IAS | INSTITUTE FOR ADVANCED STUDY

Faculty and Members
2020–2021

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*

Contents

Information contained herein is current as of September 30, 2020

Introduction

THE INSTITUTE FOR ADVANCED STUDY is an international center for theoretical research and intellectual inquiry that provides an exceptional environment for the acceleration of ideas and knowledge. It creates time and space for solitary work as well as dialogue among some 250 researchers selected and mentored each year from more than 100 institutions around the world and at various stages in their careers by a permanent Faculty, each of whom are preeminent leaders in their fields. From postdocs with new perspectives and tools, to established experts who create and advance fields of inquiry, the Institute's focused yet freely inquisitive atmosphere enables advancement in unforeseeable ways, leading to societal innovation and new understanding.

Research spans four Schools—Historical Studies, Mathematics, Natural Sciences, Social Science—and is focused on long-term and fundamental outcomes with no concern for immediate application but rather revolutionary and sustained impact. IAS is a scholar's paradise—a campus of unparalleled energy and curiosity, free of external pressures and academic restraints, where exceptional minds have boundless opportunity to explore what is not yet known. Thirty-four Nobel Laureates, forty-two of the sixty Fields Medalists, and nineteen of the twenty-two Abel Prize Laureates, as well as many winners of the Wolf and MacArthur prizes, have been affiliated with the Institute.

At the Institute, everything is designed to encourage scholars to take their research to the next level. Members carry out their work in a setting where human scale has been carefully maintained to encourage the sharing of ideas, serendipitous interaction, and friendship. During the 2020–21 academic year, the Institute has adopted special measures in support of public health, ensuring that scholars both local and remote are safely able to push the boundaries of knowledge forward.

Located in Princeton, New Jersey, the Institute was founded in 1930 with the motto "Truth and Beauty." It is an independent educational institution that charges no tuition and relies on charitable contributions and grants for its operation. Brother-and-sister philanthropists Louis Bamberger and Caroline Bamberger Fuld established the Institute in the vision of founding Director Abraham Flexner. It was Flexner's belief that if the Institute

> eschews the chase for the useful, the minds of its scholars will be liberated, they will be free to take advantage of surprises, and someday an unexpected discovery, apparently leading nowhere, will be found to be an indispensable link in a long and complex chain that may open new worlds in theory and practice.

Long and complex chains of knowledge have developed in numerous and astounding ways through research originating at the Institute—from the development of programmable computers and the uncovering of deep symmetries of nature to advances in societal understanding and historical practice. Current research at IAS involves pursuing a theory of everything that governs the smallest and largest phenomena in our universe, a unified framework pursued by IAS founding Professor Albert Einstein, father of the theory of relativity; using computational tools, models, and simulations to determine the origins and long-term fate of the universe; establishing the theoretical foundations of machine learning; reconstructing history through textual and material evidence, utilizing digital resources, climate data, and genetic information; examining facets of society previously overlooked or hidden, such as racial formation and social citizenship and emerging scientific and technological phenomena; and developing a critical anthropology of politics and morality.

Albert Einstein, Kurt Gödel, Hetty Goldman, George F. Kennan, Erwin Panofsky, John von Neumann, and Hermann Weyl were among the first in a long line of distinguished Institute scientists and scholars to produce a deeper understanding of the physical world and of humanity. Flexner's vision has been maintained by his successors as Director: Frank Aydelotte, J. Robert Oppenheimer, Carl Kaysen, Harry Woolf, Marvin L. Goldberger, Phillip A. Griffiths, and Peter Goddard. In July 2012, Robbert Dijkgraaf became the Institute's ninth Director.

Robbert Dijkgraaf

Director and Leon Levy Professor

Robbert Dijkgraaf is a mathematical physicist and a distinguished public policy adviser who has made important contributions to string theory and the advancement of science education. Past President of the Royal Netherlands Academy of Arts and Sciences and Past Co-Chair of the InterAcademy Council, Dijkgraaf is a recipient of the Spinoza Prize, the highest scientific award in the Netherlands, a Knight of the Order of the Netherlands Lion, and a member of the American Academy of Arts and Sciences and the American Philosophical Society. Dijkgraaf is most recently the author of *The Usefulness of Useless Knowledge* (Princeton University Press, 2017) in which he and IAS founding Director Abraham Flexner articulate how essential basic research and original thinking are to innovation and societal progress, a belief that has informed the mission of the Institute for nearly ninety years.

School of Historical Studies

Administrative Officer: Danette Rivera

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 as it brings together disciplines that are normally isolated in separate departments in traditional research universities. The School supports all inquiry for which historical methods and approaches are appropriate 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 Asian civilizations, with emphasis on Greek and Roman civilization, the history of Europe (medieval, early modern, and modern), the Islamic world, and East Asia, but it also promotes research in areas beyond the scholarly interests of its Faculty. The School has supported scholars whose work focuses on other regions, including Central Asia, India, Africa, and the Americas.

The Members of the School represent a variety of nationalities and career stages, with a continually increasing number of young researchers and scholars from less privileged countries. 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, ranging from the edition of texts and the analysis of images to cooperations with the social and natural sciences. 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 supports research that often is not possible in other academic environments and encourages the creation of new historical enterprises.

Suzanne Conklin Akbari

Professor · Medieval Studies

Suzanne Conklin Akbari has expanded the range and methods of exploring texts from the Middle Ages, pushing the boundaries of traditional readings and exploring shared histories. Her research has traced the evolving relationship between sight and knowledge as manifested in a range of poetic texts, explored the relationship between Islam and Christianity, challenged the notion of medieval European literature's insularity, and highlighted the influence of Arabic poetry, music, and philosophy. She is currently working on a survey of metaphor and metamorphosis as they were understood in England and France circa 1400, and an examination of how premodern people saw themselves situated in history.

Yve-Alain Bois

Professor · Art History

A specialist in twentieth-century European and American art, Yve-Alain Bois is recognized as an expert on a wide range of artists, from Henri Matisse and Pablo Picasso to Piet Mondrian, Barnett Newman, and Ellsworth Kelly. The curator of a number of influential exhibitions, he is currently working on several long-term projects, foremost among them the catalogue raisonné of Ellsworth Kelly's paintings and sculptures, the second volume (out of five) of which he plans to finish this year.

Angelos Chaniotis

Professor · Ancient History and Classics

Angelos Chaniotis is engaged in wide-ranging research in the social, cultural, religious, and legal history of the Hellenistic world and the Roman East. The author of many books and articles and senior editor of the *Supplementum Epigraphicum Graecum*, he has worked on war, religion, communicative aspects of rituals, and strategies of persuasion in the ancient world. His current research focuses on emotions, memory, identity, the history of Aphrodisias (Asia Minor) and Crete, and the history of the night. He is interested in previously unexplored aspects of the ancient world in a dialogue with other disciplines.

SCHOOL OF HISTORICAL STUDIES

Nicola Di Cosmo

Luce Foundation Professor in East Asian Studies · East Asian Studies

Nicola Di Cosmo's research focuses on the relations between China and Inner Asia from prehistory to the early modern period. He is interested in the history and 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 works explore the use of proxy data from climatology and other palaeosciences in the study of the history of China and Central Asia, with special reference to early Eurasian nomads, the Mongol empire, and the Qing dynasty.

Jonathan Haslam

George F. Kennan Professor · History of International Relations (Late Modern)

Jonathan Haslam is a leading scholar on the history of thought in international relations and the history of the Soviet Union whose work builds a bridge between historical studies and the understanding of contemporary phenomena through critical examinations of the role of ideology. His studies of Soviet foreign policy are expansive in their quality and range, demonstrating his keen originality of thought, supported by insightful and comprehensive archival research. Haslam is the author of many books, as well as a blog, www.throughrussianeyes.com, which highlights aspects of Russia's foreign and defense policies that do not see the light of day in mainstream media. He is currently completing a work detailing the origins of the Second World War, focusing on the role of ideology.

Myles W. Jackson

Professor · History of Science

Myles W. Jackson, a historian of science, explores the intersections between science, technology, aesthetics, history, and society. The breadth of Jackson's research extends from the artisanal production of scientific knowledge in nineteenth-century Germany to molecular biology and physics, intellectual property and privacy issues, knowledge sharing, race and genomics, bioengineering, and the interactions between musicians, natural scientists, and radio engineers. His scholarship is noted for its cross-disciplinary methodology and interweaves economic, commercial, and scientific insights, pushing the boundaries of the field to establish fresh lines of inquiry.

Sabine Schmidtke

*Professor* · Islamic Intellectual History

Sabine Schmidtke is a scholar of Islamic intellectual history whose research has transformed perspectives about the interrelations and connections among different strands of intellectual inquiry, across time, place, religions, and philosophical schools. Schmidtke is currently working on the history of Islamic thought in the postclassical period (thirteenth to nineteenth century) with a focus on reconstructing the textual heritage and the intellectual import of the Islamic intellectual world, from Iran and Central Asia to Turkey and Yemen. She is also engaged in a comprehensive study of the Muslim reception of the Bible, a topic on which she has published extensively.

Francesca Trivellato

Andrew W. Mellon Professor · Early Modern Europe

A leading historian of early modern Italy and continental Europe, Francesca Trivellato has made significant and groundbreaking contributions to our understanding of the organization and culture of the marketplace in the pre-industrial world. Trivellato's original and imaginative research has revitalized the study of early economic history, and her influential work on cross-cultural trade intersects European, Jewish, and Mediterranean studies, and global history, religion, and capitalism.
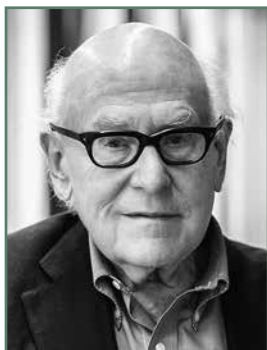
Glen W. Bowersock

Professor Emeritus · Ancient History

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

Caroline Walker Bynum

Professor Emerita · European Medieval History

Caroline Bynum studies the social, cultural, and intellectual history of medieval Europe. Her books have provided the major paradigm for the study of the medieval body, and several of her articles are widely cited in discussions of comparative history. Her recent work explores women's piety before and after the sixteenth-century reformations, the role of sacrifice in religion, the materiality of late medieval art and devotion, and theoretical questions concerning the agency of objects. A book on the meaning of "similitude," with examples from Hinduism and Buddhism as well as Judaism and Christianity, has just appeared in 2020.

Giles Constable

Professor Emeritus · Medieval History
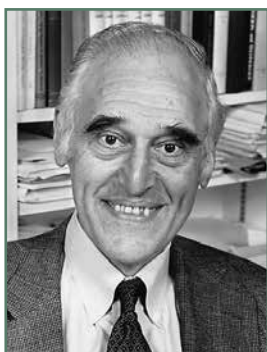
The medievalist Giles Constable is the author or editor of more than twenty books in the area of medieval religious and intellectual history concerning, among other subjects, the origins of monastic tithes, Peter the Venerable, the people and power of Byzantium, medieval religious and social thought, the reformation of the twelfth century, Renaissance Florence as seen through the case of Antonio Rinaldeschi, twelfth-century crusading, the history of Cluny, and the fourteenth-century crusading propagandist William of Adam. A work on the California Gold Rush appeared in 2015. He is at work on a short book on early medieval monasticism.

Patrick J. Geary

Professor Emeritus · Medieval History

Patrick Geary's work extends over a vast range of topics in medieval history, both chronologically and conceptually—from religiosity and social memory to language, ethnicity, social structure, and political organization. Many of his essays and books remain standard literature in the field and have been translated in multiple languages. He has directed the St. Gall Plan Project, an Internet-based initiative funded by the Andrew W. Mellon Foundation that provides tools for the study of Carolingian monasticism. Currently, Geary is leading a major project that studies the migration of European societies north and south of the Alps through the analysis of ancient DNA in Longobard-era cemeteries in Hungary and in Italy.

Jonathan Israel

Professor Emeritus · Modern European History

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

Heinrich von Staden

Professor Emeritus · Classics and History of Science

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

Hassan Farhang Ansari

Islamic Law and Theology · Institute for Advanced Study · *m*
Funding provided by the Persian Heritage Foundation and the Ruth Stanton Foundation

Hassan Farhang Ansari focuses on the study of Islamic theology, philosophy, law, and legal theory.

Ayse Baltacioglu-Brammer

Early Modern Middle East · New York University
Andrew W. Mellon Foundation Fellowship for Assistant Professors

The long-held narrative of an uncompromising sectarian division between the Sunni Ottoman and the Shia Safavid Empires emerged as a product of their escalated rivalry in the late fifteenth century. Ayse Baltacioglu-Brammer's book project examines the surrounding historical period and the formation (and reformation) of sectarian narratives and their enmeshment with nonsectarian issues.

Björn Burkhardt Peter Bentlage

Arabic Literature in the Early Modern Period · Orientalisches Institut, Martin-Luther-Universität Halle-Wittenberg · *f*
Infosys Member

Björn Burkhardt Peter Bentlage's research pertains to Arabic narratives of pilgrimage and religious visitation in the early modern period. Working from little-known manuscripts, Bentlage wants to shed light on the contexts in which it made sense to compose, write down, distribute, copy, buy, and read these texts.

Anna Bokov

History of Architecture · The Cooper Union for the Advancement of Science and Art
Funding provided by the Patrons' Endowment Fund

Anna Bokov's research focuses on the history of modern architecture and design pedagogy.

Olga Bush

Islamic Art and Architecture · Vassar College · *f*
Funding provided by the Ruth Stanton Foundation Fund

Olga Bush is working on a study of zoos, gardens, and the simulations of mechanical sculpture that complicated the boundary between the animate and inanimate in the medieval Islamic Mediterranean. It forms part of a larger work on the visual culture of al-Andalus in light of the environmental turn.

Aaron Michael Butts

Near Eastern Studies · The Catholic University of America · *v*

Aaron Butts's research is focused on the languages, literatures, and history of Christianity in the Near East, including especially Arabic, Ethiopic, and Syriac. His current book project investigates the so-called conversions of Ethiopia to Christianity.

Simona Cerutti

Early Modern History · École des Hautes Études en Sciences Sociales, Paris
Edwin C. and Elizabeth A. Whitehead Fellow

Simona Cerutti's research focuses on petitions during the early modern period. Instead of interpreting them as pressures on governers from below, Cerutti will consider them as expressions of a political pact, and will try to understand their grammar and contents. Cerutti's work combines iconography and political and legal theory with social analysis.

