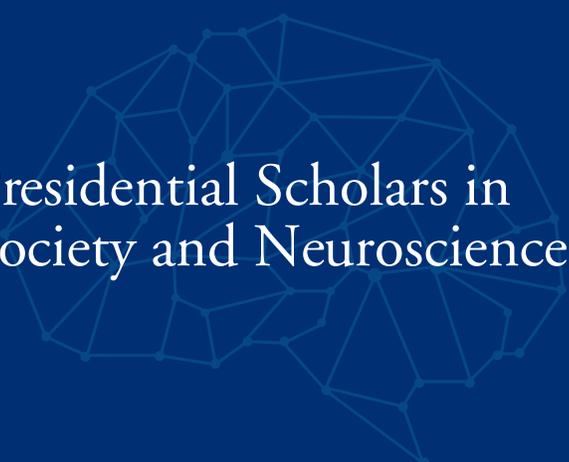




 COLUMBIA

Presidential Scholars in  
Society and Neuroscience



2018 PROGRESS REPORT



**F**ounded in 2014 by President Lee C. Bollinger as a Columbia University Presidential initiative, the Presidential Scholars in Society and Neuroscience (PSSN) program facilitates cross-disciplinary, collaborative research to advance our understanding of mind, brain, and behavior. Bringing together talented early-career scholars from a variety of fields with faculty experts in neuroscience, and in the humanities, arts, and social sciences, PSSN is creating a new paradigm for original, integrative research and training.

#### PROGRAM AIMS:

- Initiate, fund, and cultivate interdisciplinary research with path-breaking potential that is unlikely to be supported by traditional academic structures and sources.
- Recruit and support promising early-career researchers with multidisciplinary backgrounds and a critical understanding of neuroscience by providing a cross-departmental approach to scholarship and training.
- Stimulate knowledge sharing and collaboration between the human, social, and natural sciences that transcend divisions between schools, institutes, and campuses across Columbia University.

#### REVITALIZING INTERDISCIPLINARY RESEARCH IN MIND, BRAIN, AND BEHAVIOR

Recent scientific discoveries have produced biological insights into some of the most profound questions of the human condition—those relating to the basis of consciousness, emotion, preference, and free will. As researchers get closer to decoding the neural underpinnings of how people think, learn, remember, and make decisions, it becomes increasingly important to retain a context for this knowledge based in the humanities and social sciences. The study of the mind, our thoughts, and behaviors, has been a major area of inquiry for millennia, and it sits at the core of a variety of disciplinary fields today, including philosophy, history, literature, law, and the arts. Whether it is AI that can read, respond to, and influence our emotions, the use of neuroimaging in crime prediction and prevention, or the development of new treatments that reduce undesirable behaviors but alter other personality traits, it is crucial that this work is aligned with the values, history, and politics of the society in which it is being developed, in order to better impact its policies, laws, and choices. Additionally, there is a valuable opportunity to connect and incorporate new neuroscience findings with research and practice from creative fields such as the fine arts, music, literature, and film, among others.

This type of research, bridging the divide between the sciences and the humanities, however, is still uncommon. The typical university remains a 19th-century institution, with the faculty and their work largely siloed in disciplines. Although inter-, trans-, and cross-disciplinary

research has been touted by experts from industry and higher education for more than 30 years, change has been slow. At the same time, the problems humans face in the 21st century have accelerated, and they are simultaneously and irreducibly technical, political, social, and ethical issues. New methods for research, collaboration, and training are required to integrate and apply the neuroscientific discoveries of today, and to build the next generation of scholar scientists who will have the capacity to meet the challenges that lie ahead.

The Presidential Scholars in Society and Neuroscience program—comprised of postdoctoral fellows and associated faculty from a variety of fields, including the natural and social sciences, humanities, and law—is an innovative experiment to bring these areas of deep research to bear on each other in order to change the face of the 21st-century university. Housed in Columbia’s interdisciplinary Center for Science and Society, the PSSN program is made up of three components:

**Presidential Scholars Program:** PSSN supports a new generation of postdoctoral scholars: graduates from the arts, humanities, social sciences, neuroscience, and related fields who have proposed innovative cross-disciplinary research projects. Presidential Scholars are independently supported by PSSN for three years and are mentored by faculty from at least two different departments.

**Interdisciplinary Faculty Seed Grants:** PSSN awards seed funding for research, teaching, and initiatives that involve direct collaboration between neuroscientists and faculty members from other disciplines or that cross disciplinary lines to investigate important issues in society and neuroscience.

**Public and Scholarly Outreach:** PSSN organizes a public series, *Seminars in Society and Neuroscience*, as well as academic conferences, invitation-only workshops, and other events each year on topics of global importance for mind and brain research.

## THE CENTER FOR SCIENCE AND SOCIETY

The Center for Science and Society at Columbia University connects researchers, scholars, and practitioners from the sciences and the humanities to engage in interdisciplinary research, teaching, and outreach. Situated within the Faculty of Arts and Sciences on Columbia’s Morningside campus, the Center provides an academic and administrative framework and partial financial support to several interdisciplinary research groups and programs across the University, including PSSN. The Center aims to build an academic community around questions rather than fields and to create both physical and intellectual space for students and scholars from various disciplines to engage in the work of understanding each other’s terminology, methodology, and concepts. It helps to organize more than 40 conferences, seminars, workshops, and discussion groups each year, provides funding and management for a burgeoning interdisciplinary co-teaching program, and supports outreach projects and programming to enhance public understanding of science in relation to pressing social concerns.

## Presidential Scholars and Mentors

Over the past four years of its existence, the PSSN program has become **a model for the way in which cross-disciplinary research and training can be advanced throughout the University**. Its formula fosters early-career postdoctoral scholars who have proposed innovative, independent research projects that bridge neuroscience and another field in the arts, humanities, law, or social sciences. Presidential Scholars are supported by (at least) two mentors from the Columbia faculty, each with expertise in an area of the Scholar's research focus. The Scholars sit at the heart of an extensive network that fuels interdisciplinary collaboration across Columbia University. This includes a circle of faculty members who come from more than 20 departments across many of Columbia's schools and institutes, including the Irving Medical Center, Zuckerman Institute, School of Journalism, Fu Foundation School of Engineering and Applied Science, Mailman School of Public Health, Teachers College, and the New York Psychiatric Institute. The program is overseen by a multidisciplinary steering committee and advisory board, which form the core faculty members who participate in the extensive review and recruitment process for Presidential Scholars and help to organize and support the activities, conferences, and events associated with the program.



