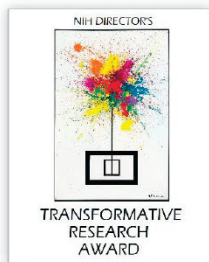
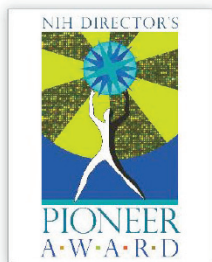




# NIH Common Fund *2023 High-Risk, High-Reward Research Symposium*

## Program Book



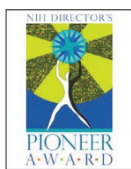


# Program Description



The NIH Common Fund is a funding entity within NIH that supports bold scientific programs that catalyze discovery across all biomedical and behavioral research. These programs create a space where investigators and multiple NIH Institutes and Centers collaborate on innovative research expected to address high-priority challenges for NIH as a whole and make a broader impact in the scientific community. More information is available at [commonfund.nih.gov](https://commonfund.nih.gov).

The NIH Common Fund's High-Risk, High-Reward Research program was created to accelerate the pace of biomedical discoveries by supporting exceptionally creative scientists with highly innovative research ideas of unusually broad impact. Four initiatives within this program—the NIH Director's Pioneer, New Innovator, Transformative Research, and Early Independence Awards—serve distinct purposes in achieving this goal.



**Pioneer Award:** Supports scientists with outstanding records of creativity pursuing new research directions to develop pioneering approaches to major challenges in biomedical, social science, and behavioral research.



**New Innovator Award:** Supports unusually creative early-career stage investigators with highly innovative research ideas with the potential for broad impact.



**Transformative Research Award:** Supports individuals or teams proposing exceptionally innovative and/or unconventional research projects that have the potential to create or overturn fundamental paradigms.



**Early Independence Award:** Supports outstanding junior scientists with the intellect, scientific creativity, drive, and maturity to bypass the traditional postdoctoral training period to launch independent research careers.



# Agenda



**Thursday, June 8, 2023**

9:00 a.m. **Trish Labosky**, Program Leader in the Office of Strategic Coordination, OD, NIH

Welcome and Opening Remarks

## Session 1

9:15 a.m. **Yongxin (Leon) Zhao**, Carnegie Mellon University  
*New Innovator Award*

Magnify: Next Generation Expansion Microscopy with a Universal Molecule Anchoring Strategy, the Applications and Beyond

9:35 a.m. **Hsiao-Tuan Chao**, Baylor College of Medicine  
*Early Independence Award*

Cerebellar Dysfunction in Autism Spectrum and Neurodevelopmental Disorders: From Discovery Genetics to Translational Neuroscience

9:55 a.m. **Nikhil Malvankar**, Yale University  
*New Innovator Award*

Wiring Cells: Control of Microbial Electron Export Using Natural and Synthetic Protein Nanowires

10:15 a.m. **BREAK**

## Session 2

10:35 a.m. **Jennifer Elisseeff**, Johns Hopkins University  
*Pioneer Award*

Biomaterials-Directed Regenerative Immunology

10:55 a.m. **Andrew Leifer**, Princeton University  
*New Innovator Award*

Neural Signal Propagation Atlas of *C. elegans*

- 11:15 a.m. **Siyuan Wang**, Yale University  
*New Innovator Award*  
*\*National Institute of General Medical Sciences*
- High-Content Image-Based CRISPR Screening Reveals Regulators of 3D Genome Architectures
- 11:35 a.m. **PHOTOSHOOT FOR ALL HRHR AWARDEES**
- 12:00 p.m. **LUNCH (ON YOUR OWN)**
- 1:10 p.m. **POSTER SESSION**  
(Cordell, Wisconsin)
- 1:10 p.m. **NIH STAFF OFFICE HOURS**  
(Bethesda A, Rosedale, Arlington, Auburn, Rugby)