Rishad Choudhury

South Asian History · Oberlin College · *f*
Funding provided by the Herodotus Fund

Rishad Choudhury's research focuses on the relationship between empire, Islam, and the political cultures generated by South Asian hajj pilgrimage traffic in the Indian Ocean between the early modern and modern eras.

Dee Clayman

Classical Studies · *f*

Dee Clayman's project is a close study of the artists, actors, musicians, poets, historians, and philosophers who accompanied Alexander the Great on his march east. It aims to show that the expedition was an unprecedented cultural event that reinforced certain trends in post-classical Greek culture and reset the course of others.

Richard Bernard Cockett

Modern Intellectual History · *The Economist*
Elizabeth and J. Richardson Dilworth Fellow

Richard Bernard Cockett's research is on the intellectual, cultural, and political influence of Vienna upon the West during the twentieth century. For Cockett's purposes, "Vienna" encapsulates the city's modern golden age, from about 1890 to 1930. Cockett's project will focus mainly on the Viennese diaspora that fled the rise of fascism.

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Khaled Fahmy

Middle Eastern Studies · University of Cambridge
Patricia Crone Member

Khaled Fahmy is working on a revisionist Egyptian history of the 1967 Arab-Israeli war. Relying on published memoirs by Egyptian commanders, newspaper and magazine interviews with officers, as well as literary works written by soldiers, Fahmy aims to offer an account of the combat experience of thousands of soldiers facing one of the most catastrophic defeats in modern history.

David Hancock

History of the First British Empire, Business and Economic History of the Early Modern Atlantic World · University of Michigan · *s*
Martin L. and Sarah F. Leibowitz Member

While at IAS, David Hancock will be working on a biography of William Fitzmaurice, second Earl of Shelburne and first Marquis of Lansdown (1737–1805), the Irish-born scholar, soldier, politician, aesthete, and office-holder who as prime minister crafted the peace that ended the American revolutionary war.

Morten Steen Hansen

Early Modern Art History · Accademia di Danimarca–Det Danske Institut i Rom
Agnes Gund and Daniel Shapiro Member

Morten Steen Hansen aims to reopen the question of Mannerism and societal crisis through an examination of artistic response to the Sack of Rome by imperial troops in 1527. Perceived on Italian soil as Lutheran iconoclasm, the Sack led to artists' reinvestment in cult images to which miraculous agency was attributed.

Carissa M. Harris

English, Medieval Literature · Temple University
AMIAS Member

Carissa M. Harris is working on women's anger, misogyny, and political power in premodern Britain. This project explores how anger became feminized in the late medieval English popular imagination, focusing particularly on the figure of the wrathful shrew.

Áine Heneghan

Music Theory, Music History · University of Michigan · *s*
Funding provided by the Herodotus Fund

Áine Heneghan is preparing a monograph on the language of music theory as expressed in the writings of Arnold Schoenberg (Vienna, 1874–Los Angeles, 1951). This intellectual history prioritizes archival sources to provide a philological study of musical concepts and terms, many of which are borrowed from other disciplines.

Karen Henson

Musicology, Opera Studies · Queens College and The Graduate Center, The City University of New York

Edward T. Cone Member in Music Studies; additional funding provided by Carnegie Corporation of New York

Karen Henson is working on a book about the relationship between opera and sound recording from the invention of the phonograph to the breakthrough of tenor Enrico Caruso.

John North Hopkins

Art History, Archaeology · New York University

Friends of the Institute for Advanced Study Member

John North Hopkins works on the visual-spatial assemblage of early Rome. While at IAS, Hopkins will work on two projects, one focused on the experiential multivalence of art and architecture between Rome and its expanding territories, and the other on communities of belonging and othering in the early Roman urban assemblage.

Jonathan Hsy

Cultural History of Disability and Race · The George Washington University

George William Cottrell, Jr. Member

Jonathan Hsy's research explores diverse histories of embodiment through critical theory and cultural studies. His current book project examines first-person writings by blind and deaf medieval authors.

Eleanor Hubbard

Early Modern Britain · Princeton University

Elizabeth and J. Richardson Dilworth Fellow

Eleanor Hubbard's current project uses a set of detailed Inquisition records from the 1570s to trace the experiences and beliefs of a number of English seamen who were abandoned in Mexico in 1568 during a brutal slave-trading expedition. Largely unknown to British historians, these records provide a new perspective on early English Reformations and global encounters.

Christopher P. Jones

Classical Philology and History · Harvard University · *ra*

Christopher P. Jones is interested in Greek and Latin authors, especially of the period 1–300 C.E., Greek and Roman history of the same period, and Greek epigraphy.

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Yannis Kalliontzis

Ancient History, Greek Epigraphy · Center for Hellenic Studies,
Harvard University · *s*
Funding provided by the Hetty Goldman Fund

At IAS, Yannis Kalliontzis will work on a new analysis of the Boeotian
League, one of the oldest federal organizations of antiquity, from the
archaic period to its dissolution by the Romans in 171 B.C.E. Kal-
liontzis's study will be based on numerous epigraphic documents and
on literary and archaeological evidence.

Dimitri James Kastritsis

History · University of St Andrews
*Funding provided by the Fund for Historical Studies and the British Academy Mid-
Career Fellowship*

Dimitri Kastritsis is studying historical narratives surrounding the rise
of the Ottoman Empire in the fifteenth century C.E. These accounts in
Turkish, Persian, Greek, and other languages combine imagined views
of history, ideas of universalism and empire, and a search for a new
Ottoman identity in dialogue with an existing Roman and Islamic past.

Samantha Lee Kelly

Early Modern Mediterranean History · Rutgers, The State University of
New Jersey
Willis F. Doney Member

Samantha Kelly is studying the interface of Ethiopian Orthodox and
Catholic cultures in sixteenth-century Italy through an analysis of the
lives, communal experience, scholarly initiatives, and Catholic
patronage of the members of the Ethiopian pilgrim hostel/monastery
of Santo Stefano in Rome.

George A. Kiraz

Ottoman History of Religious Minorities, Syriac Studies · Beth Mardutho:
The Syriac Institute · *ra*

George Kiraz is working on Ottoman Garshuni documents from the
Mardin Patriarchal Archive dating to the late nineteenth century.
These are documentary petitions addressed to the Syriac Orthodox
Patriarchs who resided in Deir al-Zaʿfarān (Monastery of the Saffaron).

Gabor Kosa

History of Religions · Eötvös Loránd University (ELTE)
Roger E. Covey Member in East Asian Studies

At IAS, Gabor Kosa will explore the newly identified Chinese Man-
ichaean texts from Xiapu County (Fujian Province) and the eleven
Chinese Manichaean paintings (all but one preserved in Japan). Kosa
will contrast these new finds with earlier Manichaean corpora deriving
from China, Central Asia, and Egypt.

Xiaoqiao Ling

Literature and History of Reading · Arizona State University · *s*
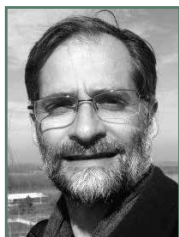*Funding provided by the Herodotus Fund*

Xiaoqiao Ling is working on the romantic play *The Story of the Western Wing*. By tracing how various social groups across cultural and regional geographies interpreted, adapted, and appropriated the play, this project aims to investigate how the play's social life sustained its iconic status throughout late imperial China.

Pamela Olivia Long

Late Medieval/Early Modern Europe, History of Science and Technology
Willis F. Doney Member

Pamela Olivia Long's project is a contextual and comparative study of manuscript and printed "machine books" that proliferated from late fifteenth to early seventeenth-century Europe. It will begin with a study of Leonardo da Vinci's Madrid Codex I of the 1490s and end with Vincenzo Scamozzi in 1612.

Jonathan Loopstra

Syriac Studies, Late Antiquity, Biblical Masorah · University of Northwestern–St. Paul · *s*
Funding provided by the Patricia Crone Fund

Jonathan Loopstra aims to complete the first general introduction to the Syriac "Masora," a genre of instructional manuscripts designed to help the reader pronounce and interpret words from across a spectrum of different sources, including works of patristics, grammar, exegesis, lexicography, and the Bible.

Valeria Alejandra Escauriaza Lopez Fadul

Early Modern Spain, Colonial Latin America, History of Science · Wesleyan University
Andrew W. Mellon Foundation Fellowship for Assistant Professors

Valeria Alejandra Escauriaza Lopez Fadul's book project reconstructs the beliefs and practices with which sixteenth-century scholars sought to write the history of Spanish America's multilingual domains. It argues that to those charged with extracting information from Spain's empire, language was an archive of local knowledge.

Georgia Mallouchou

History and Epigraphy · Archaeological Society at Athens
Stavros Niarchos Foundation Member

The aim of Georgia Mallouchou's project is to present critical editions and commentaries of the inscriptions of Chios from the classical and Hellenistic periods, and to make them available for research through the Inscriptiones Graecae (Berlin-Brandenburgische Akademie der Wissenschaften).

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Louise McReynolds

Imperial Russian History · The University of North Carolina at Chapel Hill
Funding provided by the Andrew W. Mellon Foundation Fund

Louise McReynolds is exploring how tsarist Russia's archeologists constructed an "imperial imaginary"; that is, how they generated a set of values and symbols that allowed subjects of the Russian tsar to recognize themselves as members of a multinational, multi-confessional empire whose roots stretched back not just centuries, but millennia.

Pernilla Myrne

Arabic Studies · University of Gothenburg
Funding provided by the Fund for Historical Studies

Pernilla Myrne is preparing a critical edition of the tenth-century erotic compendium *Jawāmiʿ al-Ladhdha* and examining its reception. The book, which relies on numerous earlier sources and was quoted for centuries, informs us about the circulation and development of ideas on sexuality in late antiquity and the medieval Islamic world.

Norihiro Naganawa

Russian and Eurasian History · Hokkaido University · *s*
William D. Loughlin Member

Norihiro Naganawa is writing a biography of a Tatar revolutionary and Soviet diplomat, Karim Abdraufovich Khakimov (1890–1938), whose trajectory encompasses the Volga-Urals, Turkestan, Bukhara, northern Iran, and the Red Sea. His life story illuminates the transformation of the fractured Romanov Empire into an anti-imperialist empire.

Arnaud Orain

History of Economics, Economic History · Université Paris 8 Vincennes-Saint-Denis
Funding provided by the Florence Gould Foundation Fund

Arnaud Orain's research explores older forms of economic knowledge that were influential before the emergence of "economics" in the eighteenth century: the dialogical discourse on commerce, economic fictions, the "oeconomy," and alchemical science.

Julia Christiane Orell

Art History of China · The University of British Columbia
Funding provided by the Herodotus Fund

Julia Orell's book project examines the role of landscape painting in the formation of images of place, site, region, and empire in Middle Period China. It addresses interactions with cartographic practice, geographic discourse, and conceptualizations of spatial orders to understand landscape painting as an active participant in knowledge formation.

Nahir Ivette Otano Gracia

Medieval Studies · University of New Mexico
Andrew W. Mellon Foundation Fellowship for Assistant Professors

Nahir Ivette Otano Gracia's research centers on the study of medieval literature from the global North Atlantic (British Isles, Iberia, and Scandinavia), as well as the representation of the Iberian Peninsula and Africa in the North Atlantic. Otano Gracia's theoretical frameworks include translation theory and critical identity studies.

Michael Peachin

Roman Imperial History, Roman Law · New York University
Funding provided by the Gladys Krieble Delmas Foundation

Michael Peachin's project seeks to place the work of the high imperial Roman jurisprudents into a wider context than has typically been presumed for them, and then to consider the consequences. The jurisprudence now preserved by Justinian's *Digest* was originally a vast literature about law, and must be read and interpreted as such. This impacts the substantive law.

Isabelle Poutrin

Early Modern History · Université de Reims Champagne-Ardenne · *s*
Funding provided by the Fund for Historical Studies

Isabelle Poutrin's current research focuses on the history of a family of Jewish bankers of Rome, the Corcos family, in which dozens of men and women became Catholics during the sixteenth century, taking on the name Boncompagni. It centers on the economic gains and losses connected with the change of religious affiliation.

Jessica Ratcliff

History of Science and Technology · Cornell University
Founders' Circle Member; funding provided by Georg Albers-Schonberg in memory of Ernst Albers-Schonberg

Jessica Ratcliff is researching the relationship between science and colonial capitalism in nineteenth-century Britain and its empire. Her current book project is about the East India Company's library and museum in London. In it, she offers a new perspective on the political economy of Britain's "second scientific revolution."

Jonathan Sheehan

History · University of California, Berkeley
Hans Kohn Member

Jonathan Sheehan works on the cultural and intellectual history of early modern Europe, with particular focus on religion, science, and scholarship. His project at IAS explores the history of sacrifice in the European religious and secular imagination, from the late Middle Ages to the modern era.

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Francesco Torchiani

Intellectual History, Jewish Studies · Università degli Studi di Pavia · *f*
Felix Gilbert Member

Francesco Torchiani is preparing a book on the diaspora of Italian intellectuals between the approval of racial laws by the fascist regime in 1938 and the end of the Second World War. Specifically, this book will weave the threads of the lives of ten Jewish scholars faced with three choices: leave, stay, wait.

Stephen V. Tracy

Greek History and Epigraphy · The American School of Classical Studies in Athens · *ra*

Stephen V. Tracy is helping English and Australian colleagues prepare a new edition of Athenian decrees of the late fourth to third century B.C.E. He is also working on Athenian letter cutting of the second half of the fifth century B.C.E. and on the hands of the so-called "Athenian Tribute Lists."

Karina Urbach

Modern International Relations and Jewish Family History · University of London · *v*

Karina Urbach is researching intelligence sources (Counterintelligence Corps) regarding Central Europe. She is also following the trail of an Austrian refugee from the 1930s onwards.

Marijn van Putten

Philology, Text Criticism, Historical Linguistics · Leiden University · *s*
Funding provided by the Herodotus Fund

While at IAS, Marijn van Putten will examine a corpus of early Islamic Qur'anic manuscripts in order to reconstruct their reading tradition. These manuscripts predate the canonization of the reading traditions, and their study will reveal how the Qur'an was read and understood before this canon developed.
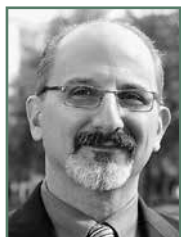
Constantine Vaporis

Japanese History (Early Modern Period) · University of Maryland, Baltimore County
Starr Foundation East Asian Studies Member

Constantine Vaporis is working on a collection of biographies of samurai from 1600 to 1868. Through the lives of fourteen individuals, this book project aims to capture the larger story of the transformation of the samurai from largely illiterate, landed warriors to an urban, cultured, and primarily stipended bureaucratic elite.

