theology, and the conflict between Roman and Christian ideologies of religion.

Klaas Ruitenbeek
Chinese Studies · Royal Ontario Museum, Toronto · *v, f*

Since the initial construction of the Forbidden City in Beijing in 1406–1420, its wooden buildings have been continuously repaired and rebuilt. Klaas Ruitenbeek's research aims to explain how the Forbidden City was built and kept in repair, paying attention to technical and economic matters, and to the people who planned, supervised, and executed the work.



Mohammad-Reza Shafii-Kadkani
Islamic Religious History and Literature · University of Tehran
Funding provided by The Andrew W. Mellon Foundation

Mohammad-Reza Shafii-Kadkani will be studying manuscripts related to the Karāmiyya sect in the context of wider debates about Sufism and notions of asceticism in ninth-century Khorasan and their social and political background.

William G. Thalmann
Classics · University of Southern California · *s*
Funding provided by The Andrew W. Mellon Foundation

William Thalmann studies Greek epic and dramatic poetry as imaginative explorations of ancient social issues. His current project draws on concepts of space developed in the social sciences to examine the representation of space in the *Argonautika* of Apollonius of Rhodes and its implications for questions of Greek identity under the new conditions of the early Hellenistic period.

Lluís To-Figueras
Medieval History · University of Girona
Agnes Gund and Daniel Shapiro Member

Lluís To-Figueras is exploring cloth consumption and the development of market facilities in the western Mediterranean during the Middle Ages, especially through wedding trousseaux of peasant and urban brides, and account books of the royal wardrobes.

Stephen V. Tracy
Greek History and 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.

Franciscus Verellen
East Asian Studies · École Française d'Extrême-Orient
Edwin C. and Elizabeth A. Whitehead Fellow; additional funding provided by The Andrew W. Mellon Foundation

Franciscus Verellen is writing about the origin and growth of "Heavenly Master" Daoism in medieval China. His project is to elucidate how ritual relates to communal organization in China's indigenous religion, against the backdrop of the propagation of Buddhism and its impact on Chinese thought and society.

Q. Edward Wang
Chinese History and Comparative Historiography · Rowan University · *s*
The Starr Foundation East Asian Studies Endowment Fund Member; additional funding provided by The Andrew W. Mellon Foundation

Q. Edward Wang is researching how narrative historiography promoted the rise of nation-states in modern East Asia; how it enabled East Asian historians to adumbrate the collective development (culture, wealth, intelligence, education, etc.) for the national imaginary; and how, to this day, it confines the ways in which the past is envisaged, reconstructed, and presented.

Don Wyatt
Chinese Intellectual History · Middlebury College · *v, s*

Don Wyatt is examining the early modern construction of Chinese racial identity. His book-length study details in particular how the now-familiar classification of the Chinese as "yellow" was originally an exogenous construct imposed on them as a people principally by a series of race-conscious thinkers of the late European Enlightenment.

İpek Kocaomer Yosmaoğlu
Ottoman History · University of Wisconsin–Madison
Funding provided by The Andrew W. Mellon Foundation Fellowships for Assistant Professors

İpek Yosmaoğlu is currently working on a project that explores the question of imperial collapse and nationalism by focusing on the province of Salonika during the final decades of Ottoman rule in the region. The competing paths that Greek, Bulgarian, and later, Turkish nationalisms followed constitute the narrative framework of her study.

Susan Youens
Musicology · University of Notre Dame · *s*
Edward T. Cone Member in Music Studies

Susan Youens is currently writing a social history of German song in the long nineteenth century. She focuses on the ways in which nationalism, gender roles, new concepts of childhood, exoticism, imperialism, religion, and the middle class were both created and disseminated in Lieder.

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.

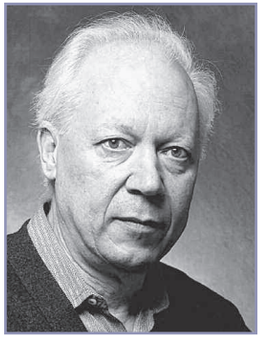
Today, the School is an international center for research in mathematics and computer science. Members discover new mathematical results and broaden their interests through seminars and interactions with the Faculty and with each other. Several central themes in mathematics in the last seventy-five years 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 academic year of 2009–10, Professors Enrico Bombieri and Peter Sarnak will lead a program on analytic number theory. Particular topics that will be covered include the distribution of prime numbers, sieves, L-functions, and special sequences, as well as additive and combinatorial methods, exponential sums, spectral analysis, and modular forms.

During the second term of 2009–10, there will be a small program on A^1-homotopy theory and its recent developments. Two directions will be emphasized during this program: the proof of the Bloch-Kato conjecture on Galois cohomology and related applications, following the work of Markus Rost, Professor of Mathematics at the Universität Bielefeld, and Vladimir Voevodsky, a Professor in the School; and recent geometric applications of A^1-homotopy to the study of smooth proper varieties over a field, especially those involving the A^1-fundamental group of A^1-connected varieties.

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.

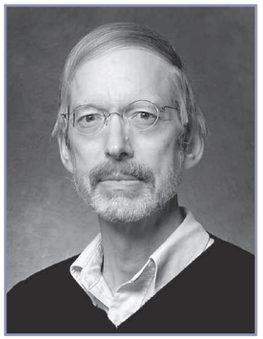
Jean Bourgain
Professor

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

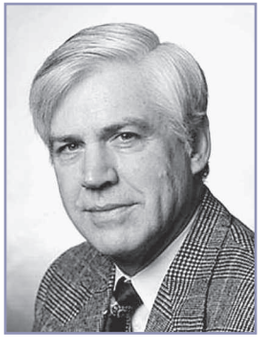
Hermann Weyl Professor

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

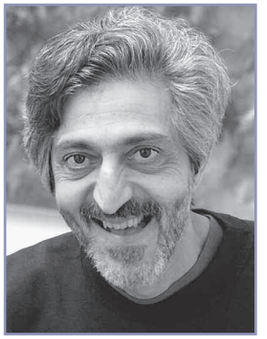
Thomas Spencer has made major contributions to the theory of phase transitions and the study of singularities at the transition temperature. In special cases, he and his collaborators have proved universality at the transition temperature. Professor Spencer has also worked on partial differential equations 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

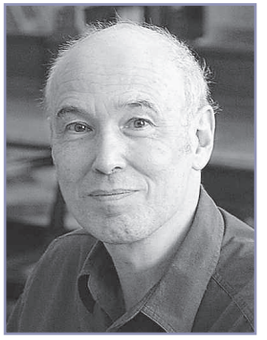
Vladimir Voevodsky is known for his work in the homotopy theory of schemes, algebraic K-theory, and interrelations between algebraic geometry and algebraic topology. He made one of the most outstanding advances in algebraic geometry in the past few decades by developing new cohomology theories for algebraic varieties. One consequence of his work is the solution of the Milnor Conjecture. Currently, he is interested in categorical probability theory, mathematical population genetics, and automated proof verification. He is working on a new approach to formalization of mathematics based on homotopy lambda calculus. His other interests include wildlife photography and trance music.



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

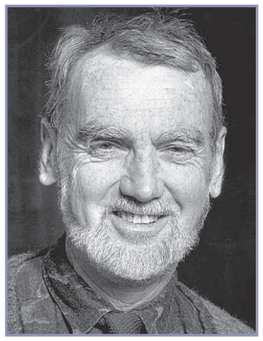
Professor Emeritus

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), Professor 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.

Members and Visitors

Peter Albers
Differential Geometry, Symplectic Topology · Purdue University · *s*
Funding provided by the National Science Foundation

Peter Albers works in symplectic topology. He will continue his study of Floer theory, in particular Rabinowitz Floer homology, and of polyfold theory. He will work with Professor Helmut Hofer.

Ekaterina Amerik
Algebraic Geometry · Université Paris-Sud 11
Funding provided by the Minerva Research Foundation and the National Science Foundation

Ekaterina Amerik plans to work on algebraic dynamics of endomorphisms and rational self-maps of smooth projective varieties, as well as on some classical problems of complex algebraic geometry.

Alexandr Andoni
Computer Science · Institute for Advanced Study · *v*

Alexandr Andoni has mostly worked on high-dimensional computational geometry and metric embeddings. His general interests extend to property testing, communication complexity, streaming algorithms, average-case complexity, and other topics of theoretical computer science.

Nils A. Baas
Algebraic Topology, Systems Biology · Norwegian University of Science and Technology · *j, s*

Nils Baas plans to study the use of higher-order structures in topology and geometry, especially in relation to new K-theories, generalized bundles, and cobordism categories. In systems biology, he plans to look for structures in genomic data.

John Arthur Baldwin
Knot Theory, Low-dimensional Topology · Institute for Advanced Study and Princeton University · *vri*
Funding provided by the National Science Foundation and The Charles Simonyi Endowment

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.