### Session 3

- 3:00 p.m. **Brian Chait**, The Rockefeller University  
*Transformative Research Award*
- Nature-Inspired Device for Next Generation Mass Spectrometry
- 3:20 p.m. **Megan Dennis**, University of California, Davis  
*New Innovator Award*
- Gene Expansions Contributing to Human Brain Evolution
- 3:40 p.m. **BREAK**

### Session 4

- 4:00 p.m. **Daniel Gallego-Perez**, The Ohio State University  
*New Innovator Award*  
*\*Other Office of the Director appropriations*
- Cell- and Tissue Nanotransfection-Driven Therapies for Neurodegenerative Conditions and Metabolic Disorders
- 4:20 p.m. **Gilad Evrony**, New York University Grossman School of Medicine  
*Early Independence Award*
- Single-Molecule DNA Sequencing of Single-Strand Mismatch and Damage Patterns

- 4:40 p.m. **Kendra Frederick**, University of Texas Southwestern Medical Center  
*New Innovator Award*
- Structural Determination of Neurodegenerative Disease-Associated Proteins Inside Cells
- 5:00 p.m. **NETWORKING HAPPY HOUR**  
Fialova Bar (Hotel lobby)

## Friday, June 9, 2023

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- 8:30 a.m. **Bob Eisinger**, Acting Director of the Division of Program Coordination, Planning, and Strategic Initiatives, OD, NIH
- Opening Remarks

### Session 5

- 8:45 a.m. **Christoph Thaiss**, University of Pennsylvania  
*New Innovator Award*  
*\*National Institute on Aging*
- Body-Brain Communication: A New Frontier in Biomedicine
- 9:05 a.m. **Arjun Raj**, University of Pennsylvania  
*Transformative Research Award*
- How Do Cells Learn New Types?
- 9:25 a.m. **Tara Deans**, University of Utah  
*New Innovator Award*
- Utilizing Synthetic Biology to Advance Therapeutics
- 9:45 a.m. **Courtney Yuen**, Brigham and Women's Hospital  
*New Innovator Award*
- Improving the Equity of Community-Based Screening Programs Through Innovative Analytic Approaches
- 10:05 a.m. **BREAK**

## Session 6

- 10:25 a.m. **Jerry Chen**, Boston University  
*New Innovator Award*
- CRACKING Cortical Circuits Underlying Learning and Behavior
- 10:45 a.m. **Anne-Ruxandra Carvunis**, University of Pittsburgh  
*New Innovator Award*
- From Non-Coding to Coding: Uncovering the Hidden Coding Potential of Non-Coding Sequences and Its Role in *De Novo* Gene Evolution
- 11:05 a.m. **Jeffrey Macklis**, Harvard University  
*Pioneer Award*
- Building, Maintaining, or Regenerating Diverse Brain Circuitry Is Complex: Subtype-Specific and Dynamic Subcellular Molecular Machinery in Cerebral Cortex
- 11:25 a.m. **Raymond Moellerling**, The University of Chicago  
*New Innovator Award*  
*\*National Institute of General Medical Sciences*
- Direct Targeting of Oncogenic Transcription Factors with Synthetic Transcriptional Repressors
- 11:45 a.m. **Medha Pathak**, University of California, Irvine  
*New Innovator Award*
- A Novel Tool to Study Endogenous Human Piezo1 from Single Cells to Tissue Organoids
- 12:05 p.m. **LUNCH (ON YOUR OWN)**
- 1:10 p.m. **POSTER SESSION**  
(Cordell, Wisconsin)
- 1:10 p.m. **NIH STAFF OFFICE HOURS**  
(Bethesda A, Rosedale, Arlington, Auburn, Rugby)

## Session 7

- 3:00 p.m. **Shixin Liu**, The Rockefeller University  
*New Innovator Award*
- Machines on Genes: A Single-Molecule Perspective

\*Award co-funding indicator



3:20 p.m. **Kamena Kostova**, Carnegie Mellon University  
*Early Independence Award*  
Ribosomal Quality Control

