

Molecular Basis of Cognition

The Second Annual Scialog Conference
October 12-15, 2023

scialog2023[®]

CIFAR



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Scialog: Molecular Basis of Cognition

Objectives

Engage in dialogue with the goal of accelerating high-risk, high-reward research.

Identify and analyze bottlenecks to advancing fundamental science for understanding the molecular basis of cognition and develop approaches for breakthroughs.

Build a creative, better-networked, collegial community that is more likely to produce breakthroughs.

Form teams to write proposals to seed novel projects based on highly innovative ideas that emerge at the conference.

Most importantly, enjoy the discussions about where this field should go and how we can work together to get there.

Process

Brainstorming is welcome; don't be afraid to say what comes to mind.

Consider the possibility of unorthodox or unusual ideas without immediately dismissing them.

Discuss, build upon and constructively criticize each other's ideas —in a spirit of cooperative give and take.

Make comments concise to avoid monopolizing the dialogue.

Diversity, Inclusion and No Harassment

Research Corporation for Science Advancement fosters an inclusive and respectful environment for listening in which the different identities, backgrounds, and perspectives of all participants are valued, and in which everyone is empowered to share ideas as fellow scientists.

RCSA does not tolerate any form of harassment, which could include verbal or physical conduct that has the purpose or effect of substantially interfering with anyone else's participation or performance at this conference, or of creating an intimidating, hostile, or offensive environment; any such harassment may result in dismissal from the conference.

[Read RCSA's Code of Conduct](#)



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Scialog: Molecular Basis of Cognition

From the President

Welcome to the second meeting of **Scialog: Molecular Basis of Cognition**, an initiative cosponsored by Research Corporation, CIFAR (the Canadian Institute for Advanced Research), and the Frederick Gardner Cottrell Foundation, with additional support from The Kavli Foundation, the Walder Foundation, and the Peter and Carmen Lucia Buck (PCLB) Foundation. This is the second of three annual Scialog meetings on this theme. We hope the face-to-face exchanges, including informal times, will offer a rich experience in scientific ideation. We hope you find the opportunity to write team proposals “on-the-spot” exciting and rewarding.



The goal of this Scialog is to build a network of researchers across multiple disciplines to develop novel collaborative projects to accelerate deeper understanding of the molecular basis of cognition.

Scialog’s overarching purpose is to advance cutting-edge science of great significance to humanity by catalyzing innovative, basic research leading to fundamental discoveries. Our focus is on scientists in the early years of their independent careers. Through the unique Scialog process, we seek to lay the foundation for an ongoing, highly creative, cross-disciplinary community of scientists that will prove adept at identifying exciting areas for research advances for decades to come.

To that end, under the guidance of Program Directors **Richard Wiener, Andrew Feig, Silvia Ronco** and **Eileen Spain** from Research Corporation and **Amy Bernard** from The Kavli Foundation, we hope you will be engaged in passionate discussions with colleagues, many of whom you will have met for the first time at Scialog. The process may even push you out of your comfort zone with the goal of stimulating new and better ideas. The result, we expect, will be a meeting unlike others that you attend. We are confident that you will find the next few days to be extremely worthwhile.

This is your opportunity to air that wild idea you have been reluctant to share with others, or to discuss a nagging hunch that does not yet have sufficient supporting data, or to take a leap on a high impact/high-risk project instead of concentrating all your effort on somewhat more “incremental” studies. This is the time to come up with, and be open to, completely new ideas that may truly change the scientific understanding of how minds work.

We hope this second meeting on this topic yields a crop of outstanding team proposals, which will make our job of determining who receives funding very challenging. I wish you every success in exploring new and compelling ideas over the next few days.

Have a terrific meeting!

Daniel Linzer

President & CEO

Research Corporation for Science Advancement

Scialog: Molecular Basis of Cognition

From the Program Director

Research Corporation, CIFAR, and the Frederick Gardner Cottrell Foundation are cosponsoring the 2023 meeting of *Scialog: Molecular Basis of Cognition*, with additional support from The Kavli Foundation, the Walder Foundation, and the PCLB Foundation. Research Corporation's highly interactive Scialog meetings have the goal of catalyzing new collaborations based on blue-sky ideas among Scialog Fellows who constitute a highly select group of exemplary early career U.S. and Canadian scientists, and a few from even farther abroad. The emphasis is on dialogue, networking, and building new collaborations to pursue novel, high-risk discovery research.