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

Members and Visitors

Valentin P. Blomer
Number Theory · University of Toronto · *f*
Funding provided by the National Science Foundation

Valentin Blomer is an analytic number theorist working on automorphic forms and L-functions and interested in the interplay between arithmetic, analysis, and geometry. He will continue to study L-functions, particularly with respect to subconvexity, and automorphic forms, particularly with a view toward higher-rank groups.

Jonathan William Bober
Number Theory · Institute for Advanced Study
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.

Alexis Bouthier
Geometric Langlands Program · École Normale Supérieure, Paris · *v, s*
Funding provided by the National Science Foundation

Alexis Bouthier is interested in the geometric Langlands program. During his stay, he will work with long-term Member Bao Châu Ngô on the fundamental lemma for the Hecke algebra. It has been proven by analytic ways by Jean-Loup Waldspurger and Ngô; Bouthier will try to prove it by another way.

Tim Daniel Browning
Number Theory · University of Bristol · s
Funding provided by the National Science Foundation

Tim Browning uses analytic number theory to study the existence and/or density of rational points on suitable projective algebraic varieties. He would like to explore how tools from sieve theory and exponential sums could be used to augment his current techniques.

Farrell Brumley
Analytic Number Theory · Université Henri Poincaré · *v, f*

Farrell Brumley works in the analytic theory of automorphic forms, including spectral theory, L-functions, representation theory, and the interplay of harmonic analysis and dynamics on symmetric spaces.

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vnf von Neumann Fellowship

Members and Visitors

Alina Bucur
Number Theory · Institute for Advanced Study
Funding provided by the National Science Foundation

Alina Bucur is interested in automorphic forms, especially Eisenstein series and theta functions, as well as their applications. More specifically, her work lies in the field of multiple Dirichlet series and their connections to Lie groups and affine Kac-Moody algebras.

Emanuel Carneiro
Analysis · Institute for Advanced Study
Funding provided by the National Science Foundation

Emanuel Carneiro's research focuses on analysis and its applications to partial differential equations and number theory. During his stay at the Institute, he will be working on geometric inequalities related to the restriction phenomena for the Fourier transform, and also on special approximations by entire functions of prescribed exponential type.

Antoine Chambert-Loir
Number Theory · Université de Rennes 1 · *vnf*
Funding provided by the National Science Foundation

Antoine Chambert-Loir is interested in Arakelov geometry, a mixture of algebraic geometry, number theory, and complex analysis. Currently, he focuses on algebraization and rationality criteria, à la Borel-Dwork, as well as on an extension to integral points of Manin and Peyre's conjectures on the number of rational points of bounded height on Fano varieties.

Szu-yu Sophie Chen
Differential Geometry, Nonlinear Partial Differential Equations ·
Institute for Advanced Study
Funding provided by the National Science Foundation

Szu-yu Chen works on nonlinear partial differential equations, conformal geometry, and complete manifolds in general relativity. Her current research interests focus on local and global behaviors of nonlinear systems and their applications in differential geometry.

Alina Carmen Cojocaru
Number Theory · University of Illinois at Chicago · *s*
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.

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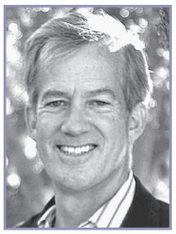
j Joint Member School of Natural Sciences · *vri* Veblen Research Instructorship
vnf von Neumann Fellowship

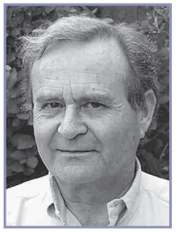


J. Brian Conrey
Number Theory · American Institute of Mathematics · *f*
Funding provided by the Ellentuck Fund

Brian Conrey works on the analytic theory of L-functions and is especially interested in their statistical properties, such as the distribution of zeros and values.

Chantal David
Number Theory · Concordia University, Montreal
Funding provided by the Minerva Research Foundation

Chantal David works in analytic number theory, with emphasis on elliptic curves and L-functions. Her recent work includes some results on the twin-prime conjecture for elliptic curves, the study of the vanishing of twisted L-functions of elliptic curves using random matrix theory, and some results on the distribution of traces in families of zeta functions of curves over finite fields.

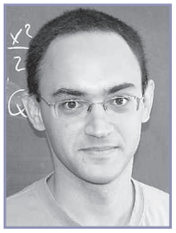


Jean-Marc Deshouillers
Number Theory · Université Bordeaux I · *v, s*

Although Jean-Marc Deshouillers plans to focus on additive number theory (mainly inverse problems and probabilistic methods) and number theoretic aspects of automatic sequences, he shall stay open to the unpredictable magic of a stay at IAS.

William Duke
Number Theory · University of California, Los Angeles · *s*
Funding provided by the Ellentuck Fund

William Duke has contributed to the study of subconvexity bounds for automorphic L-functions and their applications to equidistribution problems. Recently he has been working on weakly harmonic Maass forms having cycle integrals of modular functions as Fourier coefficients, and he is interested in their arithmetic applications.



Zeev Dvir
Computer Science · Institute for Advanced Study
Funding provided by the National Science Foundation

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

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j Joint Member School of Natural Sciences · *vri* Veblen Research Instructorship
vnf von Neumann Fellowship

INSTITUTE FOR ADVANCED STUDY

Members and Visitors

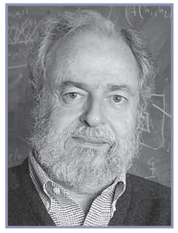
SCHOOL OF MATHEMATICS

Pierluigi Falco
Mathematical Physics · Institute for Advanced Study
Funding provided by the National Science Foundation

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

Kevin Ford
Number Theory · University of Illinois at Urbana-Champaign
Funding provided by the Ellentuck Fund; Friends of the Institute for Advanced Study Member

Kevin Ford works broadly in analytic, elementary, and combinatorial number theory, in particular questions about the multiplicative structure of integers, shifted primes, and values of arithmetic functions. One focus of his research at the Institute is the use of probabilistic methods to study number-theoretic phenomena.



John Friedlander
Analytic Number Theory · University of Toronto Scarborough · *f*
Funding provided by the Ellentuck Fund

John Friedlander's goals are: (1) to prove there are infinitely many primes of the form n^2+1; (2) to prove there are no exceptional zeros of Dirichlet L-functions; (3) in the absence of succeeding with either of the above, to continue to enjoy work and life.

Jayce Getz
Number Theory · Institute for Advanced Study and Princeton University · *vri*

Jayce Getz will investigate the arithmetic and geometry of cycles on Shimura varieties. Particular attention will be paid to the relationship of such cycles to functorial transfer in the theory of automorphic representations.

Amit Ghosh
Number Theory · Oklahoma State University · *s*
Funding provided by the Ellentuck Fund

At the Institute, Amit Ghosh will focus on the analytic theory of L-functions, restriction theorems and subconvexity, and exponential sums for curves with high genus.

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vnf von Neumann Fellowship

Mark Goresky
Geometry, Automorphic Forms · Institute for Advanced Study · *m*
Funding provided by The Charles Simonyi Endowment

Mark Goresky's main interest this year concerns the generation of pseudorandom sequences for use in cryptography and spreadspectrum communications. He plans to complete the first draft of his book, "Algebraic Shift Register Sequences," written jointly with Andrew Klapper.

Anna Gourevitch
Algebraic Geometry, Singularity Theory · Institute for Advanced Study
Funding provided by the National Science Foundation

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

Dmitry Gourevitch
Representation Theory, Algebraic Geometry · Institute for Advanced Study
Funding provided by the National Science Foundation

Dmitry Gourevitch works in representation theory and algebraic geometry. Currently he is focusing on representation theory of reductive groups over local fields including Gelfand pairs and invariant distributions.

Andrew Granville
Analytic Number Theory · Université de Montréal
Funding provided by the Ellentuck Fund

The recent extraordinary impact of additive combinatorics on analytic number theory has led to exciting breakthroughs in the distribution of prime numbers and on exponential sums. Andrew Granville hopes to use his time at the Institute to help develop further applications.

Olivier Guichard
Discrete Subgroups of Lie Groups, Surface Groups · CNRS and Université Paris-Sud 11
Funding provided by the National Science Foundation

Olivier Guichard's current research focuses on generalizations of the Teichmüller space. Those are certain components of the representation variety of a surface group in a higher-rank Lie group. Their geometrical significance still remains obscure (as opposed to the classical Teichmüller space) and will be his main concern while at the Institute.

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j Joint Member School of Natural Sciences · *vri* Veblen Research Instructorship
vnf von Neumann Fellowship

Robert Guralnick
Finite and Algebraic Groups · University of Southern California · *v, s*

Bob Guralnick studies permutation and linear representations of finite and algebraic groups with applications to Galois theory and coverings of curves. He is also studying bounds on cohomology and presentations of finite groups.

Shamgar Gurevich
Representation Theory, Algebraic Geometry · Institute for Advanced Study
Funding provided by the National Science Foundation

Shamgar Gurevich is studying the "Heisenberg-Weil" symmetries of certain Hilbert spaces that appear in concrete problems of harmonic analysis, mathematical physics, and signal processing.