3:40 p.m. **BREAK**

## Session 8

4:00 p.m. **Jonathan Brestoff**, Washington University  
*Early Independence Award*  
Mitochondria Transfer Rescues Aerobic Respiration in  
Metabolically Compromised Macrophages

4:20 p.m. **Sabrina Spencer**, University of Colorado Boulder  
*New Innovator Award*  
Control of the Proliferation-Quiescence Decision at the  
Single-Cell Level

4:40 p.m. **Sidi Chen**, Yale University  
*New Innovator Award*  
*\*National Cancer Institute*  
Genome Engineering for, of, and as Immunotherapy

5:00 p.m. **Trish Labosky**, Program Leader in the Office of  
Strategic Coordination, OD, NIH  
Closing Remarks

# Poster Sessions



## Poster Number 1

**Adam Bailey**, University of Wisconsin-Madison

FcRn Is a Pan-Arterivirus Receptor

## Poster Number 2

**Adam Bailey**, University of Wisconsin-Madison

Mapping the Determinants of Viral Hemorrhagic Fever (VHF) in Yellow Fever Virus (YFV)

## Poster Number 3

**Andrew Beel**, Stanford University

Principles of Mitotic Chromosome Structure

## Poster Number 4

**Anne Nigra**, Columbia University

Novel US Nationwide Estimates of Regulated Public Water Contaminants at Various Spatial and Temporal Resolutions for Epidemiologic Study

## Poster Number 5

**Brian Koss**, University of Arkansas for Medical Sciences

Discovering T Cell Proteome Turnover Dynamics to Enhance Persistence in Solid Tumors

## Poster Number 6

**Danny Miller**, University of Washington

Long-Read Sequencing to Identify Missing Disease-Causing Genetic Variation and Reduce Barriers to Comprehensive Genetic Evaluation

## Poster Number 7

**Jacob Capin**, Marquette University

Long-Term Benefits and Challenges of Competitive Sport: The Lived Experience of Midlife Former College Athletes

## Poster Number 8

**Magnus Hoffmann**, California Institute of Technology

Self-Assembling EABR Virus-Like Particles as a Platform Technology for Hybrid mRNA Vaccines

**Poster Number 9**

**Margaux Pinney**, [University of California, San Francisco](#)

Mapping and Dissecting Enzyme Sequence-Function-Fitness Landscapes with Microfluidics and Deep-Learning

**Poster Number 10**

**Steven Jonas**, [University of California, Los Angeles](#)

Chemically-Modified Filtration Devices Enable CRISPR/Cas9-Mediated Gene Knockout in Human Hematopoietic Stem and Progenitor Cells

**Poster Number 11**

**Yun Li**, [City of Hope National Medical Center](#)

Metabolic Modulation Sensitizes Prostate Cancer Cells to Radiotherapy

**Poster Number 12**

**Aaron Young**, [Georgia Institute of Technology](#)

Towards Co-Adaptive AI Strategies for Personalizing Wearable Robotic Control to Individuals with Mobility Deficits

**Poster Number 13**

**Alex Pollen**, [University of California, San Francisco](#)

Cell Type Evolution in the Primate Brain

**Poster Number 14**

**Alexandra-Chloe Villani**, [Harvard Medical School](#)

Deciphering the Achilles Heel of Cancer Immunotherapy

**Poster Number 15**

**Alison Feder**, [University of Washington](#)

State-Dependent Evolutionary Models Reveal Modes of Solid Tumor Growth

**Poster Number 16**

**Anindita Basu**, [University of Chicago](#)

Integration of Silicon Chip Microstructures in Soft Microfluidic Device for In-Line Microbial Cell Lysis and Characterization

**Poster Number 17**

**Arthur Beyder**, [Mayo Clinic](#)

Does the Gut Feel Touch?