During the three years of the fellowship, the Scholars engage in many types of activities to advance their research, scholarship, and careers. Current Scholars have developed research collaborations and applied for grants; organized cross-disciplinary reading groups, journal clubs, workshops, and events; taught classes, given lectures, and participated in major conferences; and written and edited books, book chapters, and academic and news articles. The Scholars also anchor a program of outreach and exchange that takes place through public lectures and seminars, in which top experts from other institutions are invited from a variety of disciplines to present their research.

### ROBERT A. BURT PRESIDENTIAL SCHOLAR

The Robert A. Burt Scholar in Society and Neuroscience was named by the President of Columbia, in honor of Robert A. Burt, co-founder of the PSSN program. Robert “Bo” Burt was the Alexander M. Bickel Professor of Law at Yale University and a visiting senior research scientist at the Mortimer B. Zuckerman Mind Brain Behavior Institute at Columbia University from 2012 until his death in 2015. Starting in 2017, one Presidential Scholar each year has been chosen for the Robert A. Burt Scholar position. The Scholar is selected from among the PSSN finalists, as determined by the program’s steering committee during the application and interview process.



# Presidential Scholars

2018–2021



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## JULIA HYLAND BRUNO

Julia Hyland Bruno is an ethologist interested in behavioral development, with a particular focus on social animals, such as songbirds or humans, that learn how to communicate with one another. Julia received her Ph.D. in biopsychology and behavioral neuroscience from the City University of New York, where she studied the rhythmic patterning of zebra finch vocal learning. As a Presidential Scholar, Dr. Bruno explores how patterns of communication among individuals influence social organization.

**Faculty Mentors:** Peter Bearman (Sociology), George Lewis (Music)

**Representative Publication:**

Bruno, J. H., and O. Tchernichovski. (2017). Regularities in zebra finch song beyond the repeated motif. *Behavioural Processes*.



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## CLARE McCORMACK

### Robert A. Burt Scholar in Society and Neuroscience

Clare McCormack is a researcher focusing on women’s psychological and cognitive health in pregnancy and the peripartum, and how these experiences are affected by maternal stress and trauma. She received her Ph.D. in public health from the National Drug and Alcohol Research Centre in Sydney, Australia, and worked as a clinical postdoctoral fellow with Dr. Catharine Monk at the Columbia University Medical Center. Her doctoral research focused on alcohol use behavior during pregnancy and the effects of prenatal alcohol exposure on infant cognitive development.

**Faculty Mentors:** Catherine Monk (Psychiatry), Rita Charon (Narrative Medicine)

**Representative Publication:**

McCormack, C., D. Hutchinson, L. Burns, J. Wilson, E. Elliott, S. Allsop, S., R. Mattick, et al. (2017). Prenatal alcohol consumption between conception and recognition of pregnancy. *Alcoholism: Clinical and Experimental Research* 41, no. 2: 369–378.

2017–2020



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## FEDERICA COPPOLA

Robert A. Burt Scholar in Society and Neuroscience

Federica Coppola is a criminal lawyer specializing in neurolaw. Dr. Coppola investigates how findings from social and affective neuroscience might be used to reform criminal law and justice. She plans to utilize neuroscientific insights into emotions and prosocial behavior to inform changes in criminal law doctrines, theories of punishment, and correctional interventions, with a special focus on perpetrators with histories of violence. Dr. Coppola earned a J.D. *summa cum laude* from the University of Bologna Law School in 2010 and an L.L.M. in Comparative, European, and International Laws from the European University Institute in 2014 before pursuing her Ph.D.

**Faculty Mentors:** Paul Appelbaum (Psychiatry), Geraldine Downey (Psychology), Jeffrey Fagan (Law)

**Select Publications:**

Coppola, F. (2018). Valuing emotions in punishment: An argument for social rehabilitation with the aid of social and affective neuroscience. *Neuroethics*, 1–18.

Coppola, F. (2018). Mapping the brain to predict antisocial behaviour: New frontiers in neurocriminology, “new” challenges for criminal justice. *UCL Journal of Law and Jurisprudence-Special Issue 1*, no. 1: 103–126.



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## NOAM ZERUBAVEL

Noam Zerubavel is a social and neural scientist interested in understanding human relationships and group interactions. Dr. Zerubavel investigates the organizing sociological principles, psychological processes, and neural mechanisms of the complex dynamics in social networks. His recent neuroimaging work on affective reciprocity postulates that brain activity might predict future friendships. He completed his Ph.D. in psychology with Professor Kevin Ochsner and postdoctoral training in social network analysis with Professor Peter Bearman at Columbia University.

**Faculty Mentors:** Peter Bearman (Sociology), Daphna Shohamy (Psychology)

**Select Publications:**

Zerubavel, N., M.A. Hoffman, A. Reich, K. N. Ochsner, and P. Bearman (2018). Neural precursors of future liking and affective reciprocity. *Proceedings of the National Academy of Sciences* 115, no. 17: 4375–4380, 201802176.

Denny, B. T., M. C. Inhoff, N. Zerubavel, L. Davachi, and K. N. Ochsner (2015). Getting over it: Long-lasting effects of emotion regulation on amygdala response. *Psychological Science* 26, no. 9: 1377–1388.

2016–2019



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### MATTEO FARINELLA

Matteo Farinella is a neuroscientist and cartoonist who studies the use of comics and other visual narratives in science communication. Working with science journalists, educators, and cognitive neuroscientists, he aims to understand how these tools may affect the public perception of science and increase scientific literacy. Dr. Farinella received a Ph.D. in neuroscience from University College London. He is the author of two graphic novels and a children's book, with his latest work receiving a nomination for best nonfiction for young adults. His award-winning illustrations have been featured in numerous exhibitions pertaining to science and graphic art.