Hamed Hatami
Combinatorics, Computer Science · Institute for Advanced Study and Princeton University · *vri*

Hamed Hatami's research focuses on applying techniques from mathematical analysis to combinatorics and theoretical computer science. In particular, he studies Gowers uniformity and other notions of pseudorandomness. He is also interested in the applications of Fourier analysis to the study of Boolean functions and other discrete structures.

Jochen Heinloth
Algebraic Geometry · University of Amsterdam · *f*
Funding provided by the National Science Foundation

Jochen Heinloth plans to work on stability conditions on algebraic stacks and the geometry of moduli spaces of torsors under Bruhat-Tits group schemes over curves.

Ghaith A. Hiary
Number Theory · Institute for Advanced Study
Funding provided by the National Science Foundation

Ghaith Hiary's research focuses on computational number theory, algorithms to compute L-functions, and connections between random matrix theory and number theory.

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j Joint Member School of Natural Sciences · *vri* Veblen Research Instructorship
vnf von Neumann Fellowship

Michael Hochman
Dynamical Systems · Institute for Advanced Study and Princeton University · *vri*

Michael Hochman's research interests include ergodic theory and topological dynamics and their applications to information theory and symbolic dynamics. He is currently working on descriptive and information-theoretic aspects of the dynamics of multidimensional symbolic systems.

Roman Holowinsky
Analytic Number Theory · Institute for Advanced Study
Neil Chriss and Natasha Herron Chriss Founders' Circle Member; additional funding provided by the National Science Foundation

Roman Holowinsky will be studying analytic properties of automorphic forms on higher-rank groups. He is currently extending techniques from analytic number theory for application to sup-norm bounds for cusp forms on GL(3).

Olga Holtz
Analysis · University of California, Berkeley · *vnf*
Funding provided by the National Science Foundation

Olga Holtz is interested in numerical analysis, matrix and operator theory, approximation theory, algebra and algebraic combinatorics, analysis of algorithms, and computational complexity. While at IAS, she will work on the theory of hyperbolic and stable polynomials and entire functions, with applications to combinatorics, matrix theory, statistical mechanics, and theoretical computer science.

Pavel Hrubes
Computer Science · Institute for Advanced Study · *v*

Pavel Hrubes's research concerns complexity of propositional and algebraic proof systems, the ideal targets being Frege and extended Frege systems, and algebraic circuit complexity.

Wenchuan Hu
Algebraic Geometry, Algebraic Cycles · Institute for Advanced Study
Funding provided by the National Science Foundation

Wenchuan Hu's research focuses on the application of homotopy and Hodge theoretic methods to algebraic geometry, especially the algebraic cycles theory, Chow varieties, Chow groups, Hodge theory, Lawson homology, and related topics.

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j Joint Member School of Natural Sciences · *vri* Veblen Research Instructorship
vnf von Neumann Fellowship

Russell Impagliazzo
Computational Complexity · University of California, San Diego · *vp*
Funding provided by The Charles Simonyi Endowment, the Fund for Mathematics, the National Science Foundation, and The Bell Companies Fellowship

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.

Valentine Kabanets
Computational Complexity · Simon Fraser University · *vnf*
Funding provided by the National Science Foundation

Valentine Kabanets plans to study a number of complexity problems, especially those related to the role of randomness in computation. The motivating questions are "BPP versus NEXP" and "RL versus L." He also plans to work on explicit constructions of various "random-looking" combinatorial objects, both in terms of finding new constructions and applying them to get interesting complexity theory results.

Jerzy Kaczorowski
Number Theory · Adam Mickiewicz University, Poznań, Poland · *v, s*

Jerzy Kaczorowski is working in analytic number theory, focusing on the general theory of L-functions with the aim of developing sufficiently general converse theorems to classify number theoretic L-functions. He is also interested in applications of L-functions to concrete arithmetic problems such as the distribution of prime numbers.

Randall D. Kamien
Differential Geometry and Materials · University of Pennsylvania

Randall Kamien's work applies topology and geometry to the study of liquid crystalline materials and foams. He will be studying contact geometry and Morse theory with applications to chiral and layered structures.

Martin Kassabov
Lie Groups, Representation Theory, Profinite Groups · Cornell University · *vnf, f*
Funding provided by the National Science Foundation

At the Institute, Martin Kassabov will work on problems related to the relation gap conjecture and property T. He also wants to pursue work related to the cohomology of the automorphism group of a free group.

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Kiran S. Kedlaya
Number Theory, Algebraic Geometry · Massachusetts Institute of Technology
Funding provided by the National Science Foundation and The James D. Wolfensohn Fund

Kiran Kedlaya studies p-adic cohomology of algebraic varieties in positive characteristic, plus associated topics including formal algebraic connections, p-adic Hodge theory, and number-theoretic algorithms. At IAS, he plans to investigate links between p-adic cohomology, algebraic K-theory, and L-functions.

Alexandra Kolla
Computer Science · Institute for Advanced Study
Funding provided by the National Science Foundation

Alexandra Kolla's research focuses on complexity theory, algorithms, and combinatorial optimization. She is particularly interested in semidefinite programming and spectral graph theory. She is also interested in quantum cryptography.

Antonina Kolokolova
Computer Science · Memorial University of Newfoundland · *v*

Antonina Kolokolova's research interests are complexity theory and logic. In particular, she is interested in bounded arithmetic, descriptive complexity, and proof complexity, and their interrelations and connections with complexity theory.

Alex Kontorovich
Number Theory, Automorphic Forms, Sieves · Brown University
Funding provided by the National Science Foundation and the Ellentuck Fund

Alex Kontorovich's recent interests include applications of sieve techniques to sets generated by group actions, and counting in hyperbolic domains of infinite volume. Examples of this are thin orbits of Pythagorean triples, integral Apollonian circle packings, and equidistribution of expanding closed horocycles and horospheres. He is also interested in automorphic forms on higher-rank groups.

Emmanuel Kowalski
Number Theory · Université Bordeaux 1 · *vnf, f*
Funding provided by the National Science Foundation

Emmanuel Kowalski is interested in many aspects of number theory, in particular the distribution of primes and related areas such as L-functions, automorphic forms, sieve methods, and exponential sums over finite fields.

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vnf von Neumann Fellowship

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.

Pär Kurlberg
Number Theory · KTH Royal Institute of Technology, Stockholm · *f*
Funding provided by the National Science Foundation

Pär Kurlberg is interested in connections between quantum chaos (especially "quantum cat maps") and number theory (e.g., bounds and distribution of exponential sums). He is also interested in arithmetic dynamics (dynamical analogs of the Mordell-Lang conjecture).

Denka Kutzarova
Banach Spaces · University of Illinois at Urbana-Champaign and Bulgarian Academy of Sciences · *v, s*

Denka Kutzarova is interested in properties of spaces of Tsirelson type. She also works on greedy algorithms in Banach spaces.

Youness Lamzouri
Analytic Number Theory · Institute for Advanced Study
Funding provided by the National Science Foundation

Youness Lamzouri is currently studying the distribution of values of the Riemann zeta function and other families of L-functions in the critical strip. He is also interested in questions on the distribution of smooth numbers, the multiplicative structure of arithmetic functions, and Chebychev Bias for primes in arithmetic progressions.

Kai-Wen Lan
Number Theory, Shimura Varieties · Institute for Advanced Study and Princeton University · *vri*
Qiu Shi Science and Technologies Foundation Member; additional funding provided by the National Science Foundation

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.

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Aaron Levin

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

Aaron Levin's interests are centered around the problems and questions related to the Bombieri-Lang-Vojta conjectures in Diophantine geometry, and their relation with value distribution theory and hyperbolicity. In addition to working on these problems, he hopes to take advantage of the opportunity to learn more analytic number theory.

Xiaoqing Li

Number Theory · University at Buffalo, The State University of New York · *vnf*
Funding provided by the National Science Foundation

Xiaoqing Li's area of research is number theory, automorphic forms, and L-functions. In recent years, she has mostly been interested in the analytic theory of L-functions, connections with the Langlands program, and the spectral theory of automorphic forms, especially on high-rank groups.

Victor Daniel Lie

Analysis · Institute for Advanced Study and Princeton University · *vri*

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. In the future, he plans to continue this line of research and also explore the rich connections between harmonic analysis and the fields of ergodic theory, partial differential equations, and additive combinatorics.

Jianya Liu

Number Theory · Shandong University
Funding provided by the Minerva Research Foundation, The James D. Wolfensohn Fund, and the S. S. Chern Foundation for Mathematics Research Fund

Jianya Liu works on number theory, mainly analytic number theory and automorphic forms. Among his current research projects are prime solutions to Diophantine equations, equidistribution problems, and automorphic L-functions.

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.