SCHOOL OF HISTORICAL STUDIES

Nathan Vedal

Chinese Cultural History · Washington University in St. Louis
Andrew W. Mellon Foundation Fellowship for Assistant Professors; additional funding provided by the ACLS Fellowship

Nathan Vedal is researching the practices of compiling, circulating, and reading encyclopedic texts in late imperial China.

Alexandra Villing

Archaeology · British Museum · *f*
Funding provided by the Hetty Goldman Fund

Alexandra Villing is an archaeologist and curator of the Greek collections in the British Museum's Department of Greece and Rome. Her research centers on the interaction between Greece and neighboring cultures in the first millennium B.C.E.

Nicholas James Watson

Medieval Studies · Harvard University
Funding provided by the Andrew W. Mellon Foundation Fund

Nicholas James Watson is studying the long history of the vernacular religious literature of England (Old English, Anglo-Norman French, Middle English) in relation to broader European developments, literary, cultural, and theological, between the late ninth and early sixteenth centuries.

Shellen Xiao Wu

Asian History, Global History · University of Tennessee, Knoxville
Starr Foundation East Asian Studies Member

Shellen Xiao Wu's research traces the global history of the frontier in the twentieth century, with an emphasis on China. Wu argues that "geo-modernity" emerged from unique dynamics during a turbulent transitional period from empire to nation-state.

Meng Zhang

Early Modern China, Economic and Environmental History · Loyola Marymount University · *s*
Andrew W. Mellon Foundation Fellowship for Assistant Professors

Meng Zhang is researching the making, circulation, and consumption of edible birds' nests, exalted for their purported health benefits in traditional Chinese medicine. Demand for this delicacy by Chinese elites spurred the Sino–Southeast Asia trade networks and transformed the life and environment of the birds and the islanders living near them.

SCHOOL OF HISTORICAL STUDIES

Jan Michael Ziolkowski
Medieval and Medievalism Studies · Dumbarton Oaks and Harvard University · *f*
Funding provided by the Fund for Historical Studies
The *Waltharius* or *Poem of Walter* is the only surviving early Germanic epic apart from *Beowulf.* In Latin, it holds vast importance for the insights it affords into not only early medieval culture but also the complicated reception of Germanic heroism in modern culture.

SCHOOL OF HISTORICAL STUDIES

f First Term · *s* Second Term · *m* Long-term Member · *v* Visitor · *ra* Research Associate

School of Mathematics

Administrative Officer: Nicole Maldonado

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 theoretical 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 nine decades 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 2020–21 academic year, the School will have a special program on Geometric and Modular Representation Theory. Geordie Williamson of the University of Sydney will be the Distinguished Visiting Professor.

Other programs associated with the School are the 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 week-long workshop traditionally held on campus.

★ *During the 2020–21 academic year, some annual programs may be held virtually or postponed due to Covid-19.*

SCHOOL OF MATHEMATICS

Camillo De Lellis

IBM von Neumann Professor

Camillo De Lellis, geometric analyst, has broad expertise in the calculus of variations, geometric measure theory, and fluid dynamics. Using modern tools and innovative approaches, de Lellis has contributed to central problems in analysis and geometry, resulting in the creation of a transparent proof of regularity and opening new lines of inquiry for geometric analysts to explore.
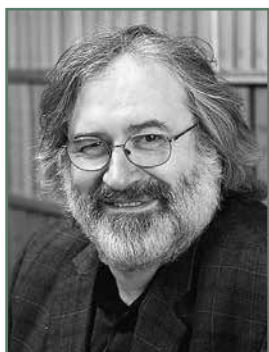
Helmut Hofer

Hermann Weyl 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."
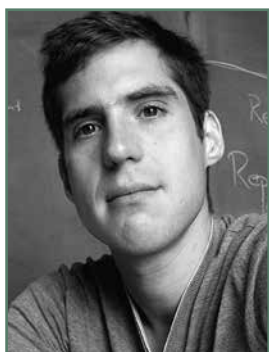
Jacob Lurie

Professor

Jacob Lurie's research has influenced a diverse range of fields from topology to number theory, providing foundational work that has changed the way mathematicians describe and work with derived phenomena. His ideas have redefined the foundations of homotopy theory and topological aspects of algebraic geometry, providing a channel through which algebraic topology influences algebraic geometry. His proof of the Baez-Dolan cobordism hypothesis changed the field drastically, providing a precise dictionary between manifold theory and operadic algebra as well as an applicable language for topological field theory.

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.

Akshay Venkatesh
Robert and Luisa Fernholz Professor

Akshay Venkatesh is a mathematician who has worked on many topics at the interface between number theory and other fields, including representation theory, dynamics, and algebraic topology. His recent work examines new algebraic structures related to the topology of locally symmetric spaces.

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)?

SCHOOL OF MATHEMATICS

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Enrico Bombieri
Professor Emeritus

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.

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.

Phillip A. Griffiths
Professor Emeritus

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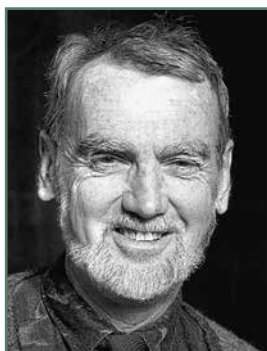
Robert P. Langlands
Professor Emeritus

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

Robert MacPherson
Professor Emeritus

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.
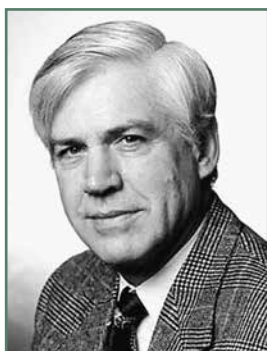
Thomas Spencer
Professor Emeritus

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

Lior Alon

Mathematical Physics · Institute for Advanced Study
Funding provided by The Ambrose Monell Foundation

Lior Alon is interested in quantum graphs, quantum chaos, and universal statistical behavior. In particular, Alon is working on nodal count statistics and quantum ergodicity on growing families of metric graphs, through the scope of their secular manifolds.

Huanchen Bao

Representation Theory · National University of Singapore

Huanchen Bao's current research focuses on quantum groups, quantum symmetric pairs, and total positivity.

Roman Bezrukavnikov

Representation Theory, Algebraic Geometry · Massachusetts Institute of Technology · *s*

Roman Bezrukavnikov concentrates on problems in geometric representation theory and in algebraic geometry.

Vijay Bhattiprolu

Approximation, Optimization, Convex Geometry · Institute for Advanced Study
Funding provided by the National Science Foundation

Vijay Bhattiprolu works on the intersection of convex geometry, approximation algorithms, and continuous optimization. A current interest is characterizing the (computational) approximability of quadratic maximization over convex sets as a function of the geometry of the convex set.

Terrence Blackman

Number Theory · Medgar Evers College, The City University of New York · *v*

Terrence Blackman works on aspects of the Jacquet-Langlands correspondence in the Langlands program. Specifically, Blackman studies the discrete spectrum and the eigenfunctions of the Laplacian for a special class of "arithmetic" surfaces, namely those with constant negative curvature, finite area, and a finite number of "punctures" or "cusps."

f First Term · *s* Second Term · *v* Visitor · *dvp* Distinguished Visiting Professor · *vp* Visiting Professor
vri Veblen Research Instructorship · *vnf* von Neumann Fellowship

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Pablo Boixeda Alvarez

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

Pablo Boixeda Alvarez's research interests lie in the field of modular representation theory of algebraic groups and related questions. In particular, Boixeda Alvarez's research has focused on the representation theory of the small quantum group and Frobenius kernels and related geometric questions about certain affine Springer fibers.

Tom Braden

Topology, Representation Theory, Combinatorics · University of Massachusetts · *s*
Funding provided by the National Science Foundation

Tom Braden plans to study three things at IAS: first, modular perverse sheaves on singularities with symplectic resolutions, including nilpotent cones and the affinization of Hilbert schemes of points in C^2; second, sheaves on the moment graph of the semi-infinite affine Grassmannian; third, perverse sheaves on the "Schubert varieties" of matroids.

Elia Bruè

Metric Geometry, Partial Differential Equations · Institute for Advanced Study
Giorgio and Elena Petronio Fellowship

Elia Bruè works in metric geometry and partial differential equations. He has been investigating the structure of non-smooth spaces with Ricci curvature bounded from below, quantitative properties of ODE flows, and solutions to partial differential equations with rough coefficients mainly coming from fluid mechanics.

Clark W. Butler

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

Clark Butler's research focuses on the properties of the Lyapunov spectrum associated with an Anosov diffeomorphism. His primary project while at IAS will be to extend continuity and simplicity of spectrum results from a special class of these diffeomorphisms to an open and dense subset of all Anosov diffeomorphisms.

Tsao-Hsien Chen

Geometric Representation Theory · University of Minnesota · *s*
Funding provided by the S. S. Chern Foundation for Mathematical Research Fund

Tsao-Hsien Chen is working on geometric representation theory of real groups, Hitchin fibrations, and the Langlands program.

SCHOOL OF MATHEMATICS

f First Term · *s* Second Term · *v* Visitor · *dvp* Distinguished Visiting Professor · *vp* Visiting Professor
vri Veblen Research Instructorship · *vnf* von Neumann Fellowship

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Sergey Cherkis

Differential Geometry, Mathematical Physics · University of Arizona
Funding provided by the Charles Simonyi Endowment

Sergey Cherkis constructs solutions of gauge theory equations and studies moduli spaces appearing in classical and quantum gauge theories. He is especially interested in hyperkähler geometry and special holonomy manifolds.

Laurent Côté

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

Laurent Côté's main area of research is symplectic topology. He is interested in the development of various types of "curve counting" invariants and their relation to problems in symplectic, contact, and low-dimensional topology. He has also worked on questions in four-dimensional symplectic topology using holomorphic curve techniques.

Daniel Anthony Cristofaro-Gardiner

Symplectic Geometry · University of California, Santa Cruz · *vnf*
Funding provided by the National Science Foundation

Daniel Cristofaro-Gardiner is currently interested in Hamiltonian dynamics and symplectic embedding problems. While at IAS, he plans to study three-dimensional Reeb dynamics, higher-dimensional symplectic embedding problems, the arithmetic of four-dimensional symplectic embedding problems, and the foundations of embedded contact homology.
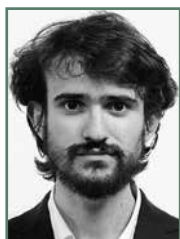
Andrea Dotto

Algebraic Number Theory · Institute for Advanced Study
Funding provided by the James D. Wolfensohn Fund

Andrea Dotto is interested in the Langlands correspondence and related topics in number theory and representation theory. He is currently studying the connections between the geometry of moduli spaces of local Galois representations and the structure of categories of modular representations of p-adic groups.

Anne Dranowski

Geometric Representation Theory · Institute for Advanced Study
Founders' Circle Member; funding provided by Cynthia and Robert Hillas

At the Institute, Anne Dranowski will continue to think about combinatorics through the algebraic geometry of loop Grassmannians. Among the projects that she intends to pursue are a comparison of the MV basis and the KLRW basis and a study of Grassmannians and plane partitions.

f First Term · *s* Second Term · *v* Visitor · *dvp* Distinguished Visiting Professor · *vp* Visiting Professor
vri Veblen Research Instructorship · *vnf* von Neumann Fellowship

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Benjamin Elias

Representation Theory · University of Oregon · *vnf*
Funding provided by the National Science Foundation

Benjamin Elias is working on categorifications of Hecke algebras and quantum groups, and diagrammatic algebras in representation theory.

Anna Erschler

Group Theory, Probability Theory, Metric Geometry · École Normale Supérieure

Anna Erschler researches the valuation of growth function asymptotics for groups of intermediate growth, Grigorchuk groups, criteria for triviality and non-triviality for the Liouville property for random walks on groups, the full description of the Poisson boundary, iso-perimetric inequality for solvable groups, and the travelling salesman problem in groups.

Tony Feng

Number Theory, Arithmetic Geometry · Institute for Advanced Study
Friends of the Institute for Advanced Study Member

Tony Feng is interested in number theory and its connections with topology and representation theory. Some of Feng's current projects study questions related to Langlands functoriality using tools from geometric representation theory and p-adic geometry.

Peter Fiebig

Representation Theory · Friedrich-Alexander-Universität Erlangen–Nürnberg · *f*

Peter Fiebig's main field of interest is currently the representation theory of algebraic groups in positive characteristics. The main tools in Fiebig's research are combinatorial categories that lie at the intersection of algebra and geometry.

Jessica Fintzen

Representation Theory, Number Theory · University of Cambridge, Duke University

Jessica Fintzen is interested in representation theory, number theory, and their interplay. Most of her research projects concern the structure theory and representation theory of p-adic reductive groups and various incarnations of the Langlands program.

<div style="writing-mode: vertical">SCHOOL OF MATHEMATICS</div>

f First Term · *s* Second Term · *v* Visitor · *dvp* Distinguished Visiting Professor · *vp* Visiting Professor
vri Veblen Research Instructorship · *vnf* von Neumann Fellowship

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Soeren Fournais

Mathematical Physics · Aarhus University
Funding provided by the Charles Simonyi Endowment

Soeren Fournais works on the mathematics of quantum mechanics. His most recent interest is the mathematics around Bose Einstein con–densation, in particular the ground state energy of dilute Bose gases.
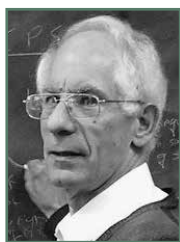
Eric M. Friedlander

Modular Representation Theory · University of Southern California · *f*

Eric M. Friedlander plans to continue investigating several aspects of modular representation theory from a geometric perspective. One focus of current research is development of a suitable theory of "support varieties" for quantum doubles of finite group schemes. Another topic is consideration of infinite dimensional representations for linear algebraic groups by adapting techniques used for finite dimensional representations of finite group schemes.

Susan Friedlander

Mathematical Fluid Dynamics · University of Southern California · *f*

Susan Friedlander uses techniques of PDE to study the Euler equations and the Navier–Stokes equations, with particular interest in stability and turbulence.