**Poster Number 18**

**Carlos Ponce**, [Harvard Medical School](#)

The Shapes of Filters in Biological and Artificial Networks

**Poster Number 19**

**Carlos Vargas-Irwin**, [Brown University](#)

Synergistic Environment/Effector Decoding: Augmenting Neural Signals with Surrogate Sensory Inputs

\*Award co-funding indicator

**Poster Number 20**

**Cressida Madigan**, University of California, San Diego

*M. tuberculosis* Crosses the Blood-Brain Barrier Through Endothelial ZO-1 Rings

**Poster Number 21**

**Dwi Kemaladewi**, University of Pittsburgh

Implications of Genetic Diversity in Muscular Dystrophy

**Poster Number 22**

**Evgeny Kvon**, University of California, Irvine

How Important Is Enhancer-Promoter Looping for Gene Activation?

**Poster Number 23**

**Fleur Ferguson**, University of California, San Diego

Chemical Control of Misfolded Protein Fate

**Poster Number 24**

**Hadi Nia**, Boston University

Crystal Ribcage: A Platform for Probing Real-Time Lung Function at Cellular Resolution in Health and Disease

**Poster Number 25**

**Joe Delaney**, Medical University of South Carolina

Haploinsufficiency SWAN Networks in Cancer Aneuploidy Highlight Autophagy and Metallothioneins as Targetable Vulnerabilities

**Poster Number 26**

**Joh Schöneberg**, University of California, San Diego

4D Cell Biology: Adaptive Optics Lattice Light-Sheet Imaging and AI-Powered Big Data Processing of Live Stem Cell-Derived Organoids

**Poster Number 27**

**Johnny Blazeck**, Georgia Institute of Technology

Remediating Immunosuppressive Metabolic Changes in Solid Tumors

**Poster Number 28**

**Justin English**, University of Utah

High Fidelity Single Molecule Long Read Sequencing of Viral Genomes for Quasispecies Diversity Mapping

**Poster Number 29**

**Justin English**, University of Utah

Tunable Microscale Transcriptional Response Elements for Programming Cellular Output

**Poster Number 30**

**Katharine White**, University of Notre Dame

Spatiotemporal Intracellular pH (pHi) Dynamics Regulate the Cell Cycle and Dysregulated pHi Drives Cytokinesis Defects

**Poster Number 31**

**Ke Xu**, University of California, Berkeley

Unveiling Nanoscale Heterogeneities in Biomolecular Interactions and Condensates Through Multidimensional Super-Resolution Microscopy

**Poster Number 32**

**Mandar Muzumdar**, Yale University

Intra-Organ Signaling Drives the Development of Pancreatic Cancer

**Poster Number 33**

**Miles Miller**, Harvard Medical School

Interrogating the Spatial Dynamics of Inflammation Using Image-Guided Synthetic Control

**Poster Number 34**

**Opeyemi Olabisi**, Duke University School of Medicine

APOL1 G1-Mediated Cation Transport Inhibits Amino Acid Transport and Increases Endoplasmic Reticulum Calcium Release, Causing Podocytopathy

**Poster Number 35**

**Paul Blainey**, Broad Institute

Profiling and Perturbing Cancer Cell Plasticity with *In Situ* Sequencing-Compatible Genetic Lineage Recorders

**Poster Number 36**

**Rachel Buckley**, Harvard Medical School

Genes That Escape X Chromosome Inactivation Are Associated with Alzheimer's Disease Clinicopathology

**Poster Number 37**

**Rizal Hariadi**, Arizona State University

GPCR-Inspired Molecular Devices for Live-Cell Isolation Targeting Cytosolic Biomarkers

**Poster Number 38**

**Rui Chang**, Yale University

The Coding Logic of Interoception

**Poster Number 39**

**Subhamoy Dasgupta**, Roswell Park Comprehensive Cancer Center

Decoding Nuclear Metabolic Pathway Regulating Gene Transcription

**Poster Number 40**

**Sung Soo Kim**, University of California, Santa Barbara

The Connectome of Visual Pathways to the *Drosophila* Compass System

**Poster Number 41**

**Thomas Longden**, University of Maryland Baltimore

Vascular Signaling Plasticity Reprograms Neurovascular Coupling Pathways to Precisely Match Energy Delivery to Neuronal Metabolic Needs

