

2014–2015
UNIVERSITY OF ROCHESTER



THE COLLEGE
ARTS, SCIENCES & ENGINEERING

NEW FACULTY





As we begin a new academic year we welcome an outstanding group of new faculty to Arts, Sciences & Engineering. The brief introductions that follow highlight the powerful and diverse talents they bring to strengthen our scholarship and research and our teaching.

Peter Lennie

Robert L. and Mary L. Sproull Dean of the Faculty of Arts, Sciences and Engineering



GEORGE ALESSANDRIA
Professor of Economics

George Alessandria joins the Department of Economics as professor. He received a BA in mathematics and economics from Duke University, and an MA and PhD in economics from the University of Pennsylvania. Prior to joining the University of Rochester, he was a senior economic advisor and economist at the Federal Reserve Bank of Philadelphia.

His research interests are in macroeconomics and international trade. In his use of dynamic models to study trade flows, George and his peers pioneered a new approach to the field of international trade that allows us to understand the effects of business cycles on trade. Through a microeconomic analysis of the behavior of firms, George's work has given insight into what were long-standing puzzles concerning the slow response of trade patterns to economic volatility. He has published in journals such as the *Quarterly Journal of Economics*, *American Economic Review*, and the *Journal of Monetary Economics*. He has served as an associate editor at some of the most prestigious journals in economics.



HUSSEIN ALUIE

Assistant Professor of Mechanical Engineering

Hussein Aluie joined the Department of Mechanical Engineering as assistant professor in July 2014. Following his PhD work at Johns Hopkins University in 2009 on hydrodynamic and magneto hydrodynamic turbulence, Hussein joined Los Alamos National Lab as a postdoctoral research associate.

Hussein's research interests are in fluid dynamics of both neutral fluids and plasmas; nonlinear multi-scale science, including highly compressible flows; and scientific computing. Areas of application range from astrophysical plasmas to geophysical fluid dynamics, satellite observations and experimental measurements, and global-scale climate predictions. His work spans high-performance computations, the analysis of huge data sets, semi-empirical physical reasoning, abstract mathematical analysis, and rigorous analysis of complex flows.

His work has focused on the numerical simulation and analysis of how different length-scales in a flow interact and communicate with each other—a profound problem hindering our ability to accurately model and predict the behavior of complex flows. He has applied this methodology to study energy cascades across scales in fluids and plasmas of variable density, in oceanographic flows, and in other nonlinear complex flows.

Hussein has published in journals including *Nature*, *Journal of Fluid Dynamics*, *Physical Review Letters*, and *Physics of Fluids*. His research has been funded by the National Science Foundation and the Department of Energy. Hussein expects to establish strong collaborations with scientists and engineers in the Laboratory for Laser Energetics and with experimentalists and computational scientists in fluid dynamics here at the university.



SEGEV BENZVI
Assistant Professor of Physics

Segev BenZvi joins the University this year as assistant professor of physics. He comes from the University of Wisconsin–Madison, where he was a postdoctoral researcher and assistant scientist working at the Wisconsin-IceCube Particle Astrophysics Center. Segev was born in Israel and raised in western Pennsylvania. He received an AB in physics from the University of Chicago in 2001, and a PhD in physics from Columbia University in 2008.

Segev is an experimental physicist interested in the origin of high-energy astrophysical cosmic rays and gamma rays. These particles can attain energies orders of magnitude beyond what we can create in terrestrial accelerators, and they are important probes of interstellar and intergalactic space. As a PhD student and postdoctoral researcher, Segev worked at the Pierre Auger Observatory, a detector in Argentina designed to measure the highest energy cosmic rays ever observed. While a member of the Auger Collaboration, he made significant contributions to measurements of the energy, mass composition, and arrival direction distribution of ultra-high energy cosmic rays.

He is currently a collaborator at the IceCube Neutrino Observatory at the South Pole and has played a major role in the construction of the High-Altitude Water Cherenkov (HAWC) Gamma-Ray Observatory in central Mexico. Segev is perhaps best known for using data from IceCube and HAWC to measure a significant anisotropy in the arrival directions of the Galactic cosmic rays in the TeV energy band.