We chose to focus on *Molecular Basis of Cognition* because we believe this critical area of science requires major breakthroughs in fundamental understanding. Just as firmly, we believe these breakthroughs can best be accelerated by scientists across disciplines, including neurobiology, neuroscience, and related cognitive sciences, working collaboratively on novel, high-risk projects, particularly with multiple approaches and methodologies. We have an outstanding keynote speaker to set the stage for breakout discussions:

Jacob Hooker, Massachusetts General Hospital

Along with Jacob, we have a team of terrific discussion facilitators: **Adam Cohen**, Harvard; **Jacqueline Gottlieb**, Columbia; **Martin Gruebele**, Illinois; **Marina Picciotto**, Yale; and **Adina Roskies**, UCSB.

Program representatives **Amy Bernard**, The Kavli Foundation, and **Bishaka Mona**, the Science Philanthropy Alliance, are looking forward to interacting with Fellows and Facilitators.

Scialog meetings focus on dialogue and team building with the goal of creating novel strategies and collaborative approaches. An important feature is the opportunity for Scialog Fellows to form teams and write proposals to pursue particularly creative ideas that emerge through the dialogue. We hope this competition is exciting, but regardless of which proposals are funded, the primary purpose is to catalyze a deeper and more meaningful exchange of ideas than ordinarily occurs at scientific conferences. Our intent is for this process to help participants gain new insights and connections that significantly advance fundamental science to enable major advances in understanding the molecular basis of cognition.

We hope each participant finds the Scialog experience of great value. Please do not hesitate to provide feedback on how to make the conference better. My fellow Program Directors, **Andrew Feig**, **Silvia Ronco** and **Eileen Spain**, the RCSA staff, and I are here to help make the meeting a great experience!

Richard Wiener

Senior Program Director

Research Corporation for Science Advancement

Scialog: Molecular Basis of Cognition

Conference Agenda October 12-15, 2023

Thursday, October 12

2:00 pm	Registration Opens	Sonoran Foyer
2:00 – 5:00 pm	Snacks & Informal Discussions	Sonoran Foyer
5:00 – 6:30 pm	Poster Session and Reception	Javelina/Sonoran Terrace
6:00 – 6:30 pm	Meeting for Discussion Facilitators	Sonoran Ballroom
6:30 – 7:30 pm	Dinner	Gold Room & Terrace
7:30 – 8:30 pm	Welcome Dan Linzer, President, RCSA Amy Bernard, Director, The Kavli Foundation Conference Overview, Outcomes and Proposal Guidelines Richard Wiener, Senior Program Director, RCSA Introductions/Ice Breakers	Sonoran Ballroom
8:30 – 11:00 pm	Starlight Cafe	Sonoran Rooftop Patio

Friday, October 13

7:00 – 8:00 am	Breakfast	Gold Room & Terrace
8:00 – 8:45 am	Keynote Presentation <i>Mapping Molecular Associations to Cognition with Neuroimaging</i> Prof. Jacob Hooker Massachusetts General Hospital	Sonoran Ballroom
8:45 – 9:00 am	Breakout Session Overview and Instructions	Sonoran Ballroom
9:00 – 10:15 am	Breakout Session I	Mesa, Canyon, Desert or Vigas Patio, Sonoran Ballroom
10:15 – 10:35 am	Report Out	Sonoran Ballroom
10:35 – 11:15 am	Conference Photo and Morning Break	Stairs Near the Main Pool
11:15 – 11:45 am	Mini Breakout Session I (Fellows)	All Spaces
	Facilitator Meeting	Sonoran Ballroom
11:45 – 1:00 pm	Lunch	Gold Room & Terrace
1:00 – 2:15 pm	Breakout Session II	Mesa, Canyon, Desert or Vigas Patio, Sonoran Ballroom
2:15 – 2:35 pm	Report Out	Sonoran Ballroom
2:35 – 3:05 pm	Mini Breakout Session II (Fellows)	All spaces
3:05 – 5:15 pm	Afternoon Break, Informal Discussions and Leisure Time	Sonoran Foyer
5:15 – 6:45 pm	Poster Session and Reception	Javelina/Sonoran Terrace
6:45 – 7:45 pm	Dinner	Gold Room & Terrace
7:45 – 8:30 pm	Previous Team Awards Discussion	Sonoran Ballroom
8:30 – 11:00 pm	Starlight Cafe	Sonoran Rooftop Patio