**Faculty Mentors:** Marguerite Holloway (Journalism), Barbara Tversky (Psychology)

**Select Publications:**

Farinella, M. (2018). Science comics' super powers. *American Scientist* 106, no. 4: 218–221.  
Farinella, M. (2017). *The Senses*. London: Nobrow.



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### NORI JACOBY

Nori Jacoby studies how different cultures use music and sound to make sense of the world around them. Through his research, Dr. Jacoby attempts to create new paradigms for scientific analysis that incorporate techniques from neuroscience, anthropology, and ethnomusicology, particularly in the study of rhythm perception. He earned a Ph.D. in computational neuroscience from the Hebrew University of Jerusalem and did postdoctoral research in computational audition at MIT. In fall 2018, Dr. Jacoby accepted a position as a research group leader at the Max Planck Institute of Empirical Aesthetics in Frankfurt, Germany.

**Faculty Mentors:** Ana Maria Ochoa (Music), Sarah Woolley (Psychology)

**Select Publications:**

Polak, R., N. Jacoby, T. Fischinger, D. Goldberg, A. Holzapfel, and J. London (2018). Rhythmic prototypes across cultures: A comparative study of tapping synchronization. *Music Perception: An Interdisciplinary Journal* 36, no. 1: 1–23.  
Jacoby, N., and J. H. McDermott (2017). Integer ratio priors on musical rhythm revealed cross-culturally by iterated reproduction. *Current Biology* 27, no. 3: 359–370.



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## LAN LI

Lan Li is a historian of the body and filmmaker with a focus on developing a comparative history of numbness. She is particularly interested in how representations of peripheral sensation through hand-drawn maps cohered and conflicted with different perceptions of health and disease. Her research collaborations include projects on chemotherapy-induced nerve damage, aging, and pain. Dr. Li received her Ph.D. in science, technology, and society studies at MIT. She has directed and produced short films about medicine, health, neurology, history of science, performance studies, and art history.

**Faculty Mentors:** Eugenia Lean (East Asian Languages and Cultures), Martin Picard (Neurology), Kathryn Tabb (Philosophy)

**Select Publications:**

Li, L. A. *Intimate Cartographies: Body Maps and the Assembly of Medical Imagination*. Chicago: University of Chicago Press (under contract).

Li, L. A. (2018). Pinpricks: Needling, numbness, and temporalities of pain. *Imagining the Brain: Episodes in the History of Brain Research*, pp. 205–229. Cambridge, MA: Academic Press.

## Alumni



2015–2018

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## DAVID BARACK

David Barack is a neuroscientist and philosopher. His neuroscientific investigations target the neural circuits of foraging decisions in humans and nonhuman primates. He is particularly interested in how primates search for information, how information is encoded in the brain independently of reward, and how information guides inferences about the world. Dr. Barack's philosophical work explores the conceptual foundations of cognitive neuroscience, especially the underlying dynamical basis for cognition. He received his Ph.D. in philosophy from Duke University and worked as a postdoctoral researcher at the University of Pennsylvania. He completed the PSSN program in 2018 and is currently a postdoctoral research fellow in the Salzman Lab at Columbia.

**Faculty Mentors:** Christopher A. B. Peacocke (Philosophy), Daniel Salzman (Neuroscience), Michael Woodford (Economics)

**Select Publications:**

Barack, D. L., S. W. Chang, and M. L. Platt (2017). Posterior cingulate neurons dynamically signal decisions to disengage during foraging. *Neuron* 96, no. 2: 339–347.

Barack, D. L. (2017). Cognitive recycling. *The British Journal for the Philosophy of Science*: 1–30.



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## ANN-SOPHIE BARWICH

Ann-Sophie Barwich is a philosopher and historian of science with a specialization in biology and chemistry. Her research has examined current and past developments in olfactory research and the epistemic, empirical, and social factors that define ongoing science in laboratories studying olfaction. She recently completed a book exploring the sense of smell as a model for studying neuroscience. Dr. Barwich received her Ph.D. from the Center for the Study of Life Sciences (Egenis) at the University of Exeter before taking on a postdoctoral fellowship at the Konrad Lorenz Institute for Evolution and Cognition Research in Klosterneuburg, Austria. She completed the PSSN program in 2018 and is currently a visiting assistant professor in the Cognitive Science Program at Indiana University, Bloomington.

**Faculty Mentors:** Christopher A. B. Peacocke (Philosophy), Stuart Firestein (Biological Sciences)

### Select Publications:

Barwich, A. *The Scentsory Brain: What the nose Tells the Mind*. Cambridge, MA: Harvard University Press (under contract).

Barwich, A. S. (2018). How to be rational about empirical success in ongoing science: The case of the quantum nose and its critics. *Studies in History and Philosophy of Science Part A* 69: 40–51.



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## ANDREW GOLDMAN

Andrew Goldman studies the cognition and neuroscience of musical improvisation, drawing on his training as a concert pianist and composer. Dr. Goldman's experiments explore how degrees of improvisation experience in musicians and dancers affect sound perception and motor planning. His research helps define what improvisation is, how people learn to do it, and the role improvisation plays in daily life. Andrew received his Ph.D. from the University of Cambridge in 2015. He completed the PSSN program in 2018, and he is currently a postdoctoral associate in the Music, Cognition, and the Brain initiative at Western University, Canada.

**Faculty Mentors:** George Lewis (Music), Paul Sajda (Biomedical Engineering), Daphna Shohamy (Psychology)

### Select Publications:

Goldman, A., T. Jackson, and P. Sajda (2018). Improvisation experience predicts how musicians categorize musical structures. *Psychology of Music* (June 27): 0305735618779444.

Goldman, A. J. (2016). Improvisation as a way of knowing. *Music Theory Online* 22, no. 4.

# Program Supervision and Mentors

## Steering Committee

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### **PAMELA H. SMITH (CHAIR)**

Pamela H. Smith is the Seth Low Professor of History at Columbia University, founding director of the Center for Science and Society, and director of the Making and Knowing Project. She specializes in the history of early modern Europe and the history of science. She is the author of *The Business of Alchemy: Science and Culture in the Holy Roman Empire* (Princeton, 1994; 1995 Pfizer Prize), and *The Body of the Artisan: Art and Experience in the Scientific Revolution* (Chicago, 2004; 2005 Leo Gershey Prize). Her work on alchemy, artisans, and the making of vernacular and scientific knowledge has been supported by grants and fellowships from many prominent foundations and institutions, as well as by federal agencies for the humanities and the sciences.