PETER CHRISTENSEN
Assistant Professor of Art History

Peter Christensen comes to Rochester from the Munich Technical University, where he taught architectural history as Wissenschaftlicher Mitarbeiter (junior faculty) from 2012 to 2014. He received his PhD in architecture, landscape architecture, and urban planning from Harvard University in 2014. He earned a master's degree in design studies from Harvard University in 2009, and a BArch in architecture from Cornell University in 2005.

Peter's research focus is modern architectural and environmental history, particularly of Germany, Central Europe, and the Islamic Middle East, with a focus on their transactional contexts. His work explores geopolitical theory and architectural history in its global contexts. He applies critical applications of the digital humanities in his research and teaching. His current book project examines cultural and architectural aspects of the German construction of the Ottoman railway network.

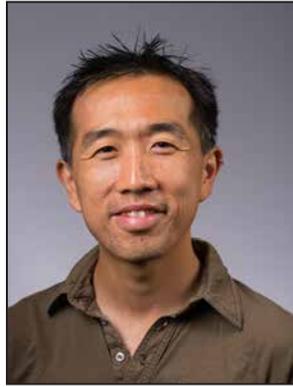
Peter is the recipient of the 2010 Philip Johnson Book Award from the Society of Architectural Historians and grants from the Fulbright Foundation and the Deutscher Akademischer Austauschdienst (DAAD), among others. Peter's writing has appeared in *Muqarnas*, *Journal of the Society of Architectural Historians*, *International Journal of Islamic Architecture*, *Harvard Design Magazine*, and *New Geographies*. He is the editor of three volumes: *Architecturalized Asia: Mapping a Continent Through History* (with Hazel Hahn, Ken Oshima, and Vimalin Rujivacharakul, University of Hawai'i Press, 2013); *Instigations: Engaging Landscape, Architecture and the City* (with Mohsen Mostafavi, Lars Müller, 2012); and *Home Delivery: Fabricating the Modern Dwelling* (with Barry Bergdoll, the Museum of Modern Art, 2008). Peter maintains the website www.peterhchristensen.com.



JOHN CRISWELL
Assistant Professor of Computer Science

John Criswell is assistant professor in the Department of Computer Science. Prior to joining the University of Rochester, John was a research programmer and graduate student at the University of Illinois. Before that, he worked at Argus Systems Group, Inc., where his work included enhancements to the AIX operating system kernel and writing utilities that utilized mandatory access controls to improve system security. He earned his BS in computer science in 2003, and PhD in computer science in 2014, both from the University of Illinois at Urbana-Champaign.

John's research interests focus on computer security and novel applications of compiler and operating system technology. His primary research work is on the Secure Virtual Architecture (SVA). SVA enforces security policies on commodity operating system and application code via compiler instrumentation, thereby providing strong protection against sophisticated attacks. Using SVA, John built the first systems that provide strong comprehensive memory safety protection and complete control-flow integrity enforcement to commodity operating system kernels such as Linux and FreeBSD. More recently, he has used SVA to create the Virtual Ghost system that protects application data and control-flow from a compromised operating system kernel.



DRAGONY FU
Assistant Professor of Biology

Dragony Fu joins the faculty as assistant professor in the Department of Biology. He received his bachelor's degree from the University of Chicago and his PhD in biochemistry and molecular biology from the University of California–Berkeley. As a postdoctoral fellow at MIT, he discovered novel functions for human enzymes in DNA repair, gene expression, and cell death.

Here at Rochester, Dragony will continue to employ techniques in biochemistry and molecular biology to elucidate the mechanisms by which cells respond to toxic and carcinogenic compounds. The research performed in his laboratory will provide critical insight into multiple aspects of human health, including cancer prevention and therapy, degenerative disorders, and aging.



PIERRE-ALEXANDRE GOURDAIN
Assistant Professor of Physics and Astronomy

Pierre-Alexandre Gourdain joins the University this year as assistant professor of physics and astronomy, coming from Cornell University where he was the NNSA assistant professor of electrical and computer engineering. A native of Montpellier in the south of France, Pierre-Alexandre did his bachelor's work (1996) and his PhD (2001) at the Ecole Centrale de Lyon, also in France. He was assistant researcher (2002–08) and lecturer (2005–08) in the Physics and Astronomy Department at UCLA.