Saturday, October 14

6:45 – 7:30 am	Optional Guided Nature Walk	Meet on Vigas Patio
7:00 – 8:00 am	Breakfast	Gold Room & Terrace
8:00 – 8:45 am	Previous Team Awards Discussion	Sonoran Ballroom
8:45 – 9:15 am	Mini Breakout Session III (Fellows)	All Spaces
9:15 – 9:45 am	Morning Break	Sonoran Foyer
9:45 – 11:00 am	Breakout Session III	Mesa, Canyon, Desert or Vigas Patio, Sonoran Ballroom
11:00 – 11:20 am	Report Out	Sonoran Ballroom
11:20 – 11:50 am	Mini Breakout Session IV (Fellows)	All Spaces
	Facilitator and Funding Partners Discussion	Sonoran Ballroom
11:50 – 1:00 pm	Lunch	Gold Room & Terrace
1:00 – 5:45 pm	Team Formation, Informal Discussions and Proposal Writing	All Spaces
5:45 – 6:30 pm	Reception	Sonoran Terrace
6:30 – 7:30 pm	Dinner	Gold Room & Terrace
7:30 – 11:00 pm	Starlight Cafe	Sonoran Rooftop Patio

Sunday, October 15

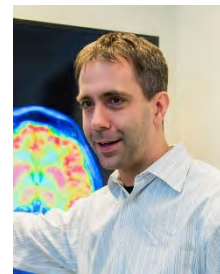
6:30 – 7:30 am	Breakfast	Gold Room & Terrace
7:30 – 11:00 am	Presentation of Proposals	Sonoran Ballroom
	Assessment Survey and Wrap-up	
11:00 – 12:00 pm	Lunch (available to go)	Sonoran Foyer

Keynote Speaker

Mapping Molecular Associations to Cognition with Neuroimaging

Jacob Hooker

Scientific Director, Lurie Center for Autism and Director of Radiochemistry, Martinos Center, Massachusetts General Hospital



Abstract:

Cognition is an ensemble of mental processes that encompass the acquisition, processing, storage, and utilization of information, enabling an organism – for example a human – to perceive, think, and interact with its environment. Functional elements/activities of the ensemble include but are not limited to memory, learning, attention, perception, and language. In essence, cognition is the grand architecture under which all these components operate. The components of cognition can likely function independently, but when integrated, they lead to a fuller, more nuanced understanding and interaction with the world. With this working definition in mind which admittedly could be incomplete or an incorrect basis framework, getting to a molecular basis of cognition will require understanding molecular components of functional elements and a way to measure relationships between the molecular components of each functional element. In this talk, I will attempt to highlight the past and current uses of neuroimaging techniques to understand molecular components that may be associated with elements of cognitive processes and multimodal neuroimaging techniques that might help us measure relationships. The lecture will focus on the intersection of neuroimaging, mostly human neuroimaging, and a few key questions. First, how do molecular processes associated with a cognitive process influence macroscopic features of the brain (e.g. functional and structural connectivity)? Second, how do we know where in the brain to explore molecular details of cognition at higher resolution and with other techniques? Finally, how do create relationships between molecular changes and brain circuit changes that lead to differences in behavior and cognition. Using examples from many creative labs, I will end with some thoughts on advancements that are occurring in neuroimaging and speculate on what may be achievable in the coming decade.

Biography:

Dr. Hooker is the Lurie Family Professor of Radiology in the Field of Autism Research and a Phyllis and Jerome Lyle Rappaport MGH Research Scholar. He received his Ph.D. in chemistry from UC Berkeley and then completed a postdoctoral fellowship at Brookhaven National Laboratory, where he maintained an appointment as an Associate Scientist through 2013. In 2009, Dr. Hooker moved to Boston to join the Martinos Center for Biomedical Imaging at Massachusetts General Hospital to build a program focused on the intersection of magnetic resonance imaging (MRI) and positron emission tomography. His lab at MGH focuses on the development and use of imaging technology for elucidating fundamental neurochemistry associated with disease. Dr. Hooker currently serves as the Scientific Director at the Lurie Center for Autism and Director of Radiochemistry at the Martinos Center.

2022 Team Awards

Lucas Pinto, Neuroscience, Northwestern University

Evelyn Tang, Physics and Astronomy, Rice University

Daniel Burnston, Philosophy / Brain Institute, Tulane University

Network Topology Underlying Circuit Dynamics During Flexible Cognitive Behavior

Kate Hong, Biological Sciences, Neuroscience Institute, Carnegie Mellon University

Benjamin Scott, Psychological and Brain Sciences, Boston University

Matthew Lovett-Barron, Neurobiology, University of California, San Diego

Understanding Cortical Control Over Subcortical Structures Using an Evolutionary Inspired Engineering Approach

Christina Kim, Center for Neuroscience & Department of Neurology, University of California, Davis