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### **CHRISTOPHER A. B. PEACOCKE (VICE-CHAIR)**

Christopher A. B. Peacocke is the Johnsonian Professor of Philosophy at Columbia University. He is a fellow of the British Academy and of the American Academy of Arts and Sciences. He has taught at Berkeley, NYU, and UCLA and has been a fellow of the Center for Advanced Study in the Behavioral Sciences in Stanford. He was president of the Mind Association in 1986–1987. His books include *Sense and Content* (Oxford, 1983), *Thoughts: An Essay on Content* (Blackwell, 1986), *A Study of Concepts* (MIT, 1992), *Being Known* (Oxford, 1999), *The Realm of Reason* (Oxford, 2003), *Truly Understood* (Oxford, 2008), and *The Mirror of the World: Subjects, Consciousness, and Self-Consciousness* (Oxford, 2014).

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### **PETER BEARMAN**

Peter Bearman is the Jonathan R. Cole Professor of Sociology and director of the Interdisciplinary Center for Innovative Theories and Empirics (INCITE) at Columbia University. As a recipient of the NIH Director's Pioneer Award in 2007, Professor Bearman investigated the social determinants of the autism epidemic. A specialist in network analysis, he codesigned the National Longitudinal Study of Adolescent Health. His current work examines models and strategies for qualitative research design, social and semantic networks, and the neural signatures of social relations. Most recently, he coauthored *Working for Respect: Community and Conflict at Walmart* (Columbia, 2018). He is a member of the American Academy of Arts and Sciences and the National Academy of Sciences.



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### **ANIRUDDHA DAS**

Aniruddha Das is an associate professor of neuroscience at the Columbia University Irving Medical Center and the Kavli Institute for Brain Science and principal investigator at the Mortimer B. Zuckerman Mind Brain Behavior Institute. He received his Ph.D. from Berkeley with Charles Townes (the inventor of the maser and laser) but decided to pursue his long-standing interest in neurobiology and perception. Professor Das's lab is interested in cortical mechanisms of visual processing. It has two broad areas of research—understanding task-related anticipation in visual cortex and analyzing the cortical basis of visual form processing. He is also actively involved in developing new recording and analysis techniques.



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### **DAVID FREEDBERG**

David Freedberg is the Pierre Matisse Professor of Art History and director of the Italian Academy for Advanced Studies in America at Columbia University. He is best known for his work on psychological responses to art and his studies on iconoclasm and censorship. His more traditional art historical writing originally centered on Dutch and Flemish art, specializing in the history of Dutch printmaking and in the paintings and drawings of Bruegel and Rubens. He then turned his attention to 17th-century Roman art and to the paintings of Nicolas Poussin, before moving on to his recent work in the history of science and in cognitive neuroscience for the study of art and its history. He is the author of *The Eye of the Lynx: Galileo, His Friends, and the Beginnings of Modern Natural History* (Chicago, 2002).



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### **CAROL MASON**

Carol Mason is a professor of pathology and cell biology, neuroscience, and ophthalmic science at the Columbia University Irving Medical Center and principal investigator at the Mortimer B. Zuckerman Mind Brain Behavior Institute, where she investigates mechanisms of development of the pathways from the eye to the brain. At Columbia, she has served as co-director of the Neurobiology & Behavior graduate program and the NIH-funded Vision Sciences training program. She is a senior fellow of the Simons Foundation, a fellow of the American Association for the Advancement of Science, and a fellow of the National Academy of Medicine. Professor Mason was president of the Society for Neuroscience from 2013 to 2014. She is currently Zuckerman Institute chair of Interschool Planning, which fosters intellectual interactions between faculty and students.



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### **VALERIE PURDIE GREENAWAY**

Valerie Purdie Greenaway is an associate professor of psychology, director of the Laboratory of Intergroup Relations and the Social Mind, and research fellow at the Institute for Research on African-American Studies (IRAAS) at Columbia University. She has authored numerous peer-reviewed publications and received grants from the National Science Foundation (NSF), Russell Sage Foundation, Spencer Foundation, and William T. Grant Foundation. In 2013, she received the Columbia University Research Initiative in Science and Engineering (RISE) award for the most innovative and cutting edge research proposal, titled, "'Cells to society' approach to reducing racial achievement gaps."

## Advisory Board



**Larry Abbott**, William Bloor Professor of Theoretical Neuroscience; Professor of Physiology and Cellular Biophysics (in Biological Sciences); Principal Investigator, Mortimer B. Zuckerman Mind Brain Behavior Institute



**Mark Hansen**, David and Helen Gurley Brown Professor of Journalism and Innovation and Director, David and Helen Gurley Brown Institute of Media Innovation



**Carol Becker**, Professor of Arts and Dean of Faculty, School of the Arts



**Rebecca Jordan-Young**, Tow Associate Professor for Distinguished Scholars and Chair, Women's, Gender, and Sexuality Studies, Barnard College



**Alessandra Casella**, Professor of Economics and Political Science



**Darcy Kelley**, Harold Weintraub Professor of Biological Sciences



**Mark Dean**, Associate Professor of Economics



**Jeremy K. Kessler**, Associate Professor of Law



**Geraldine Downey**, Professor of Psychology; Director, Social Relations Laboratory; Director, Center for Justice



**Philip Kitcher**, John Dewey Professor of Philosophy



**Stuart Firestein**, Professor of Biological Sciences



**George Lewis**, Edwin H. Case Professor of American Music



**Andrew Gerber**, Associate Clinical Professor of Psychiatry and President and Medical Director, Silver Hill Hospital



**Jeffrey A. Lieberman**, Lawrence C. Kolb Professor and Chairman, Department of Psychiatry; Director, New York State Psychiatric Institute; Psychiatrist-in-Chief, Columbia University Irving Medical Center of the NewYork-Presbyterian Hospital



**Jennifer Manly**, Professor of Neuropsychology, Gertrude H. Sergievsky Center, Taub Institute for Research on Alzheimer’s Disease and the Aging Brain