Pierre-Alexandre studies matter under extreme conditions. His research focuses primarily on laboratory astrophysics. In his laboratory, Pierre-Alexandre creates matter with large particle densities and temperatures, yielding pressures a billion times higher than the Earth's atmosphere. Under such conditions, matter turns into a plasma state, where electrons are not bound to atomic nuclei. By developing new physical models based on experimental measurements done in the laboratory, he hopes to understand the basic astrophysical mechanisms ruling the cosmos. Starting as a researcher in fusion energy at UCLA, Pierre-Alexandre developed a vibrant research program on laboratory astrophysics at Cornell University, principally studying laboratory plasma jets similar to the ones formed by galactic nuclei or proto-stars. At the University of Rochester, he will collaborate closely with astrophysicists studying the formation of galactic and stellar plasma jets, as well as physicists working on inertial fusion confinement, to understand the properties of matter under extreme conditions.



SCOTT GRIMM
Assistant Professor of Linguistics

Scott Grimm comes to Rochester after completing a postdoctoral research appointment at the University Pompeu Fabra in Barcelona, Spain, where he worked on the project “Natural language ontology and the semantic representation of abstract objects.” He received his PhD in linguistics from Stanford University in 2012. Prior to his doctoral studies, he obtained an MSc in logic from the University of Amsterdam, a Maîtrise in linguistics from the University of Grenoble III, France, and a BA in literature from Columbia University.

Scott’s research interests center on how meaning is conveyed through language and how grammars are structured to accommodate different categories of meaning. To address these issues, he engages in extraction of linguistic patterns via computational techniques and mathematical modeling, as well as typological comparison and fieldwork. His dissertation concerns the representation of grammatical number categories, such as the singular/plural contrast, including how these categories are structured differently across languages and the relation between properties of real-world objects and their categorization in language.



PHILIP GUO
Assistant Professor of Computer Science

Philip Guo is assistant professor of computer science at the University. He received a PhD in computer science from Stanford University in 2012, and BS and MEng degrees in electrical engineering and computer science from MIT in 2006. His PhD dissertation was one of the first to identify the unique software needs of data scientists and to develop five new tools to address those needs. One such tool from his dissertation, CDE, has been used by more than 10,000 people.

His main research interests are in human-computer interaction (HCI), especially building tools for informal learning and online education. He is the creator of Online Python Tutor (pythontutor.com), a web-based computer science education tool that has been used by more than 500,000 people in more than 165 countries. He plans to teach classes related to web programming, dynamic programming languages, human-computer interaction, and educational technology.

In 2012, he wrote a popular free e-book called *The PhD Grind* (phdgrind.com), which is the first known detailed account of an entire PhD experience, with more than 300,000 downloads so far. Philip also writes a monthly blog column for the Communications of the ACM, and his personal website (pgbovine.net) gets more than 250,000 visitors each year.



RALF HAEFNER

Assistant Professor of Brain and Cognitive Sciences

Ralf Haefner joins the Department of Brain and Cognitive Sciences as assistant professor. He received a PhD from Oxford University in theoretical astrophysics, an MPA from Harvard University, and worked in the private sector as a management consultant.

Ralf transitioned to the field of neuroscience 10 years ago, studying how cortical neurons process the information they receive from the two eyes in order to allow us to perceive depth. He now spends most of his time working on a general theory for how the brain combines sensory information with prior knowledge about the outside world and how it uses this information to inform decisions. The problem faced by the brain is structurally very similar to big data problems addressed by the field of machine learning, and Ralf is testing the hypothesis that neural responses might be best understood as implementing particular machine learning algorithms. The relevant mathematical framework is that of Bayesian inference, which assumes that the brain represents and computes with probabilistic beliefs rather than best estimates. How these beliefs are represented by neural responses, and what computations individual neurons perform to compute those beliefs is at the center of his research. A better understanding of these questions will allow us to infer subconscious thought processes from observable neural responses and may provide a neural and computational explanation for well-known psychological phenomena, such as why first impressions count the most.