Antonio Fernandez-Ruiz, Neurobiology & Behavior, Cornell University

Bridging Mechanism of Memory Across Levels

Travis Baker, Center for Molecular and Behavioral Neuroscience, Rutgers University

Megan Peters, Cognitive Sciences, University of California, Irvine

Robert Wilson, Psychology, University of Arizona

Beyond Computational Behaviorism: The Structure of Thought in Naturalistic Behaviors

Becket Ebitz, Neuroscience, Université de Montréal

Elizabeth Hong, Biology & Biological Engineering, California Institute of Technology

Gordon Berman, Biology, Emory University

FlyRanch: A Platform for Uncovering the Molecular Bases of Hidden Behavioral State Dynamics

Patrese Robinson-Drummer, Psychology, Haverford College

Allyson Mackey, Psychology, University of Pennsylvania

Sydney Trask, Psychological Sciences, Purdue University

From Cradle to Grave: Measuring the Lifetime Impact of Early-Life Stress

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2023 Proposal Guidelines

1. Awards are intended to provide seed funding for teams of two to three Scialog Fellows formed at this conference for high-risk, high-impact projects.
2. The application package should be submitted as a single PDF file. Pages one and two should describe the project and role of each team member. A third page may be used for references. No budget is necessary.
3. Awards will be in the amount of \$50K direct funding per team member, plus a small percentage for overhead. Grant duration will be one year.
4. No Scialog Fellow can be a member of more than two teams. If a Scialog Fellow is a member of two teams, other members of the teams must be different. No team can submit more than one proposal.
5. No Scialog Fellow who previously has won a Scialog: MBC Collaborative Award can be a member of more than one team. The other team members must be different from the members of the previously awarded team.
6. Scialog Fellows who have previously won two Scialog MBC Collaborative Awards are not eligible to be funded members of a team, but they can participate as a non-funded team member.
7. Teams cannot include members who have previously collaborated with one another. If you are unsure of your status (e.g., prospective team members were part of a large collaboration but did not significantly interact), please check for clarification with an RCSA Program Director.
8. Teams are encouraged (but not required) to:
 - a. Include members with different research approaches and methods.
 - b. Include members from different disciplines.
9. Proposals must be submitted electronically by **6:30 a.m. PST Sunday, October 15, 2023**. Instructions for submission will be provided at the meeting.
10. Awards are anticipated to start around **February 1, 2024**.

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Scialog Fellows

Maithe Arruda-Carvalho m.arrudacarvalho@utoronto.ca

Psychology, University of Toronto

My research program interrogates the maturation of isolated brain projections across the synaptic, cellular and behavioral levels to understand how brain circuits wire together to sustain cognitive and emotional function across the lifespan.

Rose Bagot rosemary.bagot@mcgill.ca

Psychology, McGill University

My research uses an integrative circuit-dissection approach combining molecular, cellular and behavioral technologies to determine how experience-dependent plasticity in stress-sensitive neural circuits shapes emotion, motivation and cognition in health and disease.

Wilma Bainbridge wilma@uchicago.edu

Psychology, University of Chicago

My research focuses on the interface of human vision and memory, looking at what makes some items more memorable across people than others. I combine methods such as behavior, artificial intelligence, crowd-sourcing, and fMRI to address this question.

Travis Baker travis.e.baker@rutgers.edu

Center for Molecular and Behavioral Neuroscience, Rutgers University-Newark
Decision making

Ann Barwich abarwich@iu.edu

History and Philosophy of Science and Medicine / Cognitive Science, Indiana University Bloomington

I am a cognitive scientist and philosopher specializing in olfaction. My empirical work combines EEG with olfactometry to study how we categorize smells. My philosophical work focuses on the conceptual foundations of neuroscience and scientific methodology.

Jessica Bernard jessica.bernard@tamu.edu

Psychological and Brain Sciences, Texas A&M University

I am interested in understanding changes in cognition that occur with aging and how they relate to changes in brain structure, function, and network organization. I am particularly focused on cerebellar contributions to these changes.

Daniel Burnston dburnsto@tulane.edu

Philosophy, Tulane University

I am interested in how to think about the functional and computational properties of highly interconnected neural systems. I am also interested in how everyday “folk” concepts of the mind are used in investigation in neuroscience.