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INSTITUTE FOR ADVANCED STUDY

Members and Visitors

SCHOOL OF MATHEMATICS

Giuseppe Molteni

Number Theory · Università degli Studi di Milano
Funding provided by the Giorgio and Elena Petronio Fellowship Fund and the National Science Foundation

Giuseppe Molteni's research concerns analytic number theory with a special focus on Selberg's class and automorphic functions, transcendence problems, and exponential sums.

Fabien Morel

Algebraic Topology and Geometry · Ludwig-Maximilians-Universität München · *s*
Funding provided by the Ellentuck Fund, The Charles Simonyi Endowment, The James D. Wolfensohn Fund, and The Oswald Veblen Fund

Fabien Morel applies and develops methods of algebraic topology in algebraic geometry through A^1-homotopy theory. His main areas of research are the study of A^1-homotopy types of geometric classifying spaces of algebraic groups as well as the development of an A^1-surgery type approach to study smooth proper varieties.

Hadar Dana Moshkovitz

Derandomization, Coding Theory · Institute for Advanced Study
Funding provided by the National Science Foundation

Dana Moshkovitz's research is in theoretical computer science. She is working on problems concerning probabilistically checkable proofs, randomness and pseudorandomness, and coding theory.

Ritabrata Munshi

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

Ritabrata Munshi is working on two projects. In the first, he is trying to combine analytic and combinatorial tools to understand the distribution of rational points on del Pezzo surfaces. In the second project, he is studying nonvanishing of central values of L-functions in quadratic families.

Bao Châu Ngô

Algebraic Geometry, Group Theory · Université Paris-Sud 11 · *m*
Funding provided by The Charles Simonyi Endowment and The Ambrose Monell Foundation

Bao Châu Ngô is working on a still conjectural geometric trace formula. This program is an attempt to bring the Arthur-Selberg trace formula into the framework of the geometric Langlands program.

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j Joint Member School of Natural Sciences · *vri* Veblen Research Instructorship
vnf von Neumann Fellowship

Members and Visitors

Stephane Nonnenmacher
Mathematical Physics · Commissariat à l'Énergie Atomique, Gif-sur-Yvette Cedex, France · *vnf, s*
Funding provided by the National Science Foundation

Stephane Nonnenmacher is interested in the interplay between quantum mechanics and deterministic chaos, a field often referred to as "quantum chaos," which has links to random matrix theory and analytic number theory. He is currently focusing on the spectral analysis of certain nonselfadjoint operators connected with such systems.

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

Yaron Ostrover's primary areas of interest are symplectic geometry and Hamiltonian dynamics. In particular, he is interested in Floer and quantum homology, mirror symmetry, geometry of the group of Hamiltonian diffeomorphisms, and the theory of symplectic capacities.

Alberto Perelli
Number Theory · Università degli Studi di Genova · *v, s*

Alberto Perelli's present research interest is mainly the theory of L-functions, in particular the converse theorems and the axiomatic class of L-functions defined by Atle Selberg. Concerning the second topic, he is particularly interested in problems related with the classification of the Selberg class and applications.

Lillian Beatrix Pierce
Analytic Number Theory · Institute for Advanced Study
Funding provided by the National Science Foundation and The Charles Simonyi Endowment

Lillian Pierce is interested in the intersection between harmonic analysis and analytic number theory. At the Institute, she plans to focus on subconvexity estimates for automorphic forms.

János Pintz
Number Theory · Alfréd Rényi Institute of Mathematics, Hungarian Academy of Sciences, Budapest · *f*
Funding provided by The Oswald Veblen Fund

János Pintz is working in the field of additive theory of primes, mainly on problems related to the Goldbach and twin prime conjectures and gaps between primes. Additionally, he would like to investigate the analogous problems when primes are substituted by almost primes, that is, numbers with a fixed number of prime divisors.

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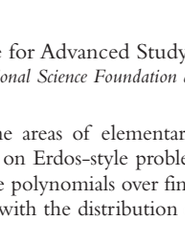
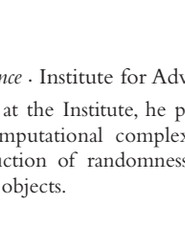
Members and Visitors



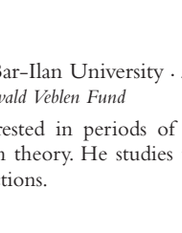
Paul Pollack
Number Theory · Institute for Advanced Study · *f*
Funding provided by the National Science Foundation and The Oswald Veblen Fund

Paul Pollack works in the areas of elementary and analytic number theory, with an emphasis on Erdos-style problems. He also studies the distribution of irreducible polynomials over finite fields and the analogies (and non-analogies) with the distribution of rational primes.



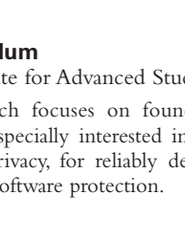
Anup Rao
Theoretical Computer Science · Institute for Advanced Study · *v, f*

During Anup Rao's stay at the Institute, he plans to seek answers to various questions in computational complexity. He is particularly interested in the construction of randomness extractors and in the design of pseudorandom objects.



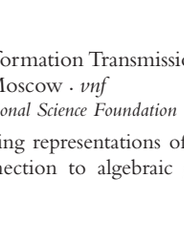
Andre Reznikov
Automorphic Functions · Bar-Ilan University · *s*
Funding provided by The Oswald Veblen Fund

Andre Reznikov is interested in periods of automorphic functions and related representation theory. He studies their analytic properties and relations with L-functions.



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.



Marat Rovinsky
Algebra · Institute for Information Transmission Problems, Russian Academy of Sciences, Moscow · *vnf*
Funding provided by the National Science Foundation

Marat Rovinsky is studying representations of automorphism groups of fields and their connection to algebraic geometry, especially to motives.

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j Joint Member School of Natural Sciences · *vri* Veblen Research Instructorship
vnf von Neumann Fellowship

Members and Visitors

Tristan Cyrus Roy
Analysis, Partial Differential Equations · Institute for Advanced Study
Funding provided by the National Science Foundation

Tristan Roy's research interests are nonlinear partial differential equations and harmonic analysis, in particular, long-time behavior of solutions to semilinear wave and Schrödinger equations.

Michael Rubinstein
Number Theory · University of Waterloo
Funding provided by the National Science Foundation

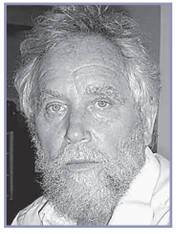
Michael Rubinstein works in number theory, focusing his research on the distribution of zeros and values of L-functions, related problems in random matrix theory, questions regarding the distribution of primes, and algorithms in number theory.

Zeev Rudnick
Number Theory · Tel Aviv University
Funding provided by The Oswald Veblen Fund

Zeev Rudnick works on various topics in number theory, mostly analytic number theory and automorphic forms, and in mathematical physics, specifically quantum chaos. Among his current projects are the study of restriction properties of eigenfunctions of the Laplacian on tori, and the statistics of zeros of zeta functions of varieties defined over a finite field.

K. Soundararajan
Number Theory · Stanford University · *f*
Funding provided by The Oswald Veblen Fund

K. Soundararajan is interested in number theory, especially in problems with an analytic flavor. His work has focused on studying the analytic properties of zeta and L-functions, and on understanding the behavior of multiplicative functions. His most recent work uses results from multiplicative functions to study equidistribution of modular forms.



Endre Szemerédi
Number Theory, Graph Theory · Rutgers, The State University of New Jersey

Endre Szemerédi is working on extremal graph theory and additive combinatorics. He plans to work on problems related to the Freiman theorem and problems about the sum-product theorem.

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Members and Visitors

Michael Temkin
Algebraic Geometry, Non-Archimedean Geometry · Institute for Advanced Study
Funding provided by the National Science Foundation

Michael Temkin will study problems from birational and non-Archimedean geometries, including topological structure of Berkovich analytic spaces via skeletons and ind-skeletons, desingularization of schemes, and Riemann-Zariski spaces with their relation to compactification of algebraic spaces and stacks.

Nicolas Templier
Analytic Number Theory · Institute for Advanced Study
Funding provided by the National Science Foundation

Nicolas Templier is aiming to pursue the interplay between sums of exponential sums, distribution of integral points on (pre-) homogeneous spaces, trace formulas, and critical values of complex/p-adic L-functions.

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, and 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.

Madhur Tulsiani
Theoretical Computer Science · Institute for Advanced Study
Funding provided by the Fund for Mathematics, The Oswald Veblen Fund, and the National Science Foundation

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.

Adrian Ubis
Number Theory, Analysis, Combinatorics · Institute for Advanced Study · *s*
Funding provided by the National Science Foundation

Adrian Ubis plans to continue studying possible effective forms of Ratner's theorem on unipotent orbits and its connections to number theory. He would also like to learn new techniques and questions in analytic number theory.