**Kathryn Tabb**, Assistant Professor of Philosophy



**Malia Mason**, Associate Professor of Business, Graduate School of Business



**Nim Tottenham**, Professor of Psychology and Principal Investigator, The Developmental Affective Neuroscience Lab



**Alondra Nelson**, Professor of Sociology and President of the Social Science Research Council



**Michael Woodford**, John Bates Clark Professor of Political Economy



**Kevin Ochsner**, Professor of Psychology and Principal Investigator, The Social Cognitive and Affective Neuroscience (SCAN) Lab



**Sarah Woolley**, Professor of Psychology and Principal Investigator, Mortimer B. Zuckerman Mind Brain Behavior Institute



**David Rosner**, Ronald H. Lauterstein Professor of Sociomedical Sciences and Professor of History



**Paul Sajda**, Professor of Biomedical Engineering, Electrical Engineering, and Radiology



**Michael Shadlen**, Professor of Neuroscience and Principal Investigator, Mortimer B. Zuckerman Mind Brain Behavior Institute; Investigator, Howard Hughes Medical Institute

## Mentors



**Paul Appelbaum**, Elizabeth K. Dollard Professor of Psychiatry, Medicine, and Law and Director, Division of Law, Ethics and Psychiatry



**Eugenia Lean**, Associate Professor of East Asian Languages and Cultures and Director, Weatherhead East Asian Institute



**Peter Bearman**, Jonathan R. Cole Professor of Sociology and Director, The Interdisciplinary Center for Innovative Theory and Empirics (INCITE)



**George Lewis**, Edwin H. Case Professor of American Music



**Rita Charon**, Professor of Medical Humanities and Ethics and Chair, Department of Medical Humanities and Ethics



**Catherine Monk**, Professor of Medical Psychology and Director of Research, The Women's Program; Co-director, Sackler Parent-Infant Project and the Domestic Violence Initiative



**Geraldine Downey**, Professor of Psychology; Director, Social Relations Laboratory; Director, Center for Justice



**Ana Maria Ochoa**, Professor of Music and Chair, Department of Music



**Jeffrey Fagan**, Isidor and Seville Sulzbacher Professor of Law and Professor of Epidemiology



**Christopher A. B. Peacocke**, Johnsonian Professor of Philosophy



**Stuart Firestein**, Professor of Biological Sciences



**Martin Picard**, Herbert Irving Assistant Professor of Behavioral Medicine



**Marguerite Holloway**, Associate Professor of Professional Practice and Director, MA in Science & Environmental Journalism, School of Journalism



**Paul Sajda**, Professor of Biomedical Engineering, Electrical Engineering, and Radiology



**Daniel Salzman**, Professor of Psychiatry and Neuroscience and Principal Investigator, Mortimer B. Zuckerman Mind Brain Behavior Institute



**Daphna Shohamy**, Professor of Psychology and Principal Investigator, Mortimer B. Zuckerman Mind Brain Behavior Institute



**Kathryn Tabb**, Assistant Professor of Philosophy



**Barbara Tversky**, Professor of Psychology and Education, Teachers College



**Michael Woodford**, John Bates Clark Professor of Political Economy



**Sarah Woolley**, Professor of Psychology and Principal Investigator, Mortimer B. Zuckerman Mind Brain Behavior Institute

“ My tenure as a Presidential Scholar in Society and Neuroscience has been intellectually transformative. Interactions with my mentors have significantly affected the way I approach my fieldwork, the content of the experiments themselves, and the type of broader questions that I ask. ”

—Nori Jacoby, *Presidential Scholar in Society and Neuroscience, 2016–2019*

# Interdisciplinary Faculty Seed Grants

Seed Grants for Interdisciplinary Projects in Society and Neuroscience fund faculty-led pilot research and other initiatives at the intersection of neuroscience and the arts, humanities, or social sciences. The program seeks out novel, integrative, and collaborative projects that may not fit the mold of conventional, government-funded research. Up to five seed grants are awarded each year.

## AWARDED SEED GRANTS 2015–2018

### **Role of Music in Electrocardiac and Autonomic Functions in Boys and Girls with Autism Spectrum Disorder**

This study aims to (1) identify differences in electrocardiac and autonomic functions (heart rate, vagal tone) between typically developing children and children with autism spectrum disorder and (2) examine how these differences are modulated by the child's sex. The overall goal is to determine if music normalizes electrocardiac and autonomic differences between the groups and whether there are interactions between music and sex/gender in these outcomes.

#### **Collaborators:**

**Sylvie Goldman**, Assistant Professor of Neuropsychology, Gertrude H. Sergievsky Center

**Nim Tottenham**, Professor of Psychology and Principal Investigator, The Developmental Affective Neuroscience Lab

**Michael M. Myers**, Professor of Behavioral Biology in Psychiatry and Pediatrics, New York State Psychiatric Institute

**Rebecca M. Jordan-Young**, Tow Associate Professor for Distinguished Scholars and Chair, Women's, Gender, and Sexuality Studies, Barnard College

### **Establishing a Leading Role for Columbia University in the Development of Trauma-Informed Policy and Programs for New York City**

Columbia University researchers investigating the impact of childhood adversity on the brain can help inform public policy and programs. The group will build a consortium of faculty across Columbia to develop a strategy to serve children and families more effectively who are affected by trauma, implement this plan in stages using a student service learning model, and engage with government, nonprofit, and commercial entities in New York City to increase awareness.

#### **Collaborators:**

**Virginia Rauh**, Professor of Population and Family Health, Columbia University Irving Medical Center

**Kimberly Noble**, Associate Professor of Neuroscience and Education, Teachers College

**Dan Press**, Adjunct Professor, Center for Study of Ethnicity and Race (retired)

### **Fear of Violence, Productivity, and Economic Disparities**

This project explores whether fear has real economic costs through a hidden channel: cognitive load, which can ultimately lead people to make decisions that undermine their efforts to escape poverty. The study will test the effects of insecurity in a way that both identifies the causal effect of violence and measures its impacts on real outcomes.