Mathilde Gerbelli-Gauthier

Number Theory, Representation Theory · Institute for Advanced Study · *s*
Funding provided by the Charles Simonyi Endowment

Mathilde Gerbelli–Gauthier's research is in number theory with a focus on automorphic representations. She is especially interested in their asymptotic properties, as well as applications to the study of locally symmetric spaces.

Silvia Ghinassi

Geometric Measure Theory · Institute for Advanced Study · *v*

Silvia Ghinassi works in geometric measure theory and its interplay with harmonic analysis and partial differential equations.

f First Term · *s* Second Term · *v* Visitor · *dvp* Distinguished Visiting Professor · *vp* Visiting Professor
vri Veblen Research Instructorship · *vnf* von Neumann Fellowship

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Mark Goresky

Geometry, Automorphic Forms · Institute for Advanced Study · *v*

Mark Goresky is studying the moduli space of abelian varieties with real structures and its finite field analogues.

François Greer

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

François Greer works in algebraic geometry with a specific focus on moduli spaces of Calabi–Yau varieties. He is currently studying relations between quasimodular forms and Gromov-Witten theory.

Jesper Grodal

Homotopy Theory, Representation Theory · University of Copenhagen · *s*
Funding provided by the Charles Simonyi Endowment

Jesper Grodal is interested in the interplay between homotopy theory and representation theory. This includes applying tools from representation theory to problems in algebraic topology, e.g., via obstruction theory, as well as using tools from homotopy theory and higher algebra to study classes of representations.

Henrik Per Anders Gustafsson

Number Theory, Representation Theory · Institute for Advanced Study

Henrik Gustafsson's research interests include automorphic forms and representations, as well as Whittaker functions and their connections to solvable lattice models, with applications to theoretical physics and combinatorics.

Nate Harman

Representation Theory · Institute for Advanced Study
Minerva Research Foundation Member

Nate Harman studies stability and periodicity phenomena in representation theory, symmetric tensor categories, algebraic combinatorics, and representations of infinite rank arithmetic groups.

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f First Term · *s* Second Term · *v* Visitor · *dvp* Distinguished Visiting Professor · *vp* Visiting Professor
vri Veblen Research Instructorship · *vnf* von Neumann Fellowship

Xuhua He

Algebraic Groups, Representation Theory, Arithmetic Geometry · Chinese University of Hong Kong

Xuhua He studies algebraic groups, representation theory, and arithmetic geometry. He is particularly interested in questions related to (finite and affine) Weyl groups and flag varieties, and their applications to arithmetic geometry and representation theory.

Fotis Iliopoulos

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

Fotis Iliopoulos's interests lie in algorithms and probability. In particular, Iliopoulos has been working on stochastic local search algorithms for finding and sampling solutions of constraint satisfaction problems.

Lars Thorge Jensen

(Geometric) Modular Representation Theory · Institute for Advanced Study
Funding provided by the National Science Foundation

Lars Thorge Jensen is studying the Hecke category and its algebraic and geometric incarnations (Soergel bimodules, perverse and parity sheaves on flag varieties, equivariant coherent sheaves on the Steinberg variety), representation theory of reductive algebraic groups (in positive characteristic), and the p-Kazhdan-Lusztig basis of the Hecke algebra and its cell theory.

Daniel Juteau

Representation Theory · CNRS, Université Paris Diderot
Funding provided by the Charles Simonyi Endowment

Daniel Juteau has been working in geometric representation theory, using geometric tools such as perverse sheaves and intersection cohomology to solve representation theoretic problems, e.g., computing characters. He has focused particularly on the modular (i.e., positive characteristic) case.

Tasho Kaletha

Representation Theory of Real and p-adic Groups, Automorphic Forms · University of Michigan · *vnf, f*
Funding provided by the Charles Simonyi Endowment

Tasho Kaletha is interested in the Langlands conjectures for disconnected reductive groups, L-packets consisting of supercuspidal representations, decomposition of Deligne-Lusztig inductions for connected and disconnected groups, and endoscopic character identities.

Adam Klivans

Machine Learning, Computational Complexity · The University of Texas at Austin · *v, f*

Adam Klivans works at the intersection of theoretical computer science and machine learning. His research interests include developing provably efficient algorithms for learning neural networks and graphical models. He also works on making supervised learning algorithms robust to noise.

Hyunju Kwon

Partial Differential Equations · Institute for Advanced Study
Funding provided by the National Science Foundation

Hyunju Kwon is interested in nonlinear partial differential equations. Kwon has been exploring incompressible fluid models, such as the Euler equations, Navier-Stokes, and equations arising from them, using functional and harmonic analysis tools.
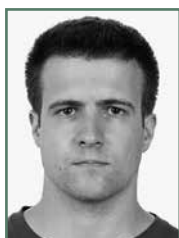
Emmanuel Lecouturier

Number Theory · Institute for Advanced Study
Shiing-Shen Chern Member

Emmanuel Lecouturier is working on modular forms and related topics. More specifically, Lecouturier is studying Eisenstein ideals, modular symbols, Galois representations, and the BSD conjecture and its variants (e.g., the Mazur-Tate conjecture).

Linyuan Liu

Modular Representation Theory · Sydney Mathematical Research Institute, The University of Sydney
Minerva Research Foundation Member

Linyuan Liu is interested in representations of reductive group schemes in positive characteristics: in particular, the cohomology of line bundles on flag schemes and topics related to the geometric Satake correspondence.

Ricky I. Liu

Combinatorics · North Carolina State University
Funding provided by the National Science Foundation

Ricky I. Liu's research interests lie in algebraic combinatorics, specifically connections between symmetric functions, the representation theory of the symmetric group, and lattice polytopes.

SCHOOL OF MATHEMATICS

f First Term · *s* Second Term · *v* Visitor · *dvp* Distinguished Visiting Professor · *vp* Visiting Professor
vri Veblen Research Instructorship · *vnf* von Neumann Fellowship

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Patrick Lopatto

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

Patrick Lopatto is interested in probability theory and its applications. His work focuses on universality questions in random matrix theory.

Ivan Loseu

Representation Theory · Yale University · *s*
Funding provided by Carnegie Corporation of New York

Ivan Loseu is interested in geometric representation theory, including the representation theory of quantized symplectic singularities, semi-simple Lie algebras, quantum groups, etc.

Alexander Lubotzky

Group Theory, Number Theory, Geometry, Combinatorics, Computer Science · The Hebrew University of Jerusalem · *vp, f*

Alexander Lubotzky is interested in all parts of group theory, including: Lie groups, arithmetic groups, finite groups, geometric and combinatorial group theory. Lubotzky is especially interested in connections with CS and combinatorics. These days, Lubotzky is working on stability theory in group theory and on property-testing and error-correcting codes.

George Lusztig

Representation Theory · Massachusetts Institute of Technology · *f*

George Lusztig plans to study total positivity in reductive groups, character sheaves, and properties of unipotent classes.

Viswambhara Makam

Invariant Theory, Computational Complexity · Institute for Advanced Study · *f*
Funding provided by the National Science Foundation

Viswambhara Makam is interested in applying algebraic techniques from invariant theory and representation theory to problems in computational complexity and tensors.

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f First Term · *s* Second Term · *v* Visitor · *dvp* Distinguished Visiting Professor · *vp* Visiting Professor
vri Veblen Research Instructorship · *vnf* von Neumann Fellowship

Shotaro Makisumi

Representation Theory · Columbia University
Funding provided by the National Science Foundation

Shotaro Makisumi's research is in representation theory. At IAS, Makisumi plans to pursue some recent developments in the understanding of the Koszul duality phenomenon for the Hecke category, especially as it relates to modular representation theory and link homology.

William A. Massey

Dynamical Queueing Systems · Princeton University

At the Institute, William Massey will continue his study of the spectral dynamic analysis of stochastic service networks. Many of these problems reduce to the transient analysis of reflected random walks on multidimensional integer lattices.

Peter Nandori

Dynamical Systems · Yeshiva University · *s*
Funding provided by the Charles Simonyi Endowment

Peter Nandori studies statistical properties of hyperbolic dynamical systems and their applications to mathematical statistical mechanics. Nandori plans to work on the derivation of the heat equation from microscopic deterministic models.

Abhishek Oswal

Number Theory, Arithmetic Geometry · Institute for Advanced Study
AMIAS Member

Abhishek Oswal hopes to investigate questions of functional transcendence in the non-Archimedean setting using tools from model theory. Oswal also hopes to better understand variations of Hodge structures and Galois representations in the p-adic setting.

Tudor Padurariu

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

Tudor Padurariu is interested in enumerative geometry, especially categorifications of Donaldson-Thomas invariants and applications of these in the study of Hall algebras.

SCHOOL OF MATHEMATICS

f First Term · *s* Second Term · *v* Visitor · *dvp* Distinguished Visiting Professor · *vp* Visiting Professor
vri Veblen Research Instructorship · *vnf* von Neumann Fellowship

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Jinyoung Park

Combinatorics, Asymptotic Enumeration, Graph Theory · Institute for Advanced Study
Funding provided by the National Science Foundation

At IAS, Jinyoung Park is working on probabilistic and extremal combinatorics.

John Peebles

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

John Peebles works in subfields including algorithms, optimization, and statistics. Peebles is also interested in applications of these techniques to other fields, including complexity theory and deep/ traditional machine learning.

Sarah Peluse

Number Theory · Institute for Advanced Study and Princeton University · *vri*
Funding provided by the Oswald Veblen Fund

Sarah Peluse works in analytic number theory and arithmetic combinatorics, and is especially interested in questions in higher-order Fourier analysis and additive number theory.

Toniann Pitassi

Computational Complexity, Proof Theory · University of Toronto · *vp, f*
Funding provided by the National Science Foundation

Toniann Pitassi's research area is complexity theory: understanding the limitations of computation, specializing in circuit complexity, proof complexity, and communication complexity. She is also interested in mathematical models for privacy-preserving computation and non-discriminatory machine learning.

Jacob Rasmussen

Topology · University of Cambridge · *f, v/s*

Jacob Rasmussen studies Floer homology, Khovanov homology, and their applications to the topology of knots, 3-manifolds, and 4-manifolds. Topics Rasmussen plans to work on while at IAS include character varieties of 3-manifold groups, Floer homology for 3-manifolds with boundary, and colored HOMFLY-PT polynomials.

f First Term · *s* Second Term · *v* Visitor · *dvp* Distinguished Visiting Professor · *vp* Visiting Professor
vri Veblen Research Instructorship · *vnf* von Neumann Fellowship

Sarah Dean Rasmussen

Low-Dimensional Topology · University of Cambridge
Funding provided by the National Science Foundation

Sarah Dean Rasmussen studies relationships among Heegaard Floer theory and various non-gauge-theoretic structures in three and four dimensions, such as left-invariant fundamental group orders, taut foliations, tight contact structures, and complex surface singularities. She is also interested in the interface of low-dimensional topology with string theory.

Emanuel Reinecke

Arithmetic and Algebraic Geometry · Institute for Advanced Study
Funding provided by the National Science Foundation

Emanuel Reinecke studies arithmetic and algebraic geometry. His recent work has focused on questions in *p*-adic geometry and the moduli theory of curves.

Simon Riche

Representation Theory · Université Paris 6 · *s*
Funding provided by the Charles Simonyi Endowment

At the Institute, Simon Riche will participate in the special year on "Geometric and Modular Representation Theory." He will work on representation theory of algebraic groups.

Raphaël Rouquier

Representation Theory · University of California, Los Angeles

Raphaël Rouquier is developing higher representation theory and the study of symmetries of categorical structures. Rouquier investigates the role this plays in representation theory, Lie theory, algebraic geometry, and low-dimensional topology. Rouquier will focus on tensor structures and their applications to modular representation theory.

Lisa Sauermann

Combinatorics · Stanford University
Funding provided by the National Science Foundation

Lisa Sauermann's main research interests are in extremal combinatorics and graph theory, particularly in the use of probabilistic and algebraic techniques in these areas. Some of her research also lies at the intersection of combinatorics with additive number theory or with theoretical computer science.

SCHOOL OF MATHEMATICS

f First Term · *s* Second Term · *v* Visitor · *dvp* Distinguished Visiting Professor · *vp* Visiting Professor
vri Veblen Research Instructorship · *vnf* von Neumann Fellowship

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Richard Schwartz

Geometry, Topology, Dynamics · Brown University
Funding provided by The Ambrose Monell Foundation

Richard Schwartz is interested in simple questions in geometry, topology, and dynamics, particularly as investigated through computer experimentation. In the past, Schwartz has worked on such topics as geometric group theory, group actions, hyperbolic triangle groups, billiards, energy minimization, and problems about polygons.

Peng Shan

Geometric Representation Theory · Tsinghua University

Peng Shan is interested in the study of representation theory of Lie algebras, Hecke algebras, and quantum groups, via geometric or categorical methods.

Carlos Tschudi Simpson

Moduli Spaces and Category Theory · CNRS, Université de Nice Sophia Antipolis · *vp, f*

Carlos Simpson is researching non-abelian Hodge theory for the topology of algebraic varieties, higher category theory, moduli and classification questions, and the applications of AI to the classification of finite structures.

Jay Taylor

Representation Theory · University of Southern California · *f*
Bell System Fellowship

Jay Taylor is working on ordinary and modular representation theory of finite reductive groups.

Salim Tayou

Arithmetic Geometry · Institute for Advanced Study · *s*
Giorgio and Elena Petronio Fellowship II

Salim Tayou studies the distribution of Hodge loci in variations of Hodge structures, especially in the context of Shimura varieties. He also studies arithmetic analogues over number fields and their applications to the geometry of K3 surfaces and orthogonal Shimura varieties.

f First Term · *s* Second Term · *v* Visitor · *dvp* Distinguished Visiting Professor · *vp* Visiting Professor
vri Veblen Research Instructorship · *vnf* von Neumann Fellowship

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Pham Tiep
Group Theory, Representation Theory · Rutgers, The State University of New Jersey
Funding provided by the Charles Simonyi Endowment

Pham Tiep is working on representations of finite and algebraic groups, and applications in number theory and other areas of mathematics.

Valerio Toledano Laredo
Representation Theory · Northeastern University
Funding provided by the Charles Simonyi Endowment

Valerio Toledano Laredo's research focuses on quantum groups, specifically Yangians, quantum loop algebras and elliptic quantum groups, and the bispectral differential and difference equations which govern their representation categories.