**Poster Number 42**

**Viviana Risca**, The Rockefeller University

Regulation of Sub-Kilobase Chromatin Folding

**Poster Number 43**

**Xiaolu Cambronne**, The University of Texas at Austin

Metabolic Control of Cell Signaling and Disease

**Poster Number 44**

**Xiaoyin Chen**, Allen Institute

Mapping Synaptic Connectivity at Scale by *In Situ* Sequencing of Barcoded Rabies Virus

**Poster Number 45**

**Xiaoyu Shi**, University of California, Irvine

Molecular-Resolution Imaging and Subcellular Multiomics for Cell and Brain Profiling

**Poster Number 46**

**Zheng Kuang**, Carnegie Mellon University

Histone Deacetylase 3 Programs Diurnal Rhythms in Tuft Cell Biogenesis and Type 2 Immunity

**Poster Number 47**

**Zhilei Chen**, Texas A&M University

DARPin-Based Protein Therapeutics

**Poster Number 48**

**Brian Litt**, University of Pennsylvania

Ghost in the Machine: Epilepsy Devices That Communicate with Their Hosts

**Poster Number 49**

**Kathleen Collins**, University of California, Berkeley

Site-Specific Safe-Harbor Transgene Supplementation of the Human Genome by RNA-Only Delivery

**Poster Number 50**

**Z. Josh Huang, Duke University School of Medicine**

Programmable RNA Sensing for Brain Cell Type Monitoring and Manipulation Across Species

**Poster Number 51**

**Ben Black, University of Pennsylvania**

Efficient Formation of Single-Copy Human Artificial Chromosomes

**Poster Number 52**

**Bonnie Dittel, Versiti Blood Research Institute**

Generation of a Universal B Cell IgD Low (BDL)-based Adoptive Cell Therapy for the Treatment of Autoimmunity

**Poster Number 53**

**Carlos Lois, California Institute of Technology**

MEMOIR: Engineering Cells to Record Their Own Lineage and Event Histories

**Poster Number 54**

**Faraz Bishehsari, Rush University**

Circadian Transcriptome of Pancreatic Adenocarcinoma Could Be Tumor Specific

**Poster Number 55**

**Julie Andersen, Buck Institute for Research on Aging**

Drug-Delivering Smart Cells to End Alzheimer's Disease: Early Progress

**Poster Number 56**

**Steven Schiff, Yale University**

Neonatal *Paenibacilliosis*: Discovery of a New Disease-Causing Sepsis and Hydrocephalus in African Infants

**Poster Number 57**

**Xiayan Li, University of Michigan**

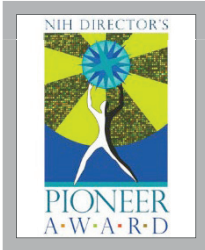
ALS Survival Associates with Whole Blood DNA Methylation Age Acceleration with Hypomethylation of Transposable Elements

**Poster Number 58**

**Yue Zhao, University of Michigan**

Whole Blood Transcriptome Analyses Reveal Heterogeneity in Amyotrophic Lateral Sclerosis

# 2022 Awardees



## NIH Director's Pioneer Awardees

**Long Cai, Ph.D.**, California Institute of Technology

Single Cell Analysis of the Kinome

**Kafui Dzirasa, M.D., Ph.D.**, Duke University

Precision Editing of Neural Circuits Using Engineered Electrical Synapses

**Yamuna Krishnan, Ph.D.**, University of Chicago

Intracellular Electrophysiology: An Electrochemical Atlas of Organelles

**Gabe A. Kwong, Ph.D.**, Georgia Institute of Technology

Finding Sleeping Beauty: T Cell Biosensors for Dormant Cancer Detection

**Celeste M. Nelson, Ph.D.**, Princeton University

Mechanical Clocks During Fetal Development

**Amanda Randles, Ph.D.**, Duke University

Dynamic Models of the Cardiovascular System Capturing Years, Rather Than Heartbeats