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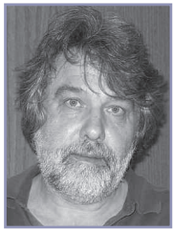
Anna Wienhard
Geometry · Princeton University · *v*

Anna Wienhard plans to investigate higher Teichmüller spaces. Classical Teichmüller space plays an important role in various fields of mathematics due to its rich structure and the fact that it is a smooth cover of the moduli space of Riemann surfaces. 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.



Kris Wysocki
Symplectic Geometry · The Pennsylvania State University · *f*
Funding provided by The Oswald Veblen Fund

Kris Wysocki is working on a polyfold theory and a generalized Fredholm theory on polyfolds. At the Institute, he plans to work on applications of polyfold theory to the Gromov-Witten theory and the Symplectic Field Theory.

Amir Yehudayoff
Computer Science, Discrete Mathematics · Institute for Advanced Study
Funding provided by the National Science Foundation

Amir Yehudayoff's main area of research is computational complexity theory. Specifically, he is interested in understanding and proving lower bounds for different computational models, such as restricted arithmetic circuits.

Cem Yalçin Yildirim
Number Theory · Boğaziçi University · *f*
Funding provided by The Oswald Veblen Fund

The topics that interest Cem Yildirim most are analytical properties of the Riemann zeta-function and the distribution of prime numbers.

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Matthew Patrick Young
Analytic Number Theory · Texas A&M University · *s*
Funding provided by the National Science Foundation

Matthew Young is interested in mean values of L-functions, large sieve inequalities, and various other problems in analytic number theory. He hopes to investigate some problems with higher degree L-functions.

Zhiwei Yun
Representation Theory, Algebraic Geometry · Institute for Advanced Study
Zurich Financial Services Member; additional funding provided by the National Science Foundation

Zhiwei Yun studies the geometry and topology of algebraic varieties that arise from representation theory, with the goal of understanding representation theory in a more structural way. The varieties include Hitchin moduli spaces, (affine) flag varieties, etc.

Eduard Zehnder
Mathematical Physics · Eldgenössische Technische Hochschule Zürich · *f*
Funding provided by the Fund for Mathematics and The Oswald Veblen Fund

Eduard Zehnder's work is in the fields of Hamiltonian dynamical systems and symplectic geometry. At present, he is working with Professor Helmut Hofer and Member Kris Wysocki on the analytical foundations of the symplectic field theory.

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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

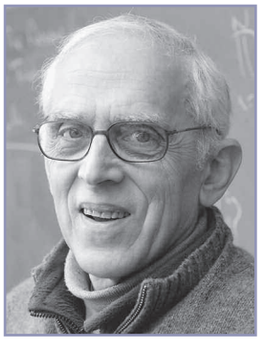
The School of Natural Sciences, established in 1966, provides a unique atmosphere for research in broad areas of theoretical physics, astronomy, and systems biology.

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.

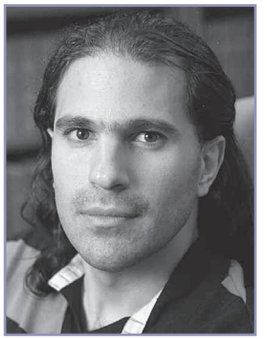
The School also sponsors Prospects in Theoretical Physics, a two-week residential summer program held at the Institute for promising graduate students and postdoctoral scholars, who attend lectures and sessions on the latest advances and open questions in the field of theoretical physics.

Faculty



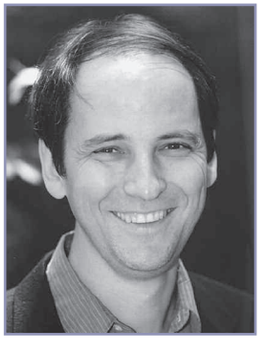
Stephen L. Adler
Professor . Particle Physics

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.



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.



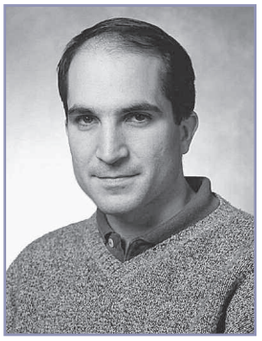
Stanislas Leibler
Professor . Biology

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, Professor 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.

Faculty

Arnold J. Levine
Professor · Biology

Arnold Levine is a widely acclaimed leader in cancer research. In 1979, Professor 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.

Faculty

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 Professor 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.

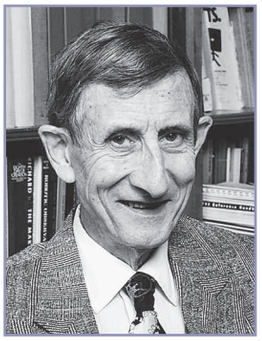
Edward Witten
Charles Simonyi Professor · Mathematical Physics

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.

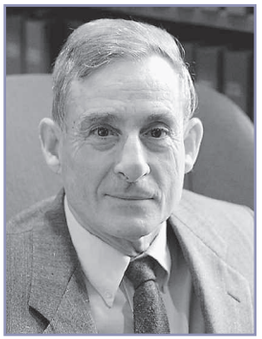
Faculty



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 · Utrecht University
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.

Natalie Arkus

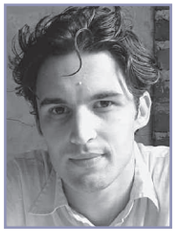
Biology · The Rockefeller University · *v*

Natalie Arkus has researched self-assembly, aging, and model reduction techniques applied to biology. At the Institute, she plans to work on how organs form and maintain themselves, to examine the relation between an organ's microscopic structure and macroscopic properties, and to explore the minimal components necessary for a self-sustained, self-replicating system.

Nils A. Baas

Algebraic Topology, Systems Biology · Norwegian University of Science and Technology · *j,s*

Nils Baas plans to study the use of higher-order structures in topology and geometry, especially in relation to new K-theories, generalized bundles, and cobordism categories. In systems biology, he plans to look for structures in genomic data.



Daniel Baumann

Cosmology, Particle Astrophysics, String Theory, Supersymmetry · Harvard University
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.

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

Jacob D. Bekenstein
Gravitation Theory, Astrophysics · The Hebrew University of Jerusalem
IBM Einstein Fellow

Jacob Bekenstein is seeking to improve the modified dynamics (MOND) paradigm so that it can ultimately describe (or summarize) dynamics on the scale of clusters of galaxies as well as it does dynamics on galaxy scale. He is looking into vacuum energy and variable coupling constants as possible contributing elements to MOND; these are, of course, phenomena of interest in themselves.

Vladimir Belyi
Biology · Institute for Advanced Study
Martin A. and Helen Chooljian Member in Biology

Vladimir Belyi is interested in 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 the evolution of transcriptional regulation.

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

Gyan Bhanot's research concerns computational biology related to cancer. He uses microarray, mass spectrometry, and SNP polymorphism data to identify, quantify, and explain cancer initiation, progression, and metastasis. He also works in evolutionary genetics, including human migration, phylogeny, disease association studies, and patterns of mutations correlated with longevity and complex disease phenotypes.

Freddy Cachazo
Field Theory, String Theory · Perimeter Institute for Theoretical Physics
Funding provided by The Ambrose Monell Foundation

Freddy Cachazo's research includes perturbative and nonperturbative aspects of quantum field theory and string theory. At the Institute, he plans on continuing his recent research on the connection between the S-matrix of massless particles in four dimensions, twistor space, and the search for a dual theory of flat spacetime.

Simon Caron-Huot
Mathematical Physics and Statistical Mechanics, String Theory, Supersymmetry · McGill University
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. During his stay at the Institute, he might work on these topics.

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.

R. Sekhar Chivukula
High-Energy Theory, Phenomenology · Michigan State University · *f*

R. Sekhar Chivukula's research in particle physics focuses on electroweak and flavor symmetry breaking. He is particularly interested in constructing new theories that can address the shortcomings of the standard model of particle physics, and in exploring the observable consequences of such theories at existing and planned collider experiments.

Simona Cocco
Biology · Institute for Advanced Study

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 multi-electrode recordings. In the future, she plans to apply these tools to other experiments on biological systems.

Shane Davis
Astrophysics · Institute for Advanced Study · *m*
Funding provided by the National Science Foundation and the National Aeronautics and Space Administration

While at the Institute, Shane Davis plans to work on a broad list of problems within the field of astrophysics, with a continuing emphasis on high-energy phenomena. This includes the study of accreting black hole systems and the nature of their emission mechanisms.

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.

Members and Visitors

Anatoly Dymarsky
Cosmology, String Theory and Supersymmetry, Particle Physics · Stanford University
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 · Massachusetts Institute of Technology · *f*

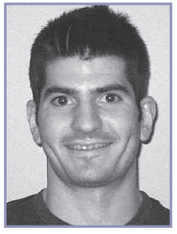
Henriette Elvang works in theoretical physics, in particular gravity and quantum field theory. At the Institute, she is interested in continuing her current work on black holes, supersymmetric gauge theories, and supergravity, while also broadening into new areas of research.

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. Current research topics include the explosion mechanism of core-collapse supernovae, and the physics of neutron stars.