Alicia Che alicia.che@yale.edu

Psychiatry, Yale University

Use circuit and in vivo approaches to understand how early life experiences, such as sensory inputs, social bonding and stress, impact brain circuit assembly and mature function in models of psychiatric illness

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Scialog Fellows Continued

Lulu Chen chenly@uci.edu

Anatomy and Neurobiology, University of California, Irvine

The role of trans-synaptic adhesion molecules (i.e., Neurexins and Neuroligins) in neurotransmission and frequency filtering in different synaptic contexts and brain regions and how these mediate behavioral flexibility.

Yao Chen yaochen@wustl.edu

Neuroscience, Washington University in St. Louis

How the spatial and temporal dynamics of intracellular signals mediate brain state transitions. I am particularly interested in (1) how neuromodulators transform behavior; (2) how sleep promotes better brain and body functions; and (3) how plasticity signals mediate learning.

Meaghan Creed meaghan.creed@wustl.edu

Anesthesiology, Neuroscience, BME, Washington University in St. Louis

Research in our lab focuses on synaptic plasticity and neuromodulation within defined neural circuits in the ventral basal ganglia (BG). We seek to understand how altered BG function drives changes reward-guided decision making and flexible behavior in chronic pain and SUDs.

Anita Disney anita.disney@duke.edu

Neurobiology, Duke University

The Disney lab is interested in neuromodulation of cortical circuits and interactions between neuromodulatory systems, primarily in primates.

Catherine Duclos catherine.duclos@umontreal.ca

Anesthesiology and Pain Medicine / Neuroscience, University of Montreal

My research aims to elucidate the functional mechanisms of consciousness, and how neural oscillations and networks can be modulated to improve patient outcomes. We record brain activity in altered states of consciousness directly in surgical and critical care units.

Guillaume Dumas guillaume.dumas@umontreal.ca

Psychiatry, University of Montreal

Systems Neuroscience and Machine Learning: cross-fertilizing brain research & artificial intelligence by combining neurocomputational & machine learning models (NeuroML) but also designing artificial agents with socio-cognitive abilities like in humans (Social NeuroAI & HMI).

Andy Dykstra adykstra@miami.edu

Biomedical Engineering, University of Miami

My research interests are in the neural mechanisms of auditory perception and cognition as well as how they are affected by age and hearing loss, with particular focus on the neural basis of auditory perceptual awareness and working memory.

Becket Ebitz r.becket.ebitz@umontreal.ca

Neurosciences, University of Montreal

The Ebitz lab uses computational and experimental techniques to study how internal states, like goals, beliefs, or arousal, change information processing in neural networks.

Scialog: Molecular Basis of Cognition

Scialog Fellows Continued

Michael Economo mne@bu.edu

Biomedical Engineering, Boston University

My research is focused on (1) the multi-regional circuits responsible for controlling movements in the mouse brain and (2) the development of new transcriptomic, connectomic, optical, and analytical technologies for neuroscience research.

Fernanda Elliott elliottfe@grinnell.edu

Computer Science, Grinnell College

To better understand human decision-making, I build AI systems that use cognitive inspiration and Reinforcement Learning techniques. My research focuses on modeling emotions, feelings, and moral processes, and decision-making differences among moral, immoral, and amoral agents.

Louie Favela luis.favela@ucf.edu

Philosophy and Cognitive Sciences, University of Central Florida

Interdisciplinary work in the cognitive sciences, experimental psychology, and philosophies of mind and science applying complexity science, dynamical systems theory, and ecological psychology to research on intelligent behavior (esp. cognition) in diverse systems.

Nicole Ferrara nicole.ferrara@rosalindfranklin.edu

Physiology and Biophysics, Rosalind Franklin University

I am interested in the maturation of affective neural circuits promoting a variety of age-dependent behaviors, including social interaction and associative fear learning. My work identifies distinct neural mechanisms sensitive to and supporting adolescent and adult behavior.

Alex Frañó afrano@ucsd.edu

Physics, University of California, San Diego

I am interested in using new materials (known commonly as quantum materials) to mimic the behavior of emergent neural networks. Here, the materials exhibit collective properties that can extend over a large range of length scales. Our hope is to also "train" these materials.

Matt Girgenti matthew.girgenti@yale.edu

Psychiatry, Yale University School of Medicine

My research interests focus on the integration of high-dimensional data from postmortem human brain, including genomic, epigenomic and transcriptomic, combining molecular biology and bioinformatic tools to understand neuropsychiatric molecular mechanisms.

Nicola Grissom ngrissom@umn.edu

Psychology, University of Minnesota Twin Cities

How do brains generate diverse approaches to cognitive challenges - both across individuals, and within them?