Anastasiia Tsvietkova
Low-Dimensional Topology and Geometry · Rutgers, The State University of New Jersey · *vnf*
Funding provided by the National Science Foundation

Anastasiia Tsvietkova is working on topology and geometry of 3-manifolds, often hyperbolic ones: e.g., embedded arcs and surfaces, their length, area, and isotopy classes, the volume of the manifold, and other properties. The insight obtained often allows one to build connections between 3-manifold topology and other areas: quantum topology, computational topology, and algebraic geometry.

Sara Tukachinsky
Symplectic Geometry, Open Gromov-Witten Theory · Institute for Advanced Study
Funding provided by the National Science Foundation

Sara Tukachinsky is interested in open Gromov-Witten invariants and related structures.

Karen Uhlenbeck
Gauge Theory · The University of Texas at Austin · *dvp*

Karen Uhlenbeck works primarily on geometric partial differential equations. She has worked in the areas of the calculus of variations, minimal surfaces, harmonic maps, gauge theory, and integrable systems. She is currently interested in flat complex connections and moduli spaces of geometric structures on complex connections.

SCHOOL OF MATHEMATICS

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vri Veblen Research Instructorship · *vnf* von Neumann Fellowship

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Paul Valiant

Algorithms, Fluid Dynamics, Machine Learning, Cognition · Brown University · *vnf*
Funding provided by the National Science Foundation

Paul Valiant's research interests are in algorithms and complexity, specifically sublinear algorithms on big data and related statistics; fluid dynamics; and the complementary perspectives provided by machine learning and human cognition.

Remy van Dobben de Bruyn

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

Remy van Dobben de Bruyn's work focuses on geometric, arithmetic, and cohomological properties of varieties in positive and mixed characteristic. His work is inspired by the motivic and anabelian programs, with a particular interest in finite fields.

Cynthia Vinzant

Real Algebraic Geometry, Combinatorics, Optimization · North Carolina State University · *vnf*
Funding provided by the National Science Foundation

Cynthia Vinzant's research centers on real algebraic objects appearing in combinatorics, matrix theory, and convex optimization. This includes polynomials with special properties, such as nonnegativity or hyperbolicity, certificates thereof, such as sums-of-squares and determinantal representations, and applications in semidefinite programming and matroid theory.

Nathalie Wahl

Topology · University of Copenhagen · *s*

Nathalie Wahl's main research areas are algebraic and geometric topology together with homotopy theory. Wahl is particularly interested in homological stability phenomena, loop spaces, string topology, operads, and field theories.
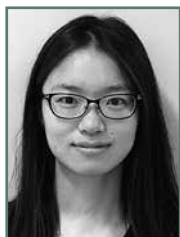
Hong Wang

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

Hong Wang is interested in Fourier analysis and related problems. For example, if we know that the Fourier transform of a function is supported on some curved objects, a sphere, or some "curved" collection of discrete points, what can we say about this function? It turns out that such problems share interesting connections with Falconer's distance problem and incidence geometry.

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vri Veblen Research Instructorship · *vnf* von Neumann Fellowship

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Charles Weibel

Topology, Algebraic Geometry · Rutgers, The State University of New Jersey
Funding provided by the Charles Simonyi Endowment

Charles Weibel works on motivic aspects of algebraic geometry, including motivic homotopy and algebraic K-theory. While at the Institute, he expects to study several aspects of these fields.

Geordie Williamson

Representation Theory · The University of Sydney · *dvp*
Funding provided by the Ellentuck Fund

Geordie Williamson works on problems at the interface of representation theory and algebraic geometry, a field known as geometric representation theory. He is also interested in high representation theory, which studies actions of (higher) categories.

Jingwei Xiao

Langlands Program, Relative Trace Formula · Institute for Advanced Study and Princeton University · *vri*
Funding provided by the National Science Foundation and the Oswald Veblen Fund

Jingwei Xiao is interested in the Langlands program, especially the study of relative trace formulas to relate special values of L-functions with automorphic objects. Xiao's research interests also include generalization of these ideas to other settings, for example, arithmetic, functional field, and p-adic.

Lai-Sang Young

Dynamical Systems · New York University · *v/f, dvp/s*

Lai-Sang Young plans to continue working in the rigorous analysis of large and complex dynamical systems, focusing on introducing biology-inspired models into the field. Young will also continue working in computational neuroscience.

Robert Young

Quantitative Geometry · New York University · *vnf*
Funding provided by the National Science Foundation

Quantitative geometry studies how geometric objects behave under limits such as large or small scales. Robert Young is particularly interested in questions from geometric measure theory and quantitative rectifiability, such as how minimal and quasiminimal surfaces behave at many different scales.

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vri Veblen Research Instructorship · *vnf* von Neumann Fellowship

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Jize Yu

Geometric Representation Theory, Number Theory · Institute for Advanced Study
Zurich Insurance Company Member

Jize Yu is interested in geometric representation theory and its applications to representation theory of *p*-adic groups and number theory. He plans to explore different versions of the derived Satake equivalence and modular representation theory while at IAS.

Allen Yuan

Homotopy Theory · Institute for Advanced Study · *v*

Allen Yuan's research focuses on problems in homotopy theory and algebraic topology. His recent work focuses on a homotopy theoretic generalization of the Frobenius map and how it relates to giving models for spaces in terms of algebraic data.

Or Zamir

Algorithms, Data Structures, Graph Theory, Combinatorics · Institute for Advanced Study · *s*
Funding provided by the Simons Foundation

Or Zamir's fields of interest revolve around algorithms, data structures, graph theory, and combinatorics. In previous work, Zamir obtained faster algorithms for solving NP-Complete problems including k-SAT and k-Coloring.

Ruixiang Zhang

Harmonic Analysis · University of Wisconsin–Madison
Funding provided by the National Science Foundation and the Ky Fan and Yu-Fen Fan Endowment Fund

Ruixiang Zhang is interested in Euclidean harmonic analysis, especially Fourier restriction type problems. Zhang is also interested in related areas such as harmonic analysis on locally symmetric spaces, analytic number theory, spectral theory, incidence geometry, and additive combinatorics.

Zhengyi Zhou

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

Zhengyi Zhou is interested in constructing Morse–Bott and equivariant theories in symplectic geometry and polyfold theory. He also works on symplectic fillings using Floer-theoretic methods.

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vri Veblen Research Instructorship · *vnf* von Neumann Fellowship

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Aleksey Zinger
Geometric Properties of Gromov-Witten Invariants · Stony Brook
University, The State University of New York
Funding provided by the Charles Simonyi Endowment
Aleksey Zinger is working on Gromov-Witten theory (including real
and open), symplectic topology, mirror symmetry, and enumerative
algebraic geometry.

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vri Veblen Research Instructorship · *vnf* von Neumann Fellowship

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School of Natural Sciences

Administrative Officer: Michelle Sage

THE SCHOOL OF NATURAL SCIENCES, established in 1966, provides a unique atmosphere for research in broad areas of theoretical physics, astronomy, and systems biology.

From its earliest days, the Institute has been a leading center for fundamental physics, contributing substantially to many of its central themes, which now interrelate with mathematics, astrophysics, and biology. Members in the astrophysics research group employ an array of tools from theoretical physics, large-scale computer simulations, and ground- and space-based observational studies to investigate the origin and composition of the universe, and to use the universe as a laboratory to study fundamental physics. At the Simons Center for Systems Biology, established in the School in 2004, the tools of modern physics and mathematics are being applied to biological investigation. This collaborative and pioneering approach to the sciences, which extends to the Institute's School of Mathematics, Princeton University, Rockefeller University, and the larger scientific community, has transformed research in these fields and presents opportunities for powerful and important discoveries.

Areas of current interest in theoretical physics include elementary particle physics, particle phenomenology, string theory, quantum theory, and quantum gravity, and their relationship to geometry, theoretical and observational astrophysics, and cosmology. The astrophysics group combines theory with modern observational studies to understand a wide variety of astrophysical phenomena, from nearby planets to distant galaxies, from black holes to the dark matter and dark energy that dominate the evolution of the universe. The Simons Center conducts research at the interface of biology and the physical sciences, developing theoretical and experimental methods necessary for studying the collective behavior of biomolecules, cells, and organisms, exploring how individual components can give rise to complex, collective phenomena, and in some cases focusing on understanding disease processes.

The School also sponsors Prospects in Theoretical Physics, a two-week residential summer program traditionally 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.

★ *During the 2020–21 academic year, some annual programs may be held virtually or postponed due to Covid-19.*

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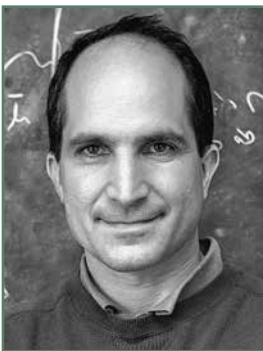
Juan Maldacena
Carl P. Feinberg Professor · Theoretical Physics

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
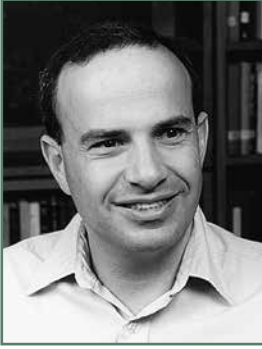
Nathan Seiberg's research focuses on various aspects of string theory, quantum field theory, and particle physics. He has made deep contributions to the understanding of the dynamics of quantum field theories, especially two-dimensional conformal field theories and super-symmetric quantum field theories. His exact solutions of supersymmetric systems have uncovered many new and unexpected phenomena, including the fundamental role of electric-magnetic duality in these theories. These exact solutions have led to many applications in physics and in mathematics. Recently, he combined insights from his earlier work to shed new light on quantum field theories in three space-time dimensions, which are also of interest to condensed matter physics.

James Stone

Professor · Computational Astrophysics

James Stone has developed novel numerical algorithms that have shaped the field of computational astrophysics and ushered in a new era of precision simulations with a wide range of applications. Stone's research is focused on fluid dynamics, particularly magnetohydrodynamics, for which he has developed some of the most powerful and widely used astrophysical codes. He has contributed groundbreaking methods to address some of the field's most challenging problems, resulting in foundational insights into the nature of giant molecular clouds, the evolution of accretion disks, the process of planetary migration, and the phenomena of radiation transport.

Michail Tsodyks

C.V. Starr Professor · Theoretical Neuroscience
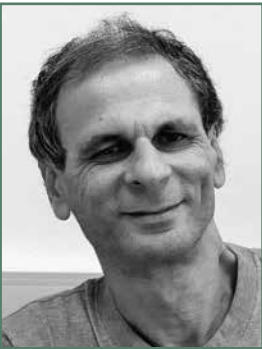
Misha Tsodyks is a leading theoretical neuroscientist whose research has influenced important areas of neurobiology and the development of a quantitative understanding of brain functioning and human cognitive abilities. His work is focused on identifying neural algorithms that define functions of cortical systems and, in recent years, various aspects of cognitive behavior. From demonstrating the importance of sparsity in neural networks to providing deep insights into the mechanisms of short-term synaptic plasticity and working and associative memory, Tsodyks has devised conceptual models that make quantitative testable predictions for experiments.

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

Richard Black Professor · Astrophysics and Cosmology

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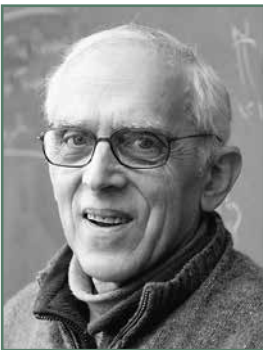
Stephen L. Adler

Professor Emeritus · Particle Physics

In a series of remarkable, difficult calculations, Stephen Adler demonstrated that abstract ideas about the symmetries of fundamental interactions could be made to yield concrete predictions. The successful verification of these predictions was a vital step toward the modern Standard Model of particle physics. In more recent work, he has been exploring generalized forms of quantum mechanics, both from a theoretical and a phenomenological standpoint. He has developed new algorithms for multidimensional numerical integration, and is currently exploring a particle unification model based on boson-fermion balance without full supersymmetry, and a novel proposal for the "dark energy" that drives the accelerated expansion of the universe.

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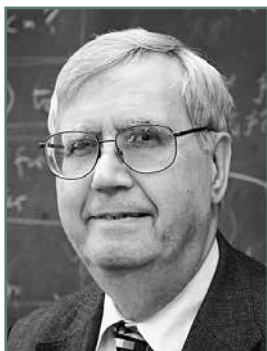
Peter Goddard

Professor Emeritus · Mathematical Physics

Peter Goddard's research concerns quantum field theory and string theory. With his collaborators, he has made pioneering contributions to these areas, including string quantization and its consistency, electric–magnetic duality in gauge theories, the construction of conformal field theories, and the realization of gauge symmetry in string theory. Before serving as the eighth Director (2004–12) of the Institute, he was Master of St. John's College and Professor of Theoretical Physics in the University of Cambridge, England, where he played a leading role in establishing the Isaac Newton Institute for Mathematical Sciences and the University of Cambridge Centre for Mathematical Sciences.
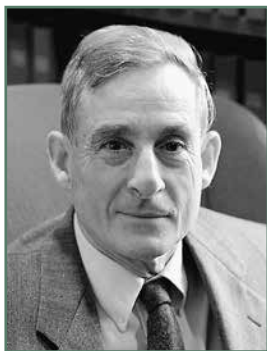
Peter Goldreich

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.

Arnold J. Levine

Professor Emeritus · Biology

Arnold Levine is a widely acclaimed leader in cancer research. In 1979, Levine and others discovered the p53 tumor suppressor protein, a molecule that inhibits tumor development. He established the Simons Center for Systems Biology at the Institute, concentrating on research at the interface of molecular biology and the physical sciences. Recognizing the potential of convergence research in the life sciences, Levine has inaugurated a program of research collaborations, in partnership with Stand Up to Cancer and others, that brings together quantitative scientists from theoretical physics, computer science, and mathematics, with biologists and clinicians, to develop novel approaches to solve important problems in cancer research. He also leads the NSF–sponsored Cancer Convergence Education Network, and focuses on fostering convergence research to produce fundamental insights in the areas of immunology and infectious diseases.

Scott Tremaine

Professor Emeritus · Astrophysics

Scott Tremaine has made seminal contributions to understanding the formation and evolution of planetary systems, comets, black holes, star clusters, galaxies, and galaxy systems. He predicted the Kuiper belt of comets beyond Neptune and, with Peter Goldreich (Professor Emeritus, School of Natural Sciences), 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.