*\* National Institute on Aging (NIA)*

**Sherri Rose, Ph.D.**, Stanford University

A Framework for the Social Impact of Algorithms in Health Care

**Sara L. Sawyer, Ph.D.**, University of Colorado, Boulder

Breaking the Barrier to an HIV Vaccine





## NIH Director's New Innovator Awardees

**Farshid Alambeigi, Ph.D.**, University of Texas at Austin

A Novel Semi-Autonomous Surgeon-in-the-Loop *In Situ* Robotic Bioprinting System for Functional and Cosmetic Restoration of Volumetric Muscle Loss Injuries

**Rachel N. Arey, Ph.D.**, Baylor College of Medicine

Uncovering Brain-Wide Molecular Determinants of Individual Memory Performance Across Lifespan

**Michael Beyeler, Ph.D.**, University of California, Santa Barbara

Towards a Smart Bionic Eye: AI-Powered Artificial Vision for the Treatment of Incurable Blindness

**John James Blazeck, Ph.D.**, Georgia Institute of Technology

Synthetic Metabolism to Armor and Enhance a New Class of Cell Therapies

**Rachel Buckley, Ph.D.**, Harvard Medical School

The Inactive X: Discovering Sex Genes That Influence Female Vulnerability to Alzheimer's Disease

*\*National Institute on Aging (NIA)*

**Lindsay Case, Ph.D.**, Massachusetts Institute of Technology

New Insights into the Molecular Regulation of Mechanotransduction

*\*National Institute of General Medical Sciences (NIGMS)*

**Michelle M. Chan, Ph.D.**, Princeton University

Building a Systematic, Comprehensive Mammalian Cell Fate Map

**Chi-Lun Chang, Ph.D.**, St. Jude Children's Research Hospital

Understanding Metabolism in Space and Time—Mechanistic Analysis of the Dynamic Spatial Organization of Metabolism

*\*National Institute of General Medical Sciences (NIGMS)*

**Alejandro (Alex) Chavez, M.D., Ph.D., University of California, San Diego**

Methods to Rapidly Explore Combinatorial Diversity and Their Application to CRISPR-Cas9 Systems

**Lucas Cheadle, Ph.D., Cold Spring Harbor Laboratory**

Neuroimmunological Insights into Brain Development and Dysfunction: An Integrative Approach Focused on Microglial Dynamics

*\*National Institute of Mental Health (NIMH)*

**Xiaoyin Chen, Ph.D., Allen Institute**

Unraveling the Developmental Logic of Cortical Long-Range Projections Using *In Situ* Sequencing-Based Neuroanatomy

**Jan Christoph, Ph.D., University of California, San Francisco**

AI-Assisted Imaging and Prediction of Cardiac Arrhythmia Origins Using 4D Ultrasound

**Tyler R. Clites, Ph.D., University of California, Los Angeles**

Compliant Limb Reconstruction: Co-Engineering Body and Machine to Revolutionize Limb Salvage

**Joe R. Delaney, Ph.D., Medical University of South Carolina**

Tumor Suppressor Vulnerability Conferred by Aneuploid Loss of Haploinsufficient Metallothionein Genes

**Fangyuan Ding, Ph.D., University of California, Irvine**

Universally Applicable RNA Mapping at Subcellular and Single-Base Resolution

*\*National Institute of General Medical Sciences (NIGMS)*

**Luisa Escobar-Hoyos, Ph.D., M.Sc., Yale University**

Unleashing T Cell Anti-Tumor Response Through Repair of Altered RNA Splicing and Antigen Mimicry Recognition

**Amelia Escolano, Ph.D., Wistar Institute**

Manipulating Epitope Immunodominance and Tracking B-Cell-Antigen Interactions for Vaccine Design

**Alison Feder, Ph.D., University of Washington**

A Phylodynamic Time Machine for Solid Tumors

**Fleur M. Ferguson, Ph.D., University of California, San Diego**

Chemical Control of Misfolded Protein Fate

**Yvette Fisher, Ph.D., University of California, Berkeley**

How Does Neuromodulation Shape the Fluidity of Spatial Working Memory?