Howard Gritton hgritton@illinois.edu

Comparative Biosciences, University of Illinois at Urbana-Champaign

My lab is motivated to reveal the mechanisms that promote neural network interactions during cognition. This includes several projects designed to identify sources of cognitive control and the role of neuromodulators in organizing activity to elevate sensory cue processing.

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Scialog Fellows Continued

Kate Hong katehong@andrew.cmu.edu

Biological Sciences and Neuroscience Institute, Carnegie Mellon University

My research is aimed at understanding how the brain mediates sensory-guided behaviors. Specifically, we study on how cortical-subcortical interactions dynamically orchestrate neural activity during tactile sensation in mice.

Autumn Ivy aivy@hs.uci.edu

Pediatrics, University of California, Irvine

My lab investigates neural epigenetic mechanisms of physical activity during early life developmental periods, with the goal of identifying, harnessing, and potentially targeting exercise-induced molecular mechanisms for the treatment of neurocognitive disorders in childhood.

Deb Karhson dkarhson@uno.edu

Psychology, University of New Orleans

My research interest centers on identifying the role of endocannabinoid signaling in the neurobiology and neurophysiology of social learning and synchrony in neurodivergent people. My goal is to identify targeted methods to enhance social learning to improve quality of life.

Tina Kim tinakim@ucdavis.edu

Neurology, University of California, Davis

Our lab develops and applies molecular and optical technologies to study the basic biochemical properties of neurons that control powerful innate drives.

Tim Machado Timothy.Machado@PennMedicine.upenn.edu

Neuroscience, University of Pennsylvania

My lab uses multiregion neural recording techniques to study how circuits across the brain send commands to control movement during different behavioral states.

Allyson Mackey mackeya@upenn.edu

Psychology, University of Pennsylvania

How do children's experiences influence neuroplasticity, the brain's ability to change? My research program examines how early life experiences influence maturation and motivation, and their consequences for learning.

Marcelo Mattar marcelo.mattar@nyu.edu

Psychology, New York University

I'm interested in the neural computations subserving memory and planning to enable intelligent, goal-directed behavior. My research methods include behavioral experiments, neural recordings, and computational models based on neural networks and reinforcement learning.

Elizabeth McNeill emcneill@iastate.edu

Food Science and Human Nutrition, Iowa State University

The complexity of neuronal connections elicits questions about how the genome encodes for the cellular diversity and morphological flexibility in nervous system. My lab focuses on the role of miRNAs as mediators of synapse formation and maintenance in nervous system function.

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Scialog Fellows Continued

Megan Peters megan.peters@uci.edu

Cognitive Sciences, University of California, Irvine

I use neuroimaging, computational modeling, and machine learning to reveal how the brain represents and uses uncertainty, and how these processes relate to phenomenology and conscious awareness.

Lucas Pinto lucas.pinto@northwestern.edu

Neuroscience, Northwestern University

Local and large-scale circuit mechanisms of flexible decision making

Adeel Razi adeel.razi@monash.edu

Turner Institute for Brain and Mental Health, Monash University

I develop generative models (e.g., dynamic causal models and active inference) of brain function and challenge them with multi-modal, multi-scale MRI and electrophysiological recordings. We also use these models to understand neural mechanisms of altered states of consciousness.

Phil Rivera privera@macalester.edu

Biology, Macalester College

I am interested in understanding how the immune system mediates cognition in a sex-dependent manner. To do this, a mouse model is used to elucidate the immune signaling component involved during specific stages of addiction.

Patrese Robinson-Drummer probinsond@haverford.edu

Psychology, Haverford College

I am interested in the psychobiological mechanisms governing the ontogenetic emergence of learning and memory and how early life insults may perturb typical development of these systems.

Tomás Ryan tomas.ryan@tcd.ie

School of Biochemistry and Immunology, Trinity College Dublin

Memory, engrams, instinct, neuroimmunology, brain/body/development

Anna Schapiro aschapi@sas.upenn.edu

Department of Psychology, University of Pennsylvania

Our research combines neural network modeling and empirical methods (fMRI, EEG, patient studies, behavior) to study how memories of regularities in the environment are acquired and consolidated in humans.

Tiffany Schmidt tiffany.schmidt@northwestern.edu

Neurobiology, Northwestern University

Our lab is interested in how light serves to modulate behavior in subconscious ways. We use the mouse as a model system to map visual circuits impacting activity, attention, addiction, and learning.

Benjamin Scott bbs@bu.edu

Psychological and Brain Sciences, Boston University

Decision making, neural dynamics, gene expression, development.