Ahmed Almheiri

Quantum Field Theory · Institute for Advanced Study · *m*

Ahmed Almheiri is interested in understanding the connections between quantum information theory, quantum field theory, and quantum gravity. He previously worked on formulating the black hole firewall paradox and recasting AdS/CFT as a quantum error-correcting code. He is currently working on understanding what happens inside black holes.

Lev Arzamasskiy

Astrophysics · Institute for Advanced Study
Ralph E. and Doris M. Hansmann Member

Lev Arzamasskiy uses analytical and numerical methods to study the basic plasma physics that occurs in various space and astrophysical systems, such as the solar wind, black hole accretion flows, and the intracluster medium of galaxy clusters.

Ibrahima Bah

Particle Theory · Johns Hopkins University · *s*

Ibrahima Bah's research concerns the relations between string theory and quantum field theory. These provide access to novel and fundamental properties of quantum field theory. Bah hopes to exploit these properties to obtain a classification of quantum field theories.

Gáspár Bakos

Astrophysics · Princeton University

Gáspár Bakos is interested in the variable sky: cosmic explosions, variable stars, and moving objects. His main research interest is in transiting extrasolar planets, and he has been working on the development and operation of automated telescope networks to discover and characterize over 140 such planets.

Pinaki Banerjee

Theoretical Physics · Institute for Advanced Study · *s*

Pinaki Banerjee is broadly interested in various aspects of quantum field theory and gauge/gravity duality. His present research primarily focuses on modern on-shell scattering amplitudes and conformal field theories in diverse dimensions.

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

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Fiona Burnell

Condensed Matter Physics · University of Minnesota · *jvp*
Funding provided by Carnegie Corporation of New York

Fiona Burnell's current primary research interests are: topological phases of matter, including strongly interacting and symmetry-protected topological phases; fractonic matter and related subsystem-symmetric phases; and dynamics of one-dimensional systems, including systems with constraints and nonthermal behavior.

Giovanni Cabass

Cosmology · Institute for Advanced Study
AMIAS Member

Giovanni Cabass's research focuses on the epoch of primordial inflation and what imprints it left on the distribution of galaxies and the low-redshift universe. Cabass is interested in developing effective field theory techniques to find what these imprints are, and then to constrain them using observations of galaxy clustering.

Sukanya Chakrabarti

Astrophysics · Rochester Institute of Technology

Sukanya Chakrabarti is working on galactic dynamics (dark matter, dwarf galaxies, computational simulations and observations) and time-domain astronomy (lensed supernovae and EM follow-up of LIGO-Virgo sources)

Christopher Logan Chariker

Computational Neuroscience · Institute for Advanced Study

Christopher Logan Chariker's research is at the interface between dynamical systems and computational neuroscience. Chariker works with networks of interacting neurons viewed as large and complex dynamical systems. Chariker's interests range from rigorous analysis of toy models of neuronal populations to large-scale computational models that are biologically realistic.

Horng Sheng Chia

Gravitational Waves, Astrophysics, Particle Physics · Institute for Advanced Study

Horng Sheng Chia is broadly interested in gravitational-wave astrophysics and phenomenological aspects of particle physics. His current research focuses on using gravitational-wave observations to search for physics beyond the Standard Model and novel phenomena of binary systems.

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Susan E. Clark

Astrophysics · Institute for Advanced Study
Friends of the Institute for Advanced Study Member

Susan Clark studies astrophysical magnetic fields. Her current research focuses on magnetohydrodynamic instabilities, the magnetic interstellar medium, and polarized cosmic microwave background foregrounds.

Shany Danieli

Astrophysics · Institute for Advanced Study
NASA Hubble Fellow

Shany Danieli is studying galaxy formation and evolution, large-scale structure, dark matter, dwarf galaxies, ultra-diffuse galaxies, low surface brightness imaging, galactic dynamics, and instrumentation.

Jo Dunkley

Cosmology · Princeton University

Jo Dunkley is using measurements of the cosmic microwave background, and the distributions of galaxies, to understand the contents and evolution of the universe.

Lorenz Eberhardt

String Theory · Institute for Advanced Study

Lorenz Eberhardt is interested in many areas related to two-dimensional conformal field theory. He is studying in particular the AdS3/CFT2 correspondence, worldsheet methods in string theory, W-algebras, and moonshine phenomena.

Eric Ford

Astrophysics · The Pennsylvania State University
Funding provided by The Ambrose Monell Foundation

Eric Ford researches exoplanets (radial velocity surveys, demographics, orbital dynamics), planet formation, and astroinformatics.

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dvp Distinguished Visiting Professor · *jvp* Junior Visiting Professor · *ra* Research Associate

Brenda Frye

Observational Cosmology · The University of Arizona
Funding provided by The Ambrose Monell Foundation and the Bershadsky Fund

Brenda Frye is making a concerted effort to understand how galaxies and galaxy structures evolve over time. To do this requires detection of the dark matter, a task that is facilitated by using the tool of gravitational lensing. Frye extends the study of galaxy clusters to earlier cosmic times by a novel use of the Planck telescope.

Jeffrey Fung

Astrophysics · Institute for Advanced Study
Funding provided by Schmidt Futures

Jeffrey Fung is interested in the theoretical study of planet formation.

Daniel Grin

Cosmology · Haverford College
IBM Einstein Fellow

While at IAS, Daniel Grin will pursue work on a broad range of topics in theoretical cosmology, including model-independent data-driven reconstruction of physical properties of the dark sector, cosmological tests of ultra-light axions, and new tests of theories in which the fine-structure constant varies in space and time.

Felix Haehl

Theoretical Physics · Institute for Advanced Study
Funding provided by the U.S. Department of Energy, the Paul Dirac Fund, and the Sivian Fund

Felix Haehl uses holography and quantum field theory to investigate questions about time-dependent gravitational physics, quantum gravity, and black holes. A recurring theme in his research is thermality and different notions of entropy.

Keisuke Harigaya

Particle Physics · Institute for Advanced Study
Friends of the Institute for Advanced Study Member

Keisuke Harigaya is interested in particle physics phenomenology, including dark matter, the strong CP problem, inflation models, grand unification, and the electroweak symmetry breaking. He is particularly interested in the parity solution to the strong CP problem and its connection with SO(10) unification.

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dvp Distinguished Visiting Professor · *jvp* Junior Visiting Professor · *ra* Research Associate

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Matthew T. E. Heydeman

Theoretical Physics · Institute for Advanced Study and Princeton University
Funding provided by the U.S. Department of Energy

Matthew T. E. Heydeman works at the interface of string theory, scattering amplitudes, and the AdS/CFT correspondence. A common theme is the use of algebraic and geometric techniques to find connections between seemingly distinct physical systems.

Nafiz Ishtiaque

Quantum Field Theory · Institute for Advanced Study
Roger Dashen Member; additional funding provided by the National Science Foundation and the Sivian Fund

Nafiz Ishtiaque studies exactly computable algebraic structures in supersymmetric quantum field theories and their roles in dualities such as holography.

Daniel Steven Kapec

Theoretical Physics · Institute for Advanced Study
Funding provided by the U.S. Department of Energy and the Adler Family Fund

Daniel Steven Kapec is broadly interested in quantum field theory, general relativity, and quantum gravity. His research has focused on various aspects of quantum field theory and quantum gravity in asymptotically flat spacetimes. His recent work explores a newly discovered correspondence between asymptotic symmetry groups and soft theorems for scattering amplitudes.

Alexander A. Kaurov

Astrophysics, Cosmology · Institute for Advanced Study
William D. Loughlin Member

Alexander Kaurov's research interests range from the physics of neutron stars to the epoch of reionization. At IAS, he is working on developing theoretical models of reionization and investigating techniques for analyzing the data from the upcoming probes of the early universe.

Joonho Kim

Theoretical Physics · Institute for Advanced Study
Funding provided by the National Science Foundation and the Sivian Fund

Joonho Kim works on quantum field theory and string theory, with a particular interest in supersymmetric field theories in diverse dimensions and their non–perturbative dynamics.

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dvp Distinguished Visiting Professor · *jvp* Junior Visiting Professor · *ra* Research Associate

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Helmer Herman Koppelman

Galactic Dynamics, Galactic Archaeology · Institute for Advanced Study
Martin A. and Helen Chooljian Member

Helmer Herman Koppelman's current research interests are the dynamics and formation history of the Milky Way, mainly focusing on its stellar halo. By combining theory, simulations, and data, Koppelman studies the assembly history of the local stellar halo and the (dark) matter profile of the Milky Way. Generally speaking, Koppelman has an affinity for theory, statistics, and data science.

Petr Kravchuk

Particle Physics · Institute for Advanced Study
Funding provided by the U.S. Department of Energy and the Adler Family Fund

Petr Kravchuk's research concerns dynamics and kinematics of quantum conformal field theories. He is particularly interested in numerical and analytical approaches to the conformal bootstrap program, which aims to classify and solve such theories starting from basic self-consistency conditions.

Nicolas Lenner

Biophysics, Ecology, Evolution · Institute for Advanced Study

Nicolas Lenner's scientific background is in physics of dynamical biological systems, ranging from molecular dynamics to developmental processes of whole organisms. Lenner now wants to apply this dynamical systems perspective to problems in ecology and evolution. Lenner is particularly interested in the complex interactions of different organisms evolving in changing environments.

Adam Levine

Quantum Gravity, Quantum Information Theory · Institute for Advanced Study
Founders' Circle Member; funding provided by Carl P. Feinberg, the National Science Foundation, and the Sivian Fund

Adam Levine's research aims to understand the structure of entanglement in quantum field theories and quantum gravity. Levine uses techniques from the study of conformal field theories as well as quantum information theory and AdS/CFT.
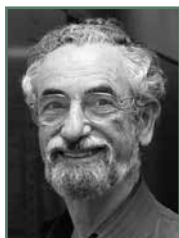
Elliott H. Lieb

Mathematical Physics · Princeton University · *v*

Elliott H. Lieb's research interests include mathematical physics and mathematical analysis, especially functional analysis. In physics, his main interests are in condensed matter physics, statistical mechanics, and questions concerning stability of matter and atomic physics.

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

Jing Luan

Theoretical Astrophysics, Planetary Science · Institute for Advanced Study
Funding provided by The Ambrose Monell Foundation

Jing Luan applies physics to explain observational puzzles adopting analytical methods. Her current research focuses on dynamics, including orbit dynamics, tidal interaction, stellar and planetary oscillations, and physical librations. These physical processes influence the evolution of orbits for planet–satellite and star–planet systems and help to constrain stellar and planetary interiors.

Dalimil Mazac

Quantum Field Theory · Institute for Advanced Study
Founders' Circle Member; funding provided by Edward and Kiyomi Baird and the U.S. Department of Energy

Dalimil Mazac studies how quantum field theory and quantum gravity are constrained by their internal consistency. He has been developing analytic approaches to the conformal bootstrap.

Lia Medeiros

Astrophysics · Institute for Advanced Study

Lia Medeiros is interested in using extreme astrophysical objects and phenomena to test fundamental theories of physics. Currently, she works on several aspects of the Event Horizon Telescope. Her work primarily focuses on theoretical simulations, but she will sometimes delve into data analysis as well.

Victor Mikhaylov

Biology · Institute for Advanced Study · *ra*

Victor Mikhaylov works in mathematical physics and biology, focusing on supersymmetric and topological quantum field theories, and the application of modern methods of data analysis to bioinformatical problems.

Sebastian Mizera

Theoretical Physics · Institute for Advanced Study
Frank and Peggy Taplin Member; additional funding provided by the U.S. Department of Energy

Sebastian Mizera's work focuses on aspects of scattering amplitudes in quantum field theory and string theory, as well as their relation to geometry and topology.

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Elias Most

Theoretical Astrophysics · Institute for Advanced Study and Princeton University

Elias Most's research focuses on fundamental physics in the presence of strong gravity associated with compact objects. As a computational astrophysicist, Most performs large-scale numerical relativity simulations of merging neutron star binaries to elucidate the imprint of fundamental properties of the system on different observational channels.

Baurzhan Mukhametzhanov

Theoretical Physics · Institute for Advanced Study
Funding provided by the National Science Foundation and the Sivian Fund

Baurzhan Mukhametzhanov is interested in various aspects of strongly coupled quantum field theories, especially in the context of holography and black hole physics. Mukhametzhanov's recent research has been focused on conformal bootstrap and thermalization.

Elena Murchikova

Astrophysics · Institute for Advanced Study
Corning Glass Works Foundation Fellowship

Elena Murchikova works on the interface between theoretical astrophysics and observational astronomy. Her research interests span studies of the Milky Way's galactic center black hole with the ALMA telescope, black hole accretion theory, the interiors of neutron stars, and cosmic strings in the vicinity of black holes.

Yaron Oz

Quantum Field Theory, Gravity, Strings · Tel Aviv University
IBM Einstein Fellow

Most fluid motions in nature are turbulent, yet we lack an analytical description of fluid flows in the nonlinear regime. Recently, Yaron Oz proposed a new viewpoint inspired by black hole dynamics and constructed a random geometry field theory of turbulence, deriving an exact KPZ-type analytical formula for the inertial range anomalous scalings.

Sridip Pal

Quantum Field Theory · Institute for Advanced Study
Funding provided by the U.S. Department of Energy

Sridip Pal is working to deeply understand quantum field theory, a framework to describe nature, from the theory of fundamental particles to collective phenomena in condensed matter, using symmetry-based arguments, especially scale invariance. Currently, Pal is working on two-dimensional conformal field theories and nonrelativistic avatars of these theories in different dimensions.

SCHOOL OF NATURAL SCIENCES

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Natalie M. Paquette

Theoretical Physics, Mathematical Physics · Institute for Advanced Study
Funding provided by the National Science Foundation and the Sivian Fund

Natalie Paquette studies quantum field theory and string theory, with a particular interest in their mathematical underpinnings and applications. Some of her recent work explores connections between holography and the mathematical subject of Koszul duality. She is also interested in quantum field–theoretic studies of condensed matter physics.

Geoff Penington

Theoretical Physics · Stanford University · *jvp, f*
J. Robert Oppenheimer Visiting Professor

Geoff Penington works on the connections between quantum information theory and quantum gravity. In particular, he is interested in understanding how information escapes from evaporating black holes.