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 and Supersymmetry, Phenomenology, Mathematical Physics and Statistical Mechanics · Stanford University
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 on their connections to particle physics and cosmology. He is currently interested in nonperturbative solutions to theoretical problems in both particle physics and cosmology.

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Members and Visitors

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.

Jonathan Jacob Heckman
String Theory and 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 · University of Cambridge
Funding provided by the National Aeronautics and Space Administration and the National Science Foundation

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

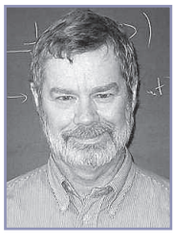
Kevin Heng
Astrophysics · Institute for Advanced Study
Frank and Peggy Taplin Member; additional funding provided by the National Aeronautics and Space Administration

Kevin Heng's research interests involve the study of planetesimal disks and their detectability, the physics of shocks and dust in the interstellar medium, and supernova remnant 1987A.

Zohar Komargodski
String Theory and Supersymmetry, Phenomenology · Weizmann Institute of Science
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.

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



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

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.

Marilena LoVerde
Cosmology, Astrophysics · Columbia University
Friends of the Institute for Advanced Study 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, non-Gaussianity, and to explore astrophysical probes of fundamental physics.

Rachel Mandelbaum
Astrophysics · Institute for Advanced Study · *m*
Funding provided by The Ambrose Monell Foundation

Rachel Mandelbaum continues to work in the field of weak gravitational lensing. Her work includes an analysis of data to answer a variety of questions related to galaxy formation and evolution, and development of techniques for using lensing as a probe of cosmological parameters and basic 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. During her stay at the Institute, she plans to work 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.

Patrick Meade
Particle Physics · Institute for Advanced Study · *v, f*

Patrick Meade's research concerns theoretical high-energy physics. He is primarily focused on ideas related to the upcoming experiments at the Large Hadron Collider. Additionally, he continues to explore connections between particle physics and cosmology.

Mikhail V. Medvedev
Theoretical Astrophysics · The University of Kansas · *s*
Funding provided by The Ambrose Monell Foundation

Mikhail Medvedev's work covers a variety of areas in theoretical astrophysics, including gamma-ray bursts, accretion flows, cosmic rays, galaxy clusters, heliospheric physics, nonlinear waves, and turbulence. His current research is focused on relativistic collisionless shock physics and on cosmic ray acceleration and propagation.

Todd P. Michael
Biology · Waksman Institute of Microbiology, Rutgers, The State University of New Jersey · *v*

Todd Michael's research focuses on understanding how environmental influences, both biotic (other organisms) and abiotic (light and temperature), shape genome structure and variability. His work primarily focuses on plant genomes, which represent an unprecedented spectrum of evolutionary histories and sizes.

Hideaki Mizuno
Biology · Chugai Pharmaceutical Co., Ltd., Tokyo

Hideaki Mizuno works on developing computational methods for analyzing large genomic datasets. At the Institute, he is trying to discover hidden relations between human evolution and diseases, which could explain disease etiology and help drug discovery.

Rémi Monasson
Biology · Institute for Advanced Study

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

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.

Donal O'Connell
Particle Physics · Institute for Advanced Study
Martin A. and Helen Chooljian Member; additional funding provided by the United States Department of Energy

Donal O'Connell expects that his research for the year will focus on general features of new physics that might be discovered at the Large Hadron Collider. Some examples are sources of CP violation and new physics associated with stabilizing the Higgs mass.

Michele Papucci
Particle Physics · Institute for Advanced Study
Funding provided by the National Science Foundation

During Michele Papucci's stay at the Institute, he will continue to work on particle physics, with particular emphasis on models of electroweak symmetry breaking and how they can be tested using data coming from collider experiments.

Martin Pessah
Astrophysics · Institute for Advanced Study
Funding provided by the W. M. Keck Foundation Fund

Martin Pessah's work focuses on understanding the properties of turbulent magnetized accretion flows under a wide variety of physical conditions; developing accretion disk models for which angular momentum transport is mediated by magneto-hydrodynamic turbulence; and understanding the similarities exhibited by the global spectral and timing properties of accreting binary systems and active galactic nuclei.

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Gunaretnam Rajagopal
Biology · The Cancer Institute of New Jersey · *v*

Gunaretnam Rajagopal's research is at the interface of systems biology, medicine, and population sciences. He is developing integrative, quantitative techniques to probe the underlying biological mechanisms governing the control and regulation of cellular processes with the goal of addressing fundamental problems in cancer prevention, treatment, and control.

Soo-Jong Rey
String Theory, Theoretical High-Energy Physics · Seoul National University
Funding provided by the United States Department of Energy

Soo-Jong Rey's research interests include fundamental quantum gravitational questions in string theory; open theoretical questions in high-energy physics; understanding 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 Rudd
Astrophysics · Institute for Advanced Study
Funding provided by the National Science Foundation; IBM Einstein Fellow

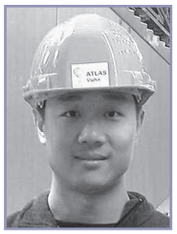
Douglas Rudd is using high-resolution cosmological simulations to study the growth and evolution of large-scale structure in the universe. In particular, he has been examining techniques to constrain the as-yet poorly understood physics of galaxy formation through large astronomical observations.

Alexia Schulz
Astrophysics · Institute for Advanced Study
Corning Glass Works Foundation Fellow; additional funding provided by the National Science Foundation

Alexia Schulz is examining astrophysical probes of large-scale structure in the universe to discover signatures that may shed light on the interplay between dark matter, baryonic matter, and dark energy in the formation processes of galaxies and clusters of galaxies.

Leonardo Senatore
Particle Astrophysics, Cosmology, String Theory and Supersymmetry, Phenomenology · Harvard University
Funding provided by the National Science Foundation

Leonardo Senatore works on the connections between theoretical physics and cosmology. He is working on various subjects, including eternal inflation and the string landscape, applications of effective field theory to inflation, new bouncing cosmologies, and data analysis of cosmological experiments such as the Wilkinson Microwave Anisotropy Probe.



David Shih

Particle Physics · Institute for Advanced Study
William D. Loughlin Member; additional funding provided by the United States Department of Energy

David Shih is working on particle phenomenology and collider physics at the Institute, with a focus on building models to describe the eagerly anticipated flood of data from the Large Hadron Collider.

Elizabeth H. Simmons

Particle Physics · Michigan State University · *f*

Elizabeth Simmons studies dynamical electroweak symmetry breaking and the origins of the masses of the elementary particles, especially the top quark. At IAS, she will explore the field theory, Large Hadron Collider, phenomenology, and astrophysical implications of Higgsless models and their duals.

Anna Marie (Ann) Skalka

Biology · Institute for Cancer Research, Fox Chase Cancer Center, Philadelphia · *f*

Ann Skalka's research concerns the understanding of the biochemical mechanisms by which retroviruses (including the AIDS virus) replicate and integrate their genetic material into the host genome. While at the Institute, she will be collaborating on studies of retroviral evolution, and of the viral and host proteins that are critical to their integration and expression.

Aristotle Socrates

Astrophysics · Institute for Advanced Study
Funding provided by the National Science Foundation; IBM Einstein Fellow

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

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.

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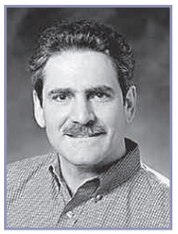


Salvatore Torquato

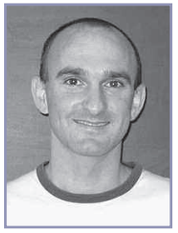
Particle Physics · Princeton University · *v*

Salvatore Torquato continues to work on the problem of the determination of the densest sphere packings in high-dimensional Euclidean spaces, and its connection to condensed matter theory and statistical mechanics. In addition, he is working on the second edition of his book *Random Heterogeneous Materials: Microstructure and Macroscopic Properties*.

Tanmay Vachaspati

Particle Physics · Case Western Reserve University · *v*

Tanmay Vachaspati's research interests include cosmology, topological defects, and gravitational physics. During his stay at the Institute, he plans to study the formation of black holes, the generation of cosmic magnetic fields, and the properties of non-Abelian magnetic monopoles.



Tomer Volansky

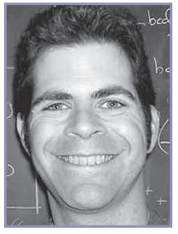
Particle Physics · Institute for Advanced Study
Funding provided by the United States Department of Energy

Tomer Volansky's research interests span topics in particle cosmology, phenomenology of high-energy physics, and some aspects of string theory. He is mainly interested in the interface between these subjects. In the next year, he hopes to continue his study of Large Hadron Collider phenomenology and various aspects of supersymmetry and supersymmetry breaking.