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Scialog Fellows Continued

Prerana Shrestha prerana.shrestha@stonybrook.edu

Neurobiology & Behavior, Stony Brook University SUNY

I am interested in understanding spatiotemporally-resolved protein synthesis dynamics in innate and learned emotional behaviors. Towards this, we develop chemogenetic tools to modulate protein synthesis in specific cell types in the limbic forebrain during memory consolidation.

Monsheel Sodhi msodhi@luc.edu

Molecular Pharmacology and Neuroscience, Loyola University Chicago

My laboratory tests how transcriptional regulation modifies cognition in psychiatric illness. We use multiple approaches, including molecular and cellular analyses of postmortem human brain, and tests in mutant mice. We expect to discover novel targets for drug development.

Emily Sylwestrak emily@uoregon.edu

Biology, University of Oregon

Our lab investigates how different transcriptionally-defined cell types are functionally organized to drive behavior. Using molecular, anatomical, physiological, and behavioral analyses, we focus on the role of habenular cell types in reward-guided behavior and in addiction.

Masashi Tabuchi mxt512@case.edu

Neurosciences, Case Western Reserve University

I am interested in understanding how neural coding regulates persistent internal drive (e.g., sleep) by impacting molecular signaling of synaptic plasticity and how aging influences cellular machinery underlying such coding mechanisms to affect our brain performance.

Evelyn Tang e.tang@rice.edu

Physics, Rice University

Neural networks and their dynamics and activity patterns, as well as how these patterns support cognition. As a theoretical physicist, I use mathematical tools including topology and geometry to analyze system-wide properties of networks and their behavior.

Jordan Theriault jtheriault2@mgh.harvard.edu

Radiology, Massachusetts General Hospital

I use quantitative MR/PET imaging and control-based computational frameworks to study the relationship between brain metabolism (e.g., task-elicited increases glucose metabolism) and brain-based information encoding (e.g. within predictive-coding frameworks).

Sydney Trask smtrask@purdue.edu

Psychological Sciences, Purdue University

I am interested in the ways the brain encodes, stores, retrieves, and updates memory. I am particularly interested in understanding memory for context, or the environment in which events take place, as well as how these processes change throughout the lifespan.

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Scialog Fellows Continued

Alison Weiss weissa@ohsu.edu

Neuroscience, Oregon National Primate Research Center

Nonhuman primate researcher focused on developing biomarkers that predict age-associated impairments in learning/memory. I employ multimodal neuroimaging (MRI, DTI, rsfMRI, and PET), in conjunction with cognitive tasks, in monkeys ranging from middle age (15y) to very old (30y).

Scott Wilke swilke@mednet.ucla.edu

Psychiatry, University of California, Los Angeles

I study the role of prefrontal circuits in adaptive and maladaptive behaviors relevant to understanding psychiatric disorders. I am particularly interested in how clinical interventions such as non-invasive brain stimulation impact the structure and function of these circuits.

Bob Wilson bob@arizona.edu

Psychology, University of Arizona

Computational modeling of decision making

Gabriella Wolff ghw23@case.edu

Biology, Case Western Reserve University

In my lab, we investigate how arthropod brains encode salient sensory information into memory. Using comparative neuroanatomical and behavioral assays, we examine how these structures have evolved to adapt to various learning behaviors and host-seeking strategies.

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Discussion Facilitators

Adam Cohen cohen@chemistry.harvard.edu

Chemistry & Chemical Biology, Harvard University

I am interested in developing tools to monitor neural activity. We work on voltage imaging, optogenetics, and whole-brain recording. We use these tools to study dynamics from the finest details of dendritic integration to whole-brain patterns of activity.

Jackie Gottlieb jg2141@columbia.edu

Neuroscience, Columbia University

Cognition, decision making, neurophysiology, fronto parietal network, cognitive control, attention, motivation, curiosity, creativity, exploration

Martin Gruebele mgruebel@illinois.edu

Chemistry, Physics, Biophysics and Quantitative Biology, College of Medicine, University of Illinois at Urbana-Champaign

Animal behavior; protein dynamics in live organisms

Jacob Hooker jhooker@mgh.harvard.edu

Radiology, Harvard University

My research goal is to develop treatments based on a deep molecular understanding of brain disease. Currently, I study neuroinflammation, epigenetic enzymes, and develop new methods to image molecular targets in the brain.

Marina Picciotto marina.picciotto@yale.edu

Psychiatry, Yale University

Research in the Picciotto Lab focuses on acetylcholine and its receptors in cellular processes and circuits relevant to complex behaviors and psychiatric illness.