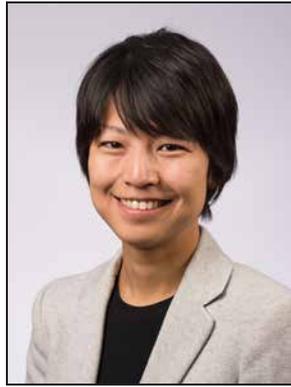
CELESTE KIDD

Assistant Professor of Brain and Cognitive Sciences

Celeste Kidd is assistant professor in the Department of Brain & Cognitive Sciences and in the Center for Visual Science, and co-director of the Rochester Baby Lab. She began her research career as a research assistant at the University of Southern California, where she worked in labs that spanned the departments of linguistics, psychology, computer science, and engineering. She was awarded a National Science Foundation Graduate Research Fellowship to support her graduate school research in the Department of Brain and Cognitive Sciences at the University of Rochester under the advisement of Professor Richard Aslin. She was awarded a Marr Prize for Computational Modeling and a Glushko Dissertation Prize by the Cognitive Science Society for her thesis work.

Celeste's research investigates the mechanisms that guide young children's early behavior and learning, with a special focus on attention and decision making. Her work draws on rational models to make sense of both children's implicit attentional decisions and overt behavioral decisions (e.g., selecting actions that optimize promised rewards). She employs a range of methodologies, including eye-tracking, touch screen testing, in-person behavioral experiments, and corpus studies. A key feature of her approach is the combination of behavioral methods and computational modeling, which allows her to rigorously test competing theories of decision making and learning by quantifying otherwise unobservable cognitive processes or variables.

More on Celeste's research and the Rochester Baby Lab is available at www.rochester.edu/babylab.



CHIGUSA KURUMADA
Assistant Professor of Brain and Cognitive Sciences

Chigusa Kurumada is assistant professor in the Department of Brain and Cognitive Sciences. She received her PhD from Stanford University in linguistics.

Chigusa's research investigates how human language users perceive and interpret linguistic signals in pragmatic communications. As any utterance from our everyday conversation would reveal, much of linguistic communication occurs implicitly. A subtle variation in pronunciation or intonation, as well as choice of words and sentence structures, can convey what the speaker intends to say. Chigusa's dissertation, *Navigating variability in the linguistic signal: Learning to interpret English contrastive prosody*, laid out a probabilistic theory of how language users infer implicit speaker intentions from what is explicitly encoded in acoustic realizations of speech. Her research also focuses on young children's pragmatic development, addressing the question of how communication shapes the ways in which children acquire linguistic representations.

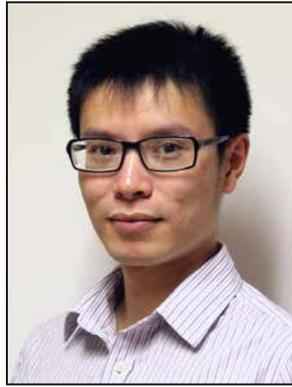


ALEXANDER LEE
Assistant Professor of Political Science

Alexander Lee earned his PhD from Stanford University and his BA from Yale University.

His research focuses on the historical factors governing the success or failure of political institutions, particularly in South Asia and other areas of the developing world. He is currently working on a book project that links regional political variation within India to the economic redistribution among caste groups that occurred during the colonial period. Additional research areas include the causes of political violence and terrorism, the politics of medieval and early modern Europe, and the use of archival material in social science. His work combines quantitative methods, historical sources, and intensive fieldwork in rural India.

Alexander's work has been published in *World Politics* and the *Quarterly Journal of Political Science*.



JI LIU

Assistant Professor of Computer Science

Ji Liu is assistant professor in the Department of Computer Science. He received his PhD in computer science from the University of Wisconsin–Madison in 2014, his MS in computer science from Arizona State University in 2010, and his BE degree in automation from University of Science and Technology of China in 2005.

His research interests include machine learning and optimization, as well as their applications in such areas as big data analytics, data mining, and computer vision. He won the Knowledge Discovery and Data Mining (KDD) best research paper award honorable mention in 2010.



GONZALO MATEOS

Assistant Professor of Electrical and Computer Engineering

Gonzalo Mateos has been assistant professor in the Department of Electrical and Computer Engineering since 2014. In 2013, he was a visiting scholar in Carnegie Mellon University's Computer Science Department. From 2003 to 2006, he worked as a systems engineer in the Automation Technologies Division at ABB in Uruguay. He received his BSc degree in electrical engineering from Universidad de la Republica, Uruguay, in 2005, and MSc and PhD degrees in electrical engineering from the University of Minnesota in 2009 and 2012.

Gonzalo's research interests lie in the areas of statistical learning from big data, network science, wireless communications, and signal processing. His current research focuses on algorithms, analysis, and application of statistical signal processing tools to dynamic network health monitoring, social networks, the power grid, and big data analytics. Since 2012, he has served on the editorial board of the *EURASIP Journal on Advances in Signal Processing*. He received the Best Student Paper Award at the 13th IEEE Workshop on Signal Processing Advances in Wireless Communications, held in Cesme, Turkey in 2012, and was a finalist in the Student Paper Contest at the 14th IEEE DSP Workshop in 2011, held in Sedona, Arizona. His doctoral work has been recognized with the 2013 University of Minnesota's Best Dissertation Award (honorable mention) across all physical sciences and engineering areas.



SEVAK MKRTCHYAN
Assistant Professor of Mathematics

Sevak Mkrtchyan spent 2009 to fall 2011 as a G.C. Evans Instructor at Rice University. He was then a postdoctoral fellow, first at the Mathematical Sciences Research Institute in spring 2012, and then at Carnegie Mellon University. Sevak received his PhD in mathematics in 2009 from Berkeley.

Sevak works in probability and related areas of mathematical and statistical physics. His research interests include the very active areas of random tilings, determinantal point processes and random matrix theory, asymptotic representation theory, and asymptotic combinatorics.



YENA PARK
Assistant Professor of Economics

Yena Park joins the Department of Economics as a tenure-track assistant professor. She graduated summa cum laude from Seoul National University, Korea, in 2005, with a BA in economics. After a stint as an economist at the Bank of Korea, she earned her PhD in economics from the University of Pennsylvania in 2014.

She is a macroeconomist whose current work focuses on issues in public finance—in particular questions of tax policies—and uses tools from the theory of contracts. Her most recent paper, “Optimal Taxation in a Limited-Commitment Economy,” has been accepted for publication at the *Review of Economic Studies*. In it, Yena shows that a welfare-maximizing tax policy must tax capital income when there are frictions in the economy arising from a limited ability of agents to enforce contracts. Her result is in contrast to the received view in the literature, which is that it is optimal to tax labor, and not capital, income.



STEVE PIANTADOSI

Assistant Professor of Brain and Cognitive Sciences

Steve Piantadosi studies language processing and acquisition as assistant professor in the Department of Brain and Cognitive Sciences. His background is in mathematics and linguistics at the University of North Carolina at Chapel Hill. He attended graduate school at MIT, winning a Glushko prize for his dissertation in brain and cognitive sciences. After completing his degree, Steve first came to Rochester as a postdoctoral researcher with Richard Aslin.

He uses modeling and experimental methods to understand the computational processes that support language learning, as well as the form of human languages more generally. His work includes computational explorations of domains such as the acquisition of number words (e.g., “one,” “two,” “three,” etc.), quantifiers (e.g., “every,” “most,” “both,” etc.), and syntactic knowledge. This work builds statistical learning models over the domain of structured “language of thought” representations in order to explain how learners might discover new, computationally complex representations. Steve’s research also includes studies with infants, preschoolers, and large-scale behavioral experiments with adults, all aimed at pinpointing the conceptual primitives that learners might use to support linguistic meaning and conceptual development. His earlier work draws on tools from information theory and mathematical modeling to explain phenomena like the pervasiveness of ambiguity in language and the form of words.

More information about his research can be found at <http://colala.bcs.rochester.edu>.



CHRISTIAN RABELING
Assistant Professor of Biology

Christian Rabeling is assistant professor in the Department of Biology. He received his degree in biology from the Eberhard Karls Universität Tübingen in Germany and studied abroad at the Universidade de São Paulo in Brazil as an undergraduate student. Christian received a PhD from the University of Texas at Austin, and he was awarded a postdoctoral fellowship to study at the Smithsonian Institution's National Museum of Natural History. Before joining the faculty at the University of Rochester, Christian was elected a Junior Fellow at the Harvard Society of Fellows.

Christian's research program investigates evolutionary genetics of ants, and his research integrates evolutionary biology, genetics, behavioral ecology, taxonomy, and natural history. Currently, he investigates the evolution of social parasitism, utilizing molecular phylogenetic, population genetic, and genomic approaches, exploring how a change in social organization contributes to speciation. In addition, Christian recently became interested in exploring the ant biodiversity of the South Pacific island archipelago, Vanuatu. The goal of this research program is to integrate classic biogeography and molecular phylogenetics in order to understand the diverse mechanisms that underlie species formation and generate biodiversity. An integral part to his studies is field research, which frequently leads to new discoveries that are then further dissected in the laboratory.



LLERENA SEARLE
Assistant Professor of Anthropology

Prior to joining the Department of Anthropology, Llerena taught at Williams College, the Rhode Island School of Design, and the University of Rhode Island. She earned her PhD from the University of Pennsylvania in 2010.

Her dissertation research, which was funded by the National Science Foundation and the American Institute of Indian Studies, explains the rapid growth of Indian cities and the proliferation of new malls, high-rises, and office parks across India by examining the practices and ideas of those who fund real estate projects. Llerena worked with international financiers and real estate developers to understand how they transform Indian buildings into legible assets available to international networks of speculative finance. Building on her interest in cultures of capitalism and urban space, her next project will investigate the reconfigured image of the Indian housewife that has emerged in advertisements for housing and, in particular, she'll examine the relationships between this image and emerging ideals of domesticity, class, and gender in globalizing India.



LAURA ACKERMAN SMOLLER
Professor of History

Laura Ackerman Smoller has held positions as lecturer and acting assistant professor of history at Stanford University, and more recently as professor of history at the University of Arkansas at Little Rock. She earned her PhD in history from Harvard University in 1991.

Her research examines the intersections between magic, science, and religion in medieval and early modern Europe, with particular foci on the topics of astrology and apocalyptic prophecy, saints' cults and miracles, and disease and healing. She is the author of *History, Prophecy and the Stars: The Christian Astrology of Pierre d'Ailly, 1350–1420* (Princeton University Press, 1994), *The Saint and the Chopped-Up Baby: The Cult of Vincent Ferrer in Medieval and Early Modern Europe* (Cornell University Press, 2014), and numerous articles in leading journals. A number of institutions, including the John Simon Guggenheim Memorial Foundation and the National Endowment for the Humanities, have recognized her scholarship with fellowships and awards. Laura also serves as editor-in-chief of the journal *History Compass*.



DUSTIN TRAIL

Assistant Professor of Earth and Environmental Sciences

Dustin Trail is a new faculty member in the Department of Earth and Environmental Sciences. After completing an undergraduate degree in computer science at the University of Colorado–Boulder, Dustin went on to pursue graduate degrees in geology, receiving an MS from the University of Colorado, and PhD from Rensselaer Polytechnic Institute.

Dustin tries to understand what's going on inside our planet, our moon, and other terrestrial planets in our solar system in regions inaccessible by drilling, direct observation, or spacecraft observation. To do this, he designs and executes laboratory experiments at pressures as high as 40,000 times the pressure of Earth's atmosphere (equivalent to a depth in the Earth of 120 kilometers) and temperatures as high as 2000°C. He seeks to understand the evolution of terrestrial and lunar magmas through time; the conditions of early Earth (that is, before 4 billion years ago) and the implications for an emergent biosphere; and secular changes in the oxidation state of magmas and fluids and the connection between the chemical state of the crust and mantle. As part of the NASA Astrobiology Institute, he is especially interested in addressing how the processes of biology—ancient and modern—may ultimately influence the chemical properties of magmas through the recycling of material. He applies the results of laboratory experiments conducted in a controlled environment to natural samples to address these questions and typically classifies himself as a high-temperature experimental geochemist.