#### **Collaborators:**

**Suresh Naidu**, Associate Professor of International and Public Affairs and Economics

**Christopher Blattman**, previously at Columbia, now Ramalee E. Pearson Professor of Global Conflict Studies, The University of Chicago

**Johannes Haushofer**, previously at Columbia, now Assistant Professor of Psychology and Public Affairs, Princeton University

**Pietro Ortoleva**, previously at Columbia, now Professor of Economics and Public Affairs, Princeton University

### **Neonatal EEG as Biomarkers for Later ASD and Neurodevelopmental Disorder Risk**

The study will assess developmental delays in the second year of life in approximately 582 children with autism spectrum disorder (ASD) to examine correlations between differences in electrocortical activity at birth and later socio-emotional/behavioral problems. Determining which perinatal, neonatal, and social risk factors are important in the development of ASD will help clinicians focus prevention, early diagnosis, and early intervention efforts.

#### **Collaborators:**

**William Fifer**, Professor of Medical Psychology in Psychiatry and Pediatrics, Columbia University Irving Medical Center

**Virginia Rauh**, Professor of Population and Family Health, Columbia University Irving Medical Center

### **Form as Concept: Levels of Mental Construal Involved in Processing Abstract Art**

While some research suggests that abstract art elicits higher-order creative thinking associated with top-down processing (abstract), other research points to abstract art's elicitation of bottom-up (concrete) processing through the exaggeration of visual data such as color, line, and shape. This group will develop a collection of stimuli to determine whether abstract art evokes more abstract or more concrete mental construal.

#### **Collaborators:**

**Daphna Shohamy**, Professor of Psychology and Principal Investigator, Mortimer B. Zuckerman Mind Brain Behavior Institute

**Eric Kandel**, Professor of Neuroscience; Director, Kavli Institute of Brain Science; Co-director, Mortimer B. Zuckerman Mind Brain Behavior Institute

### **Examining Neural Correlates of Stigma in the Clinical High Risk State for Psychosis: Integrating Neuroscience and Public Health Approaches for Mental Illness Stigma**

While the study of social stigma has advanced from a social science and public health perspective, there remains an almost complete lack of knowledge about the neural bases of how stigma affects people with mental illness. This study will identify fundamental brain processes by which stigma negatively exerts its effects and by providing biomarkers to guide selection of the most effective cognitive strategies to reduce how stigma is internalized.

#### **Collaborators:**

**Lawrence Yang**, Associate Professor of Clinical Epidemiology, Mailman School of Public Health

**Kevin Ochsner**, Professor of Psychology and Principal Investigator, The Social Cognitive and Affective Neuroscience (SCAN) Lab

**Julie Spicer**, Assistant Professor of Behavioral Medicine, Columbia University Irving Medical Center

### **Supporting Just Drug Policies through Neuroscience and Narrative**

This research collaboration utilizes an evidence-based approach aimed at understanding how findings from neuroscience can be appropriately and effectively communicated to reduce our society's impulse to incarcerate and instead develop alternative actions that benefit the larger society. An initial focus is on the link between neuroscience and the way in which drug policies have contributed in a racially discriminatory way to mass incarceration.

#### **Collaborators:**

**Geraldine Downey**, Professor of Psychology; Director, Social Relations Laboratory; Director, Center for Justice

**Carl Hart**, Dirk Ziff Professor and Chair of Psychology

**Frances Négron-Muntaner**, Professor of English and Comparative Literature

### **Attention and Decisions: Determinants of Attention and Information Seeking in Human Economic Choice**

How do we actively filter information through selective attention and how is this filtering coordinated in the context of the broader task? The goal is to build a new empirical and theoretical framework for addressing these questions that has relevance for both psychology/neuroscience and economics/social sciences.

#### **Collaborators:**

**Jacqueline Gottlieb**, Professor of Neuroscience and Principal Investigator, Mortimer B. Zuckerman Mind Brain Behavior Institute

**Michael Woodford**, John Bates Clark Professor of Political Economy

### **Socioeconomic Disparities in Cognitive and Brain Development during the First Year of Life**

Socioeconomic (SES) disparities are associated with large differences in children's cognitive development and academic achievement. However, until recently, neuroscience was not used to study these disparities. The study will measure SES, proximal mediators, brain function, and cognition in the first year of life to track how quickly SES-related differences develop and what the modifiable environmental factors are by which SES disparities operate.

#### **Collaborators:**

**Kimberly Noble**, Associate Professor of Neuroscience and Education, Teachers College

**Jane Waldfogel**, Compton Foundation Centennial Professor for the Prevention of Children's and Youth Problems, School of Social Work

**William Fifer**, Professor of Medical Psychology in Psychiatry and Pediatrics, Columbia University Irving Medical Center

### **Aging in the Brain and the Brain in Aging Societies: The Role and Function of Culture, Cognition, and History among Older Adult Populations**

Global aging poses issues regarding how neuroscience can be applied across contexts and diverse populations. Most cognitive impairment studies are based on educated, Western populations. Cross-cultural investigations and the importance of life experiences have not been sufficiently understood. This project will collect data from interviews in India and South Africa to determine how cognitive decline is categorized and described among populations with different socioeconomic and education levels.

#### **Collaborators:**

**Kavita Sivaramakrishnan**, Associate Professor of Sociomedical Sciences, Mailman School of Public Health and Affiliated Faculty in the Department of History

**Jennifer Manly**, Professor of Neuropsychology, Gertrude H. Sergievsky Center, Taub Institute for Research on Alzheimer's Disease and the Aging Brain

“ We would definitely recommend this PSSN [seed grant] mechanism to all our colleagues. It was the ideal way to forge partnerships within the University and facilitate subsequent applications for other funding opportunities. ”

—William Fifer (principal investigator) and  
Virginia Rauh (co-investigator), 2016 Seed Grant Awardees

## SEED GRANT OUTCOMES (THROUGH AUGUST 2018)

### Publications

Ursache, A., E. C. Merz, S. Melvin, J. Meyer, and K. G. Noble (2017). Socioeconomic status, hair cortisol and internalizing symptoms in parents and children. *Psychoneuroendocrinology* 78: 142–150.