Robert Penna

Theoretical Physics · Institute for Advanced Study
Funding provided by the U.S. Department of Energy and the Sivian Fund

Robert Penna is interested in general relativity, fluid dynamics, and mathematical physics. Recent research has focused on the structure of asymptotic symmetries at asymptotic infinity and at black hole event horizons.

Roman Rafikov

Astrophysics · University of Cambridge
John N. Bahcall Fellow

Roman Rafikov works in the areas of planetary sciences, planet formation, N-body dynamics, fluid dynamics, accretion disks, and high-energy astrophysics.

Carolyn Raithel

Astrophysics · Institute for Advanced Study and Princeton University
John N. Bahcall Fellow

Carolyn Raithel is interested in using astrophysical observations of neutron stars to study the properties and interactions of matter at extreme densities. Her current research focuses on the gravitational waves emitted during neutron star mergers, using a mix of analytic theory and numerical simulations.

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Riccardo Rao

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

Riccardo Rao's research focuses on using the framework of thermodynamic models to investigate specific classes of chemical reaction networks, such as metabolic networks.

Shlomo Razamat

Theoretical Physics · Technion, Israel Institute of Technology · *jvp*
IBM Einstein Fellow

Shlomo Razamat is interested in different aspects of quantum field theories in various spacetime dimensions and interrelations between them. He is working on properties of strongly coupled supersymmetric field theories (such as dualities and emergent symmetries in the IR).

Vladimir Rosenhaus

Theoretical Physics · Institute for Advanced Study
Funding provided by the National Science Foundation and the Sivian Fund

Vladimir Rosenhaus is interested in quantum field theory and its intersection with gravity, string, and quantum information theory. His recent work has focused on the Sachdev-Ye-Kitaev model, kinematics of conformal field theory, and integrable deformations of field theories.

Phil Saad

Theoretical Physics · Institute for Advanced Study
Marvin L. Goldberger Member

Phil Saad's research focuses on understanding signatures of quantum microstructure in quantum gravity, especially in the context of black holes. Saad uses simple toy models and techniques from the study of quantum chaos to shed light on these problems.

Marcel Manfred Schmittfull

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

Marcel Schmittfull studies the large-scale structure of the universe and gravitational lensing of the cosmic microwave background radiation. While at IAS, he plans to develop new analytic methods inspired by theory and simulation, aiming to add to our knowledge of the origin of the universe, dark energy, gravity, and neutrinos.

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Shu-Heng Shao

Theoretical Physics · Institute for Advanced Study · *m*
Funding provided by the Simons Foundation

Shu-Heng Shao has a broad interest in quantum field theory and its applications to condensed matter systems and quantum gravity. He is interested in global symmetry, 't Hooft anomalies, and defects in diverse dimensions. Recently, he has combined the conformal boot-strap with anomalies to derive universal constraints on conformal field theory.

Alexandre Streicher

High Energy Theory · Institute for Advanced Study and Perimeter Institute for Theoretical Physics

Alexandre Streicher studies quantum gravity, holography, and quantum chaos. He is fascinated by dynamical phenomena and is pursuing a more general understanding of how many internal degrees of freedom can conspire to form higher-dimensional gravity. He has found emergent patterns in operator dynamics, such as the epidemic among internal degrees of freedom.

Rashid Sunyaev

Astrophysics · Max-Planck-Institute für Astrophysik · *dvp*
Maureen and John Hendricks Distinguished Visiting Professor

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

Yuan-Sen Ting

Astrophysics · Institute for Advanced Study
NASA Hubble Fellow

Yuan-Sen Ting is interested in unraveling the evolution of the Milky Way in the past fourteen billion years by extracting statistical information from millions of spectra currently being collected from individual stars in the galaxy. His research operates at the intersection of theoretical modeling, observational astronomy, and machine learning.

Elizabeth Ann Tolman

Plasma Physics · Institute for Advanced Study
Bezos Member

Elizabeth Tolman studies plasma physics. Her current focus is the theoretical study of plasma processes relevant to compact astrophysical objects, with particular emphasis on magnetic reconnection. She is also interested in fusion plasmas and the energetic particle driven instabilities they experience.

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Benjamin Wallisch

Cosmology · Institute for Advanced Study and University of California, San Diego

Benjamin Wallisch's research focuses on cosmological probes of fundamental physics. He is interested in using observations of the cosmic microwave background and the large-scale structure of the universe to extract clues about the laws of nature, both within the Standard Model and beyond.

David Weinberg

Astrophysics · The Ohio State University
Funding provided by the W. M. Keck Foundation Fund

David Weinberg uses measurements of galaxy clustering and weak gravitational lensing to probe the physical origin of accelerating cosmic expansion. He interprets measurements of elemental abundances in stars to learn about the history of the Milky Way and other galaxies and about nucleosynthesis in supernovae.

Siyao Xu

Magnetohydrodynamic Turbulence, Turbulent Dynamo · Institute for Advanced Study
NASA Hubble Fellow

Siyao Xu studies the fundamental physics of magnetohydrodynamic (MHD) turbulence, turbulent dynamo, and particle transport in MHD turbulence. The theoretical findings are applied to studying diverse astrophysical problems, including cosmic rays, (first) star formation, magnetic reconnection, and particle acceleration in high-energy astrophysical environments.

Lai-Sang Young

Dynamical Systems · New York University · *v/f, dvp/s*

Lai–Sang Young plans to continue working in the rigorous analysis of large and complex dynamical systems, focusing on introducing biology-inspired models into the field. Young will also continue working in computational neuroscience.

Ying Zhao

Theoretical Physics · Institute for Advanced Study
Funding provided by the Simons Foundation

Ying Zhao is interested in quantum gravity, quantum information, and black hole physics. She has worked on various aspects of complexity and its application to the understanding of black holes.

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School of Social Science

Administrative Officer: Donne Petito

FOUNDED IN 1973, THE SCHOOL OF SOCIAL SCIENCE takes as its mission the analysis of contemporary societies and social change. It is devoted to a pluralistic and critical approach to social research from a multidisciplinary and international perspective. Operating under the guiding principles of informality and collegiality, and with a shared understanding that the social sciences are not to be narrowly defined, the School brings together scholars with various perspectives, methods and topics, providing a space for intellectual debate and mutual enrichment. Scholars are drawn from a wide range of fields, notably political theory, economics, law, psychology, sociology, anthropology, history, philosophy, and literature, to examine historical and contemporary problems.

Each year, the School designates a theme, which is neither exclusive nor excluding. The theme for the 2020–21 academic year is "Science and the State," led by Alondra Nelson, Harold F. Linder Professor and Charis Thompson, Professor of Sociology at the London School of Economics, in collaboration with Didier Fassin, James D. Wolfensohn Professor.

Modern science and the modern state are inextricable and co-emergent. Indeed, the rise of the state form has been accomplished through the ways of knowing and extracting that scientific analysis makes possible—including classification, hierarchization, quantification, and reductionism. But while the production of science and the formation of the state are relatively well studied, much remains to be understood about the relationships between the two—how states support, use, and regulate sciences, and how the sciences support the structure, function, and legitimacy of states.

What have been the historical processes involved in the intertwined development of states and sciences, and how much have they varied across national contexts? While the state remains the driver of both private and public sector technoscience in certain societies, what has its role become in many others, where scientific innovation is increasingly seen as the purview of the private sector? As we today face issues and crises, from human gene-editing to climate change, that supersede provincial boundaries—even as forms of violence and social control enabled by science continue to be operationalized by nation-states—what forms of transnational oversight may be required? How might state engagement with the natural and social sciences, such as the use of "nudge units" and "evidence-based" claims in legislation and governance, necessitate new understandings of the relationship between states and sciences? How does the corporate world respond to increasing demands from both the state and citizens for social responsibility and ethical practice with regard to science and technology? These are some of the questions that will be addressed by the various disciplines of the social sciences and humanities.

Didier Fassin

James D. Wolfensohn Professor

An anthropologist and a sociologist who has conducted ethnographic fieldwork in Senegal, Ecuador, South Africa, and France, Didier Fassin was initially trained as a physician in internal medicine and public health. Having dedicated his early research to an exploration of medical questions, in particular the AIDS epidemic, he later pioneered the field of moral anthropology, which explores the historical, social, and political signification of moral forms involved in everyday judgment and action as well as in broader issues such as humanitarianism and punishment. His most salient contributions are his reflections on the inequality of lives and on the public presence of the social sciences. He recently developed a critical approach to crises, focusing on those related to migrations and to Covid-19.

Alondra Nelson

Harold F. Linder Professor

An acclaimed sociologist, Alondra Nelson explores questions in science, technology, and social inequality. Nelson's work offers a critical and innovative approach to the social sciences in fruitful dialogue with many disciplines. Her major research contributions are situated at the intersection of racial formation and social citizenship, on the one hand, and emerging scientific and technological phenomena, on the other. She explores and connects these dimensions in a range of publications, including *Technicolor: Race, Technology, and Everyday Life*, *Genetics and the Unsettled Past: The Collision of DNA, Race, and History*, *Body and Soul: The Black Panther Party and the Fight Against Medical Discrimination*, and *The Social Life of DNA: Race, Reparations, and Reconciliation after the Genome*. She is currently at work on a book about science politics in the Obama administration.

Joan Wallach Scott

Professor Emerita

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 trans-formations in the construction of social and political life.
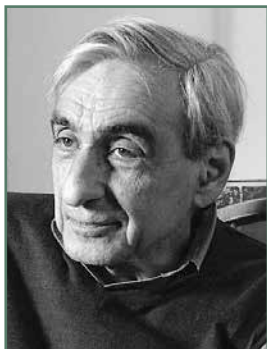
Michael Walzer
Professor Emeritus

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 religion and politics. He continues to work on a major collaborative project focused on the history of Jewish political thought.

Lawrie Balfour

Politics (Political Theory), African American Studies, American Studies · University of Virginia
Friends of the Institute for Advanced Study Member

How should we understand freedom? How should we understand freedom in the shadow of racial slavery and colonialism? For Toni Morrison, these questions are concrete, urgent, conjoined. Lawrie Balfour's project advances a fresh understanding of modern freedom by drawing from Morrison's deep reservoir of words that are "unquestionably political and irrevocably beautiful at the same time."

Banu Bargu

Political and Social Theory · University of California, Santa Cruz

Banu Bargu's research focuses on the uses of the body in political and social struggles both as an object and as a subject of violence directed at itself. Drawing on different examples from around the world, she examines the implications corporeal politics holds for modern conceptions of agency, citizenship, and democracy.

Joshua Barkan

Geography, Legal Studies · University of Georgia

Joshua Barkan's current research focuses on the legal history and geography of land concessions. Barkan is interested in the ways the reemergence of land concessions in different times and places forces us to rethink basic ideas about political territory.

Erica A. Cartmill

Anthropology and Psychology · University of California, Los Angeles · *v*

Erica A. Cartmill studies communication and social cognition in children and great apes. At IAS, Cartmill will be tackling two projects. The first will integrate psychological and anthropological perspectives on parenting to critique "language gap" interventions. The second project will explore humor and play in great apes through a series of experiments.

Nusrat Chowdhury

Anthropology · Amherst College

Nusrat Chowdhury's current book project explores the concept of sacrifice for postcolonial development. Ethnographically, Chowdury studies the rumors of sacrifice and violence around particular development megaprojects in Bangladesh as manifestations of larger tensions that arise from legitimizing sacrifice, which is at the core of postcolonial democratic imagination.

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Marc de Leeuw

Philosophy and Law · University of New South Wales · *v*

Marc de Leeuw's research concerns the edges of law on domains that, due to radical technological change or ruptures in our ethical imagination, require legal consideration in a philosophical register: the legal standing of collective ecological entities, the fashioning, use, and ownership of human body parts, and the legal status of nonhuman minds.

Anne-Claire Defossez

Sociology · Institute for Advanced Study · *v*

Anne-Claire Defossez will devote part of this year at the Institute to writing the first chapters of a book on women and politics in France. Defossez will also continue working on field data collected on the French-Italian border regarding migrations from African and Middle Eastern countries, in order to analyze their legal, social, and economic features and the tensions between states' repression and local solidarities.

Thomas Fossen

Philosophy · Leiden University

When people take to the streets and demand the fall of the regime, they contest the authorities' right to rule. Thomas Fossen's book in progress develops a philosophical theory of legitimacy. What can one do, and what must one know, in order to judge the legitimacy of a regime from a practical standpoint, in the face of disagreement and uncertainty?

Jacob Gates Foster

Sociology · University of California, Los Angeles
Infosys Member

Jacob Gates Foster is a computational sociologist of science, culture, and cognition. At IAS, Foster will develop a new account of knowledge as fundamentally algorithmic, collective, and pragmatic. Drawing on sources that range from science studies to theoretical computer science, Foster's book will offer a theory of knowing for an age of distributed knowledge.

Aisha Ghani

Anthropology · University of Minnesota

Aisha Ghani's research traces the formation of "legal Islam" across U.S. civil and criminal contexts. Her work draws attention to the variety within legal regimes: the multiple and distinct modes of legality that different legal contexts engender, and the implications of these nuances for theorizations of religion, law, and secularity.

Sarah Barringer Gordon

American Religious and Legal History · University of Pennsylvania

Sarah Barringer Gordon is completing a book on separation of church and state for the first hundred years of U.S. national history.

Diana Graizbord

Sociology · University of Georgia

Diana Graizbord's research focuses on expertise and democracy. She is writing her first book, on expertise and the politics of accountability, which examines how policy evaluation techniques have been adopted by the Mexican state and how this form of policy expertise shapes political accountability processes in contemporary Mexico.

Emmanuel Henry

Sociology, Political Science, Science and Technology Studies · Université Paris–Dauphine, PSL University

Emmanuel Henry's research seeks to gain insight into how scientific knowledge and ignorance, particularly as structured by power dynamics, contribute to shaping social problems, as well as the ways in which those problems are addressed in the public sphere and managed within the framework of public policy. He will focus mostly on how occupational and environmental health are shaped as socially invisible non-issues.

Florence Jany-Catrice

Socioeconomics · Université de Lille
Richard B. Fisher Member

Florence Jany-Catrice's research aims to develop an institutional political economy of economic indicators. It will do so by exploring some macroeconomic values, by analyzing the processes of quantification of qualities, and by questioning the expansion of impact measures in the evaluation of public policies.