Haijian Wang

Biology · Fudan University
Qiu Shi Science and Technologies Foundation Member

Haijian Wang is working on genetic variations of cancer pathways and genes, with diverse interests in their functional significance in cancer biology, implications in evolutionary population genetics, and applications in translational medicine. His research also concerns regulatory variation and evolution of the transcription network of main transcription factors in cancer development.



Brian Wecht

Particle Physics · Institute for Advanced Study
Frank and Peggy Taplin Member; additional funding provided by the United States Department of Energy

Brian Wecht works on string theory and supersymmetric gauge theories. He is currently interested in gauge mediation, supersymmetry breaking, and novel compactifications of string theory.

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

Members and Visitors

David Weinberg
Cosmology, Astrophysics . The Ohio State University
Funding provided by the Association of Members of the Institute for Advanced Study (AMIAS)

David Weinberg uses numerical simulations and observational data to study the formation of galaxies and the matter and energy contents of the universe. He is the Project Scientist of the Sloan Digital Sky Survey III, which will be the focus of his research at the Institute.

Amit Pratap Singh Yadav
Cosmology, Astrophysics · Harvard University
IBM Einstein Fellow

Amit Yadav is interested in broad topics within theoretical cosmology, particle physics, and astrophysics. His research focuses on the Cosmic Microwave Background (CMB) temperature and polarization, and the early universe. Some specific topics include connecting primordial non-Gaussian signatures in CMB to specific classes of inflationary models, weak gravitational lensing, and extracting primordial B-modes.

Joshua D. Younger
Astrophysics · Institute for Advanced Study
Hubble Space Telescope Fellow

Josh Younger's research focuses on galaxy formation and evolution, and particularly the role of colliding galaxies. At the Institute, he will use both theory and observations to investigate hyperluminous starbursts and the growth of supermassive black holes.

Nadia Zakamska
Astrophysics · Institute for Advanced Study · *m*
John N. Bahcall Fellow; additional funding provided by the National Science Foundation

Nadia Zakamska is studying processes near compact objects, such as neutron stars and black holes. In particular, she is investigating the structure and origin of relativistic outflows using theoretical and observational methods. She will also pursue her interests in dynamics of stellar and planetary systems.

f First Term · *s* Second Term · *m* Long-term Member
v Visitor · *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 2009–10 academic year, "The Dewey Seminar: Education, Schools, and the State," will explore the interrelationships among these components. Every society and political regime develops institutions and practices of education that substantially shape its evolutions, revolutions, and stabilizations over time. Diverse educational practices are also tightly linked to specific political orders. Contemporary phenomena have placed significant pressure on the approaches to education undertaken by many polities as well as on the capacity of educational systems to support democratic political systems in particular. Because of the centrality of education to the continuity of sociopolitical orders, its analysis embraces virtually all the social sciences. The Dewey Seminar will be run jointly by UPS Foundation Professor Danielle S. Allen and Professor Rob Reich of Stanford University.

Faculty

Danielle S. Allen
UPS Foundation Professor

Danielle Allen is a political theorist who has published widely 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. This year she is finishing a book on the Declaration of Independence as well as working on essays on the public sphere and education.

Didier Fassin
James D. Wolfensohn Professor

Didier Fassin's body of work is situated at the intersection of the theoretical foundations of the main areas of anthropology—social, cultural, political, medical. Trained as a medical doctor, Fassin has conducted field studies in Senegal, Ecuador, South Africa, and France, illuminating important aspects of urban and maternal health, public health policy, social disparities, and the AIDS epidemic. He recently turned to a new area that he calls "critical moral anthropology." He analyzes the ways in which, in recent years, inequality has been redefined as "suffering," violence reformulated as "trauma," and military interventions qualified as "humanitarian."

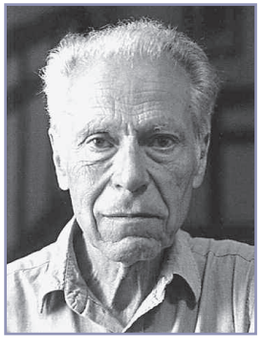
Eric S. Maskin
Albert O. Hirschman Professor

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 the theory of income inequality, the study of intellectual property rights, and political economy.

Faculty

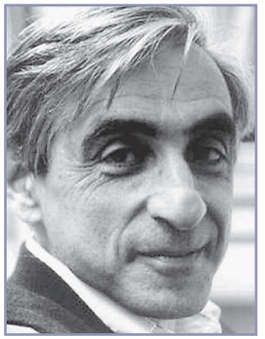
Joan Wallach Scott
Harold F. Linder Professor

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.

Members, Visitors, and Research Staff

Paul Attewell
Sociology · The Graduate Center, The City University of New York
Leon Levy Foundation Member

Paul Attewell is researching the role of the state in developing an institutional and policy environment that stratifies the college student population and creates the conditions that foster discontinuous enrollment, elongated time to the completion of degrees, and high levels of debt among the nontraditional majority of the country's college students.

Julia A. Clancy-Smith
History · The University of Arizona

Julia Clancy-Smith's research focuses on schooling for girls in colonial Tunisia and Algeria, where the question of whether colonized women should receive modern education generated the most passionate polemics—debates that were ensnared in global struggles over the meaning of empire and local conflicts over family structures, hierarchies, religion, and identities—over how to become modern.

Julie E. Cooper
Political Theory · The University of Chicago
Ralph E. and Doris M. Hansmann Member

Julie Cooper is working on a book that will survey seventeenth- and early eighteenth-century debates about modesty, humility, pride, and self-esteem, provide new resources for thinking about what secular subjectivities look like and how they have been produced, and challenge the influential historiographical narrative that equates secularization with self-deification.

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

James Doyle will be 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."

Graham Finlay
Political Theory · University College Dublin
Ginny and Robert Loughlin Founders' Circle Member

Graham Finlay will be using the theory of global justice to develop a strategy for cosmopolitan citizenship education in Ireland. This project will contribute to the theory and practice of citizenship education, which is mainly national in focus, and to cosmopolitan theory, since realizing cosmopolitan justice involves changing individuals' attitudes to global inequality.

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

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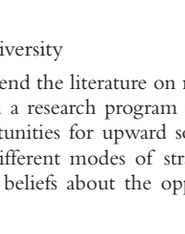
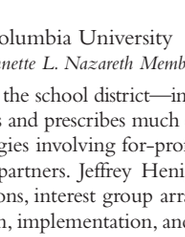


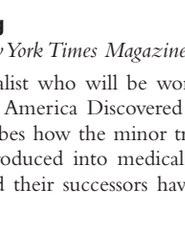
Angel L. Harris
Sociology · Princeton University

Angel Harris seeks to extend the literature on racial differences in academic outcomes through a research program that focuses on youths' perceptions about opportunities for upward socioeconomic mobility. He will examine how different modes of stratification—social class, race, and gender—shape beliefs about the opportunity structure and academic orientation.



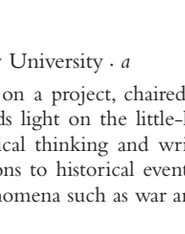
Jeffrey R. Henig
Politics and Education · Columbia University
Roger W. Ferguson, Jr. and Annette L. Nazareth Member

The conventional form of the school district—in which the central office oversees individual schools and prescribes much of their operations—has been challenged by strategies involving for-profit and nonprofit organizations as management partners. Jeffrey Henig will look at the way local governance institutions, interest group arrangements, and political culture influence adoption, implementation, and consequences.



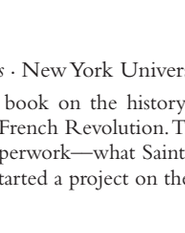
Robin Marantz Henig
Science Writing · *The New York Times Magazine* · *v*

Robin Henig is a journalist who will be working on a book called "Bottling Normal: How America Discovered Valium and Redefined Mental Health." It describes how the minor tranquilizers were developed, marketed, and introduced into medical practice in the 1960s, and shows how they and their successors have shaped our changing definition of "normal."



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

Yuval Jobani is working on a project, chaired by Professor Emeritus Michael Walzer, that sheds light on the little-known and unexplored Jewish tradition of political thinking and writing. He is researching Jewish intellectual reactions to historical events as well as other conceptions of political phenomena such as war and peace.



Ben Kafka
History and Media Studies · New York University

Ben Kafka is finishing a book on the history of bureaucracy in the decades surrounding the French Revolution. The book focuses on the powers and failures of paperwork—what Saint-Just called the "demon of writing." He has also started a project on the history of graphology.

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

David Karen

Sociology, Education · Bryn Mawr College

How do different kinds of local control of public schools in the United States affect curriculum, student achievement, and political participation? David Karen will examine a variety of local governance structures in a number of contexts in order to determine exactly what is gained—and, perhaps, lost—in this uniquely American set of arrangements.

Mary Fainsod Katzenstein

Political Science · Cornell University · *v*

Mary Fainsod Katzenstein writes about the ways liberalism enables and limits the efforts of social movements to argue for equality. Her project on incarceration in the United States focuses on "rights" and "responsibility" as the two-sided ideological coinage of the post-1970s penal realm.