### Conference Lectures and Posters

American Psychological Association Convention (2017)  
Bridge to the Ph.D. Program Research Symposium, Columbia University (2017)  
Cognitive Neuroscience Society Annual Meeting (2017)  
Society for Affective Science Conference (2018)  
Society for Neuroscience Annual Conference (2017)  
Society for Research in Child Development Biennial Meeting (2017)  
Society for Personality and Social Psychology Annual Convention (2018)

### Grant Applications

Azrieli Foundation (submitted)  
Centers for Disease Control and Prevention, Injury Center Grant (submitted)  
Dana Foundation (submitted)  
Dean's Interdisciplinary Award, Mailman School of Public Health, Columbia University (awarded)  
Eunice Kennedy Shriver National Institute of Child Health and Human Development (awarded)  
National Institute of Mental Health, Administrative Supplement (awarded)  
National Science Foundation (submitted)  
Research Initiatives in Science and Engineering (RISE), Columbia University (awarded)  
Russell Sage Foundation (awarded)  
Sackler Institute for Developmental Psychobiology (awarded)  
The Center for Science and Society Seed Grant, Columbia University (awarded)  
William T. Grant Foundation (submitted)

# Public and Scholarly Outreach

The Presidential Scholars, mentors, and affiliated faculty members form a core group that organizes activities, conferences, and events for the PSSN program and other partners across campus. Each Presidential Scholar receives support to propose, design, and host a yearly seminar in the *Seminars in Society and Neuroscience* series. Scholars in their second and third years of the program present their work to the Columbia community during the PSSN Research Symposia, held twice yearly.

Accessible to both academic scholars and the public, the *Seminars in Society and Neuroscience* are evening events on topics of universal importance for interdisciplinary mind and brain research. Each seminar brings together three to five leading experts from different fields to share their unique perspectives on a single question or subject. In 2017–2018, PSSN seminars attracted more than 1,200 attendees.

## SEMINARS IN SOCIETY AND NEUROSCIENCE

### 2018–2019 (Confirmed as of December 1, 2018)

Promises and Perils of Neuroprediction (April 16, 2019)

Timing and Social Coordination: Cross-Disciplinary Perspectives (March 11, 2019)

Evaluating Chronic Pain in Neuroscience, Ethics, and Law (October 29, 2018)

### 2017–2018

What Can Neuroscience Contribute to Economics? (May 7, 2018)

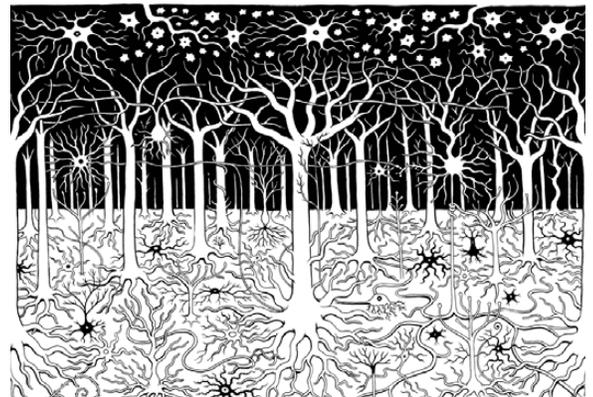
Responsibility, Punishment, and Psychopathy: At the Crossroads of Law, Neurocriminology, and Philosophy (April 9, 2018)

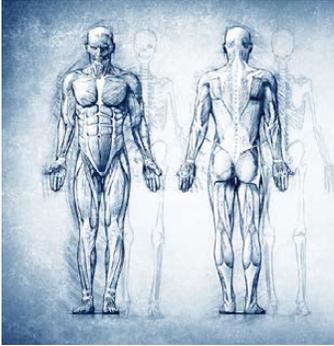
Evidence and Theory in Neuroscience (March 5, 2018)

Educating the Brain: How the Acquisition of Reading and Mathematics Affects Human Brain Circuits (December 4, 2017)

Metaphors and Models: The Neuroscience of Comparison (November 20, 2017)

Music and Meaning (October 19, 2017)





## 2016-2017

Sound Studies and Auditory Neuroscience: New Perspectives on Listening (May 1, 2017)

The Human Sense of Smell (April 13, 2017)

Neuroscience in the Body: Perspectives at the Periphery (March 6, 2017)

The Transmission of Knowledge: Tool Use and Cognition (December 12, 2016)

Characterizing Animals in Science and Fiction (November 28, 2016)

Theory of Mind (October 20, 2016)



## 2015-2016

Neuroscience and Education (May 2, 2016)

Prediction: How Forecasting and Prospection Shape Thought (April 18, 2016)

The Perception of Time (February 22, 2016)

What Can Neuroscience Offer the Study of Creativity? (November 23, 2015)

Understanding Cognition through Development: What Do Animals, Children, and Science Have in Common? (November 2, 2015)

## WEBSITE/VIDEO ARCHIVE

The PSSN website houses an extensive video archive containing edited video footage from seminars and research symposia since 2015.

Recordings from 23 events are available featuring 86 experts from leading national and international research institutions.

Through the website and YouTube portal, the video archive receives more than 10,000 views, annually.

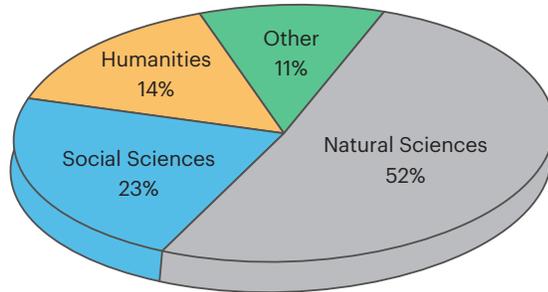
On average, 2,000 unique users visit the PSSN website each month.



# Impact

The PSSN program and the Presidential Scholars have had a major impact on the Columbia faculty members participating in the program's steering and advisory committees, the mentors, and the faculty receiving PSSN seed grants.

## OUR COMMUNITY



### FIELDS REPRESENTED:

**Natural Sciences:** Biological Sciences, Engineering, Neuroscience, Psychiatry, Psychology

**Social Sciences:** Economics, History, Political Science, Public Health, Sociology, Social Work

**Humanities:** Art History, East Asian Languages and Cultures, English and Comparative Literature, Music, Philosophy, Women's and Gender Studies

**Other:** Business, Fine Arts, Journalism, Law, Narrative Medicine

>33%

More than one-third of the 40+ faculty members associated with PSSN reported that they have interacted more often with people outside their own field of specialization since participating in the program.