Nikolas Kosmatopoulos

Anthropology and Politics · American University of Beirut
Wolfensohn Family Member

Nikolas Kosmatopoulos's first project links global politics, critical expert studies, and political anthropology. It focuses on discourses of violence and the policies of peace, as in global institutions of peacemaking, crisis think tanks, and conflict resolution NGOs. Kosmatopoulos's second project is on the maritime domain as an emergent space for popular politics, policy, and social theory.

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Donald W. Light

Comparative Health Care · Rowan University · *v, f*

Donald Light is exploring how states, as protectors and promoters of the public's health, can interact with pharmacological research to develop better medicines and make them available at prices that states can afford. This entails markets for public health, which operate differently from private markets, especially during pandemics.

Magdalena Małecka

Philosophy · University of Helsinki

Magdalena Małecka's project at IAS challenges the epistemic presumptions underlying so-called behavioral policy and attempts to provide a new perspective on how behavioral science and states' governing practices are entangled. It aims to advance a philosophical approach that combines insights from feminist philosophy of science, STS, and history of science.

Luis Mireles-Flores

Philosophy and Economics · University of Helsinki · *v, s*

Luis Mireles-Flores is working on a project on opening the policy black-box in evidence-based policy. The project combines philosophy of science and public policy studies to investigate knowledge exchanges between economics and policy-making. At IAS, he will examine the scientific import and sociopolitical relevance of the evidence-based policy movement in economics.

Ryo Morimoto

Anthropology · Princeton University
AMIAS Member

Ryo Morimoto is completing a book project on atomic livelihood in Fukushima's gray zone. The book will integrate environmental anthropology, recent Japanese history, and science and technology studies to understand the uses and applications of technologies in social processes whereby certain sensory-cognitive experiences are (im)materialized.

Anne Norton

Politics · University of Pennsylvania

Anne Norton will be researching the second part of a two-part critique of liberalism. The first part argues for popular democracy against liberalism. The second is a study that aims to think differently about property, investigating the use of commodities as a language, where capitalism is both most inventive and most oppressive; and the survival and recovery of the commons—property that is neither private nor collective, but also both private and collective.

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Arnaud Orain

History of Economics, Economic History · Université Paris 8 Vincennes–Saint-Denis
Funding provided by the Florence Gould Foundation Fund

Arnaud Orain's research explores older forms of economic knowledge that were influential before the emergence of "economics" in the eighteenth century: the dialogical discourse on commerce, economic fictions, the "oeconomy," and alchemical science.

David Ost

Politics · Hobart and William Smith Colleges

Understanding fascism's enduring appeal to "dominant-essence" (intersectionally-privileged) workers calls for a new theorization of the left (continual clash between nationalism and internationalism), the right (fascism's innovation melding conservatism and populism), and the nexus of class and culture (with culture regularly deployed to push class gains).

David Owen

Social and Political Philosophy · University of Southampton · *vp, f*

David Owen's current research has two related foci. The first explores the development of Nietzsche's philosophy through the lens of his concern with human flourishing, ethical culture, and politics. The second addresses the distinct roles of the concepts of justification and vindication in ethics and political philosophy.

Timothy Pachirat

Politics · University of Massachusetts, Amherst
Roger W. Ferguson, Jr. and Annette L. Nazareth Member

While at IAS, Timothy Pachirat will work on telling two stories. The first is of a factory farm that converted its concrete walls to glass and turned itself into a major tourist destination; the second is of a worker at a factory farm in Wyoming who took his own life in the aftermath of an undercover investigation by an animal protection organization.

Leslie Paik

Sociology · The City College of New York

Leslie Paik's book project is on family and victim experiences with legal financial obligations in juvenile court. It explores how the administration of fines, fees, and restitution in the juvenile justice system leads to increased legal involvement and long-term financial penalties for families as well as delayed or partial justice for victims.

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Joy Rohde

History, Science and Technology Studies · University of Michigan, Ann Arbor
Funding provided by Carnegie Corporation of New York

Joy Rohde studies the relationships between social science, public policy expertise, and American democracy. Her current project examines the origins and consequences of data-driven, computational approaches to U.S. social science and public policy since the 1950s.

Christo Sims

Communication and Science Studies · University of California, San Diego

Christo Sims's book project examines how corporations, cities, and states are materially reconfiguring themselves in response to climate catastrophe. Taking Silicon Valley as a case study, the project focuses on how the technology sector is embracing avant-garde architecture in response to growing concerns about climate change, traffic, and a dearth of affordable housing.

Oscar Sosa López

Urban and Regional Studies · The New School · *v*

Oscar Sosa López is a critical planning scholar examining the promises and paradoxes of ongoing global efforts to implement climate governance at the urban scale. His current book project examines how sustainable transportation planning reforms impact existing regimes of infrastructure inequality and democratic exclusion in Mexico City.

Robyn C. Spencer

U.S. History, Post–World War II Social Movements, Radical Politics · Lehman College, The City University of New York
Frederick Burkhardt Fellowship funded by the American Council of Learned Societies

Robyn C. Spencer's project on Black Liberation politics and the movement against the Vietnam War explores how and why the struggle for Vietnamese independence became a rallying point for grassroots Black activists based in the United States who were part of the freedom struggles of the 1950s to 1970s.

Charis Thompson

Science, Technology, Biomedicine, Inequality, Gender, Race, Social Theory · London School of Economics · *vp*

Charis Thompson's project on science, technology, and the state develops the concept of the "migrapolitical" to explore the relation between technologies and a stratified world on the move through two signature technologies of our day: AI/machine learning and human genome editing.

Fabien Truong

Sociology · Université Paris 8 Vincennes–Saint-Denis
Funding provided by the Florence Gould Foundation Fund

Fabien Truong's book project draws upon an ethnographic study started in 2015 in France. It focuses on everyday solidarities and coping routines towards ordinary violence in underprivileged urban neighborhoods, and questions their impacts on political imaginaries. In addition, Truong is continuing to develop two long-term parallel projects, a book and a film.

Sonja van Wichelen

Sociology and Anthropology · University of Sydney
Founders' Circle Member; funding provided by Deborah Lunder and Alan Ezekowitz

Sonja van Wichelen's research takes place on the cross-disciplinary node of law, life, and science in a globalizing world. Previous projects focused on cross-border reproductive technologies, global migration, and religion. Van Wichelen's current focus is on "biolegality" and examines the constitutive relation between biology and law in the formation of knowledge and sociality.

Sarah E. Vaughn

Anthropology · University of California, Berkeley

Sarah E. Vaughn's primary field is the critical study of climate change. She has engaged climate change through both ethnographic and archival research of the geotechnical engineering sciences and the shifting frameworks for climate data and services. Her most recent articles and current book project explore climate change with an emphasis on the intergenerational demands of technology across the Caribbean.

Waqar H. Zaidi

World History · Lahore University of Management Sciences

Waqar Zaidi studies twentieth-century technology and international relations. His current project focuses on the interrelations between civil aviation, the cold war, and developmentalism in post–World War II West Asia. His project will explore the origins of globalized civil aviation within the international political economy of the early cold war.

SCHOOL OF SOCIAL SCIENCE

Program in Interdisciplinary Studies

THE PROGRAM IN INTERDISCIPLINARY STUDIES explores different ways of viewing the world, spanning a range of disciplines from physics and astrophysics, geology, paleontology, and biology, to artificial intelligence, cognitive psychology, and philosophy. The most recent interdisciplinary focus is on questions related to the origins and nature of cognition. The program is headed by Professor Piet Hut.

Piet Hut
Professor
Piet Hut is head of the Program in Interdisciplinary Studies at IAS. The program's main research theme is "the Nature of Reality," as seen through the lenses of *Math*, *Matter*, and *Mind*. Some subthemes are: for *Math*, "Algorithms and Foundations"; for *Matter*, "Physics and Biology"; and for *Mind*, "Phenomenology and Contemplation." Hut's main research background is in computational astrophysics, with asteroid "17031 Piethut" named in his honor. He is one of the co-founders of the Earth-Life Science Institute at the Tokyo Institute of Technology. His current book projects include a *Typology of Novelty* and *Rekindling Natural Philosophy*.
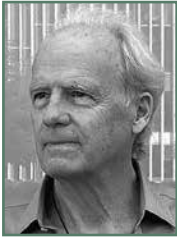
Stephen Burlingham
Art and Science

Stephen Burlingham uses visual arts as a medium to explore awareness through a focus on the tangible-intangible divide. Central for him is the paradox that our experience of self and world is sculpted equally by the seen and the unseen. His current project is a TV series on the question of what consciousness is and the many people throughout history who have tried—and are still trying—to answer it.

Will Cavendish
Science Communication

Will Cavendish is a mathematician and filmmaker interested in how scientific and mathematical knowledge is communicated both between experts and to the public. His current film project explores the ideas of John Horton Conway.

Eiko Ikegami
Historical Sociology · The New School

Eiko Ikegami is a sociologist specializing in the historical sociology of Japan. At IAS, she will work on her research program on the various forms of diverse intelligence generally, and her digital research on autistic individuals in virtual worlds. Central to her project is the use of avatars in virtual environments and the virtual ethnography that allows her to access the experiences and worldviews of autistic adults.

Philip Ording
Mathematics · Sarah Lawrence College · *s*

Philip Ording is interested in the creative process as understood by mathematicians. During his visit to the Institute he plans to study the late writings of Max Dehn (1878–1952) on the psychology of mathematics.

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

Michael Rassias's research interests lie in mathematical analysis, analytic number theory, and more specifically in exponential/trigonometric sums, zeta functions, approximation theory, functional equations, and analytic inequalities. He is also interested in the distribution of prime numbers, the analytic investigation of elliptic curves, and cryptography.

PROGRAM IN INTERDISCIPLINARY STUDIES
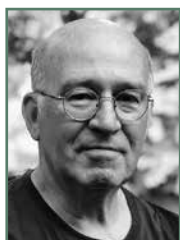
Michael Solomon

Bioethics · Institute for Advanced Study

Michael Solomon's activities for the coming year stem from his bioethics perspective, from the implications of artificial intelligence for the changing practice of medicine, from interest in biology and neuroscience, and from general curiosity. He will focus on the moral status of machines that can think. What obligations will we owe them, and what obligations will they think we deserve?
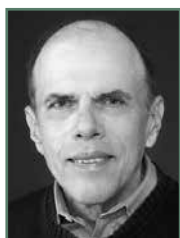
Edward Tenner

History of Science and Technology · Lemelson Center, Smithsonian Institution

Edward Tenner is studying the history of risks, voluntary and involuntary, since the early twentieth century, extending earlier work on the Titanic shipwreck and its unintended consequences. In particular, Tenner is exploring the relationships among disasters (and averted disasters) and the paradoxes of preparedness, in light of Covid-19.

Edwin L. Turner

Astrophysics · Princeton University

Edwin L. Turner is working on statistical biases and estimators for samples of exoplanets, on the Strategic Exploration of Exoplanets and Disks with Subaru project, and on implications of complexity in cellular automata systems for the limits of reductionism, as well as related topics in the philosophy of science.

Harald Wiltsche

Philosophy of Science · Linköping University

Harald Wiltsche is a philosopher working at the intersection between philosophy of science, epistemology, and phenomenology. What interests Wiltsche is how bodily, socially, and historically situated subjects gain knowledge about reality by means as diverse as thought experiments, mathematical models, or scientific instruments.

PROGRAM IN INTERDISCIPLINARY STUDIES

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.
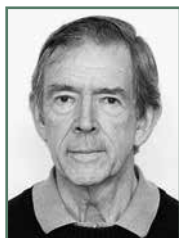
Curtis Callan
Theoretical Physics and Biology

Curtis Callan is a theoretical physicist who has recently become fascinated by the opportunities for theory that modern biology presents. While the phenomena of biology do not submit to mathematically precise theorizing as readily as do those of physics, modern data and statistical thinking suggest well-posed theoretical questions in certain corners of the field. At IAS, Callan aims to develop a deeper theoretical understanding of one such corner, the adaptive immune system, and to identify other areas of biology that are ripe for theoretical thinking.

David N. Cannadine
History of Philanthropy

While at IAS, David Cannadine will be working on a comprehensive history of the Ford Foundation. Since the Ford Foundation took on a global role from 1950, its history also provides a new perspective on the second half of the American century. The project will also engage with many of the conversations and controversies surrounding the purpose and nature of philanthropy today.

Anna Laqua
Institute Visitor

Anna Laqua is investigating the transfer of early modern knowledge between medicine and the theater. The starting point of her research is the historical figure John Bulwer (1606–1656), a London physician and Baconian who had a special interest in theater culture.

Lorenza Pescia De Lellis
Institute Visitor

One main focus of Lorenza Pescia De Lellis's current research is the influence of translation in multilingual Swiss society, particularly related to the discourse about energy as realized in Italian and French texts on Swiss websites. Other topics she is currently working on include the linguistic analysis of discourses about immigration in Italian and Swiss Italian newspapers, as well as the Italian language and sexism, with a focus on newspapers and literature.

Artist–in–Residence Program

THE ARTIST-IN-RESIDENCE PROGRAM was established in 1994 to underscore the Institute's dedication to scholarly and artistic endeavors. Unrestrained curiosity, risk-taking, and even blind faith are concepts native to transformative research and the visual and performing arts. As part of the Artist-in-Residence program, a pioneering artist is appointed to join the Institute community and curate the Edward T. Cone Concert Series, pursue their creative and intellectual work, and exchange ideas with scholars from all disciplines. Composer David Lang was appointed as Artist-in-Residence in 2015. In 2020–21, Lang continues his VIRTUOUSITY program, an exploration of mastery, meaning, and experience.

★ *During academic year 2020–21, all Artist-in-Residence programming will be presented virtually.*

David Lang
Composer

David Lang is a Pulitzer Prize–winning composer whose recent works include his opera *prisoner of the state*, which premiered in June 2019 with the New York Philharmonic; the score for Paolo Sorrentino's film *Youth*, which received Academy Award and Golden Globe nominations; *man made*, a concerto for Sō Percussion and orchestra; *anatomy theater*, an opera written in collaboration with visual artist Mark Dion; *the public domain*, a commission from Lincoln Center for one thousand amateur singers; and *the loser*, an opera based on the novel by Thomas Bernhard, for which Lang served as librettist, composer, and stage director. Lang is Professor of Music Composition at the Yale School of Music and co-founder and co-artistic director of New York's legendary music festival Bang on a Can.

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Marcia Tucker
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Information Technology Group

James Stephens
Information Technology Manager
School of Natural Sciences Computing

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