**Vikram Gadagkar, Ph.D., Columbia University**

The Female Songbird as a Novel Mechanistic Model for the Neural Basis of Social Evaluation

**Felipe Garcia Quiroz, Ph.D., Emory University**

Multifunctional Phase Sensors for Probing and Manipulation of Intracellular Biomolecular Condensates

**Jellert Gaublomme, Ph.D., Columbia University**

Spatially Mapping of Pooled *In Vivo* CRISPR Screens in the Tumor Microenvironment

*\*Common Fund (CF) and National Cancer Institute (NCI)*

**Emily L. Goldberg, Ph.D., University of California, San Francisco**

Discovering Mechanisms of Tissue-Resident Immune Aging

**Adam Granger, Ph.D., Harvard University**

High-Throughput Methods for Measuring Cortical Synaptic Connectivity at Single-Cell Resolution

*\* National Institute of Mental Health (NIMH)*

**Nathan D. Grubaugh, Ph.D., Yale University**

Enhancing Dengue Virus Genomic Surveillance to Uncover Circulating Genetic Diversity

**Gavin Ha, Ph.D., University of Washington**

Translating the Tumor Regulome from Cell-Free DNA for Precision Oncology

**Siniša Hrvatin, Ph.D., Whitehead Institute for Biomedical Research**

Biology and Applications of Mammalian Hibernation-Like States

**Hidehiko Inagaki, Ph.D., Max Planck Florida Institute for Neuroscience**

A Novel Approach to Crack Neuronal Mechanisms That Shape Computations in the Brain

*\*Award co-funding indicator*

**Chengcheng Jin, Ph.D., University of Pennsylvania**

A Blueprint for Neutrophil Heterogeneity and Reprogramming in Cancer

**Alok V. Joglekar, Ph.D., University of Pittsburgh**

Signaling via MHC: Engineering Immune Cells with New Capabilities

**Benjamin P. Kleinstiver, Ph.D., Harvard Medical School**

Scalable Development of Custom Genome Editing Technologies

**Zheng Kuang, M.D., Carnegie Mellon University**

Microbial Regulation of Mammalian Circadian Rhythms and the Sexual Dimorphism: From Metabolism to Immunity

**Aditya M. Kunjapur, Ph.D., University of Delaware**

Boosting Efficacy of Oral Vaccine Candidates by Enabling Spore Display of Nitrated Antigens

**Evgeny Kvon, Ph.D., University of California, Irvine**

Deciphering the Mechanism of Long-Range Gene Regulation *In Vivo*  
*\*National Institute of General Medical Sciences (NIGMS)*

**Audrone Lapinaite, Ph.D., Arizona State University**

Engineering Novel Precision Genome Editing Tools  
*\*National Institute of General Medical Sciences (NIGMS)*

**Zhongwei Li, Ph.D., University of Southern California**

The Synthetic Kidney: A Revolutionary Solution for the Shortage of Kidneys for Transplantation

**Ci Ji Lim, Ph.D., University of Wisconsin-Madison**

Unraveling the Telomere Black Box: A New Single-Molecule Approach to Define the Telomere Chromatin Landscape and Its Functional Mechanisms  
*\*National Institute of General Medical Sciences (NIGMS)*

**Christopher Makinson, Ph.D., Columbia University Health Sciences**

Unlocking the Postnatal Human Brain Using Activity Augmented Organoids  
*\*National Institute of Mental Health (NIMH)*

**Steven E. Mansoor, M.D., Ph.D., Oregon Health & Science University**

Elucidation of P2X7 Receptor Signaling and Development of Novel Small Molecule and Aptamer Ligand Therapies

*\*National Institute of General Medical Sciences (NIGMS)*

**Aaron McKenna, Ph.D., Dartmouth College**

Annotated Lineage Trees of Murine Development

**Kara L. McKinley