Adina Roskies aroskies@ucsb.edu

Philosophy, University of California, Santa Barbara

My interests lie mainly in the intersection of philosophy and the biological and cognitive sciences, in particular in philosophy of neuroscience and cognitive science, neuroethics, and philosophy of mind.

Scialog: Molecular Basis of Cognition

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The Kavli Foundation supports basic research through partnerships and funding designed to push the boundaries of human knowledge. In neuroscience, we ask: What is the molecular basis of cognition? How do we observe and measure the brain? How do cells respond to change?

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I'm interested in problems in complex systems with applications in astrophysics and social science. I am currently working on a project studying scientific collaboration using the Scialog data.

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Scialog: Molecular Basis of Cognition

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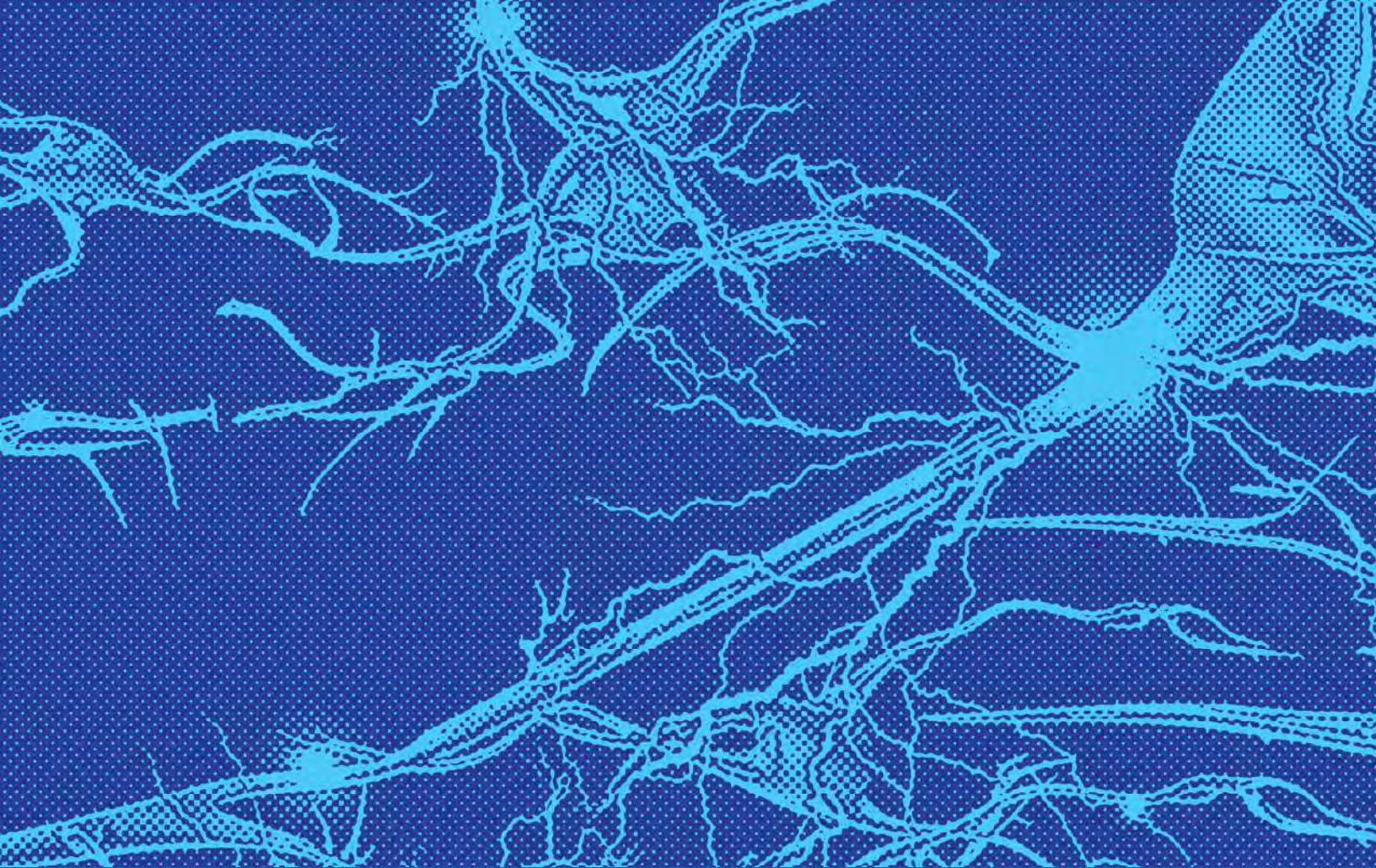
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