Peter J. Katzenstein

Political Science · Cornell University
Louise and John Steffens Founders' Circle Member

To gain a better understanding of America's soft power and foreign policy, Peter Katzenstein will examine America's multiple traditions and their engagements of multiple modernities in world politics, which are more encompassing than the secularism of the discipline of international relations and the statism of studies of American foreign policy are ready to acknowledge.

Dalenda Largueche

History · Université de la Manouba, Tunis

Dalenda Largueche's research concerns Tunisian women's life in the eighteenth to nineteenth centuries. She aims to delve deeply into the traces left by indigenous women, according to various material data from daily life. Using their property, their knowledge, and their hands, Muslim women were widely present in the life of their city and its history.

Humberto Llavador

Economics · Universitat Pompeu Fabra, Barcelona
Deutsche Bank Member

Humberto Llavador is studying welfare sustainability in the presence of global warming. The approach, logically prior to the design of the best system of tradable permits or price incentives, aims at highlighting the ethical issues of intertemporal and intratemporal justice. It requires specifying welfare criteria and empirically estimating possible paths of the economy.

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

INSTITUTE FOR ADVANCED STUDY

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Patrick McGuinn

Political Science · Drew University

Patrick McGuinn is analyzing how the No Child Left Behind Act has reconfigured educational politics and practice in the United States. He will examine ongoing efforts at both the state and federal level to restructure administrative institutions and relationships, create new political alliances, reframe public debates over school reform, and assess their impact on the congressional debate over NCLB's reauthorization.

Joel S. Migdal

Political Science · University of Washington

Joel Migdal is researching the creation of the public in the United States, once it had become, in the nineteenth century, an urbanized "society of strangers." He will look at the rules for everyday interaction and ask how and why they became cross-cutting, and who benefited from and who was disadvantaged by them.

Seth Moglen

American Literature and History of American Social Movements · Lehigh University
Friends of the Institute for Advanced Study Member

Seth Moglen is tracing the development of Bethlehem, Pennsylvania, from an eighteenth-century utopian religious community, to an industrial steel town, to a postindustrial casino development. He will explore the structures of power and the democratic aspirations that have shaped this iconic American city over 250 years.

Matthew J. Nelson

Political Science · University of London
The Wolfensohn Family Member

Matthew Nelson is interested in the relationship between religious education and citizenship in Pakistan. He is particularly interested in the circumstances that might be expected to generate a "religious" appreciation for religious and sectarian diversity in the context of local schools and madrasas.

Mae M. Ngai

History · Columbia University
Funding provided by the Association of Members of the Institute for Advanced Study (AMIAS)

Mae Ngai is examining the social organization and experience of Chinese gold miners across Anglo-American settler colonies in the North American West, Australia, and South Africa (1850–1910), and the relationship between Chinese and European labor and the circulation of racial discourses in the making of polities that were at once democratic and exclusionary.

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

Niels Reeh
Sociology of Religion · University of Copenhagen · *v*

Niels Reeh is exploring the state religious politics of the Danish state in elementary schools from 1700 until today. In order to account for the current repolitization of religion, a fission-perspective on the state is suggested. This implies a reinterpretation of the secularization narrative and a corrective of the secularization theories.

Rob Reich
Political Theory · Stanford University · *vp*

Rob Reich, whose research concerns political theory and questions about the purposes of education in a democratic society, is co-organizer (with Professor Danielle Allen) of the Dewey Seminar, the School's theme year. He is also working on a book about the ideals of equality and adequacy as applied to the state's obligation to provide education to children.

Richard Rothstein
Journalism · Economic Policy Institute · *v*

School accountability policies using narrow test-based measures have failed, but the need for public accountability remains. Extending previous work on the design of a workable accountability system, Richard Rothstein will develop proposals for how measures of behavioral outcomes, such as good citizenship, can be incorporated into educational accountability policy.

Jason Schnittker
Sociology · University of Pennsylvania
Deutsche Bank Member

The "genetic revolution" provides an unprecedented opportunity to enhance our understanding of disease, but this recent revolution needs to be integrated into our mature understanding of the social causes of illness. Jason Schnittker is developing principles for evaluating genetic causes in the context of pervasive environmental influences, especially those stemming from education.

Anna Marie Smith
Political Science · Cornell University
Rosanna and Charles Jaffin Founders' Circle Member

Anna Marie Smith's research entails a normative exploration of the education adequacy lawsuit in New York. Should the right to education be justiciable? How does the normative argument in favor of the court's enforcement of the right to education implicate difficult questions relating to intergenerational justice? What are the potential pitfalls of the race-neutral character of this social justice strategy?

INSTITUTE FOR ADVANCED STUDY

Members, Visitors, and Research Staff

SCHOOL OF SOCIAL SCIENCE

Carola M. Suárez-Orozco
Psychology · New York University

Our current immigration system is misaligned with rational language and education policies, as well as the requirements of citizenship and social cohesion in the twenty-first century. Carola Suárez-Orozco's project (with Marcelo Suárez-Orozco) seeks to articulate a conceptual framework for understanding the lived experiences of immigrant students and develop recommendations for sounder practice.

Marcelo M. Suárez-Orozco
Education · New York University
Richard B. Fisher Member

Marcelo Suárez-Orozco (with Carola Suárez-Orozco) seeks to develop a conceptual framework for understanding the lived experiences of immigrant children and youth. He will focus on schools in light of a current policy architecture that is at once misaligned with the realities of global migration and plagued by unclear, contradictory, and unrealistic objectives.

Ian P. Wei
History · University of Bristol

Ian Wei works on the identity, status, and roles of intellectuals in medieval Europe, with particular focus on the University of Paris. He is also looking at policy-making and decision-making in contemporary universities. Key themes include: claims for legitimacy, ethical responsibilities for students, and academic engagement with policy-making.

Anat Zohar
Education · The Hebrew University of Jerusalem
Paula and James Crown Member

Through the lens of the Israeli school system, Anat Zohar is examining a national-scale pedagogical transformation from an emphasis on rote learning toward an emphasis on deep understanding and higher-order thinking. She will analyze several converging factors—political, global, ideological, theoretical—and investigate how they affect what actually takes place in schools.

Noam Zohar
Jewish Studies · Bar-Ilan University · *v*

Noam Zohar aims to describe central aspects of the political thought of classical Rabbinic Judaism through an exploration of Mishnah tractate Nezikin (the "Three Gates") and its ideas pertaining to social cohesion and to the mutual obligations and responsibilities of neighbors and stakeholders in the shared social space.

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

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

Edwin L. 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.

Molly Vallor
Japanese Literature · Stanford University

Molly Vallor is interested in Buddhism in the literary works of Musō Soseki (1275–1351). She will examine how this influential figure used prose, poetry, and the visual arts to promote and express Zen teachings and practice.

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

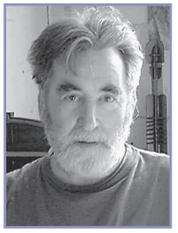
Graham Farmelo will be researching a new book on Winston Churchill's relationship with his nuclear scientists during the project to build the first nuclear weapon, and afterwards, until he left office in 1955. Farmelo is also interested in the work of American scientists during that period, especially in the roles of Vannevar Bush and James Conant, advisers to Franklin Delano Roosevelt.

Serge J-F. Levy
Photographer

Serge Levy will be photographing the culture and daily life of the Institute. Concurrently, he will be working on an ongoing self-portrait project that investigates his interior emotional landscape.

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

Tarik O'Regan is currently working on a monodrama based on Anna Rabinowitz's extended poem *The Wanton Sublime* and a reduced version of Arnold Schoenberg's *Erwartung*, for which he is preparing the arrangement. This pairing, forming an evening-length production, deals with the spiritual expansion of a single moment of trauma.



Tom Phillips
Painter, writer, composer

Tom Phillips is looking forward to thinking about a final picture/text/score version of his opera *IRMA*, which was originally completed on the day and on the hour man landed on the moon.

Director's Visitors

Siobhan Roberts
Writer, journalist
Funding provided by Dow Jones and Company, Inc.

Siobhan Roberts is a Toronto-based journalist and author of *King of Infinite Space: Donald Coxeter, The Man Who Saved Geometry*. While at the Institute, she is writing a biography of Princeton mathematician John Horton Conway.

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.

This year, composer and clarinetist Derek Bermel has been named Artist-in-Residence. He will be responsible for organizing the 2009–10 Edward T. Cone Concert Series, "The Harmonic Series," while pursuing his scholarly and creative interests and developing major work.

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

The winner of numerous prizes, including the 2001 Rome Prize Fellowship from the American Academy in Rome, Bermel has received commissions from a diverse array of American orchestras. In addition to directing the IAS concert series, he will be busy composing and performing at venues throughout the world. He will work on a commission from the Los Angeles Philharmonic that will have its world premiere next May, conducted by Gustavo Dudamel. He will also compose a new work for the Los Angeles Chamber Orchestra's 2010–11 season.

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