50%

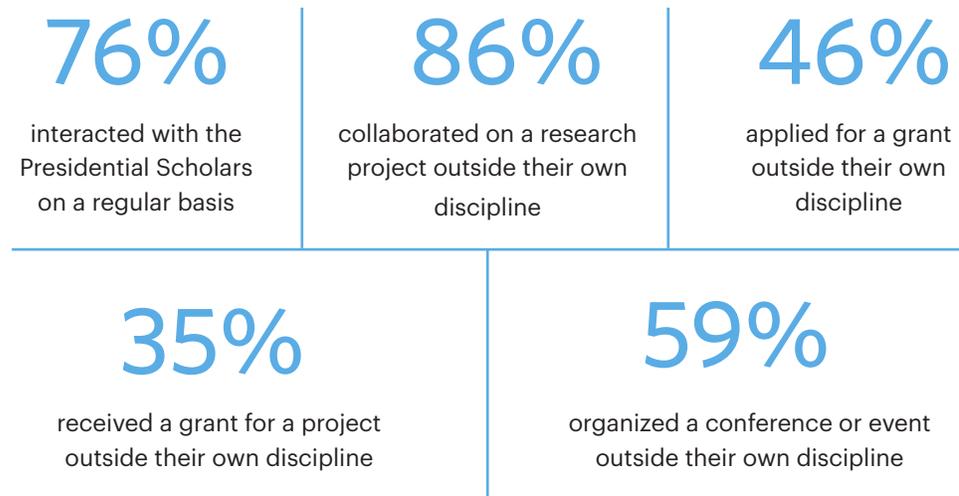
Approximately 50 percent of PSSN-affiliated faculty have applied for a grant with someone outside their field, and more than half of these applicants have received funding.

100%

Ten out of ten faculty collaborations awarded PSSN seed grant funding (2015–2018) produced pilot data that were used to submit additional grant applications, some of which have already received external funding.

## PSSN PROGRAM SURVEY RESULTS 2017–2018

Each year, the program conducts a survey of affiliated researchers and faculty members to collect information on interdisciplinary interaction, collaboration, and funding of the program’s participants. Survey results from academic year 2017–2018:



## PRESIDENTIAL SCHOLARS’ RECRUITMENT

PSSN receives more than 100 applications each year from recent from recent doctoral graduates at top-tier research universities and institutions all over the world. Disciplines of the applicants include neuroscience, English, art history, psychology, history of science, philosophy, public health, music, economics, law, journalism, sociology, and many others.

### Applicants by Year



\*Submissions were only open to recent doctoral graduates from the humanities and social sciences in 2015. Since 2016, the fellowship has been open to all disciplines.

\*\*Includes number of applications received as of December 1, 2018.

## 2018 Applicant Demographics

		RACE/ETHNICITY								
GENDER		Non-Hispanic/Non-Latino								
	Hispanic/Latino	American Indian/Alaska Native	Asian	Black or African American	Native Hawaiian or Other Pacific Islander	White	Not Disclosed	Two or More	Total	
	Female	5	0	21	1	0	32	6	1	66 (41%)
	Male	9	0	27	5	0	31	1	0	73 (46%)
Not Disclosed	0	0	0	0	0	1	6	0	7 (4%)	
<b>Total</b>	<b>14 (9%)</b>	<b>0</b>	<b>48 (30%)</b>	<b>6 (4%)</b>	<b>0</b>	<b>64 (40%)</b>	<b>13 (8%)</b>	<b>1 (1%)</b>	<b>146</b>	

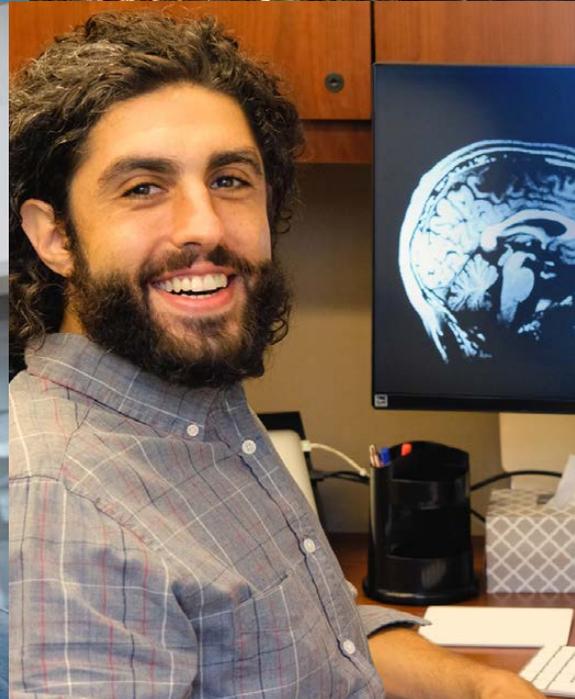
		FIELD				
LOCATION OF Ph.D.		Natural Sciences	Social Sciences	Humanities	Other	Total
	U.S. Institutions	22	32	24	1	79 (54%)
	International Institutions	25	20	13	9	67 (45%)
	<b>Total</b>	<b>47 (32%)</b>	<b>52 (36%)</b>	<b>37 (25%)</b>	<b>10 (7%)</b>	<b>146</b>

“ The opportunity to talk to somebody coming from a very different disciplinary background, or a set of backgrounds, from my own has been very revealing to realize how differently other people approach many of the same questions. ”

—Michael Woodford, John Bates Clark Professor of Political Economy

## Acknowledgments

We thank President Lee C. Bollinger, the Office of the President, the Center for Science and Society, and the Trustees of Columbia University in the City of New York for their support.





Presidential Scholars in  
Society and Neuroscience

Columbia University in the City of New York

511 Fayerweather Hall, MC 2509

1180 Amsterdam Avenue

New York, NY 10027

(P) 212-854-0666 (F) 212-851-4265

[presidentialscholars@columbia.edu](mailto:presidentialscholars@columbia.edu)

[presidentialscholars.columbia.edu](http://presidentialscholars.columbia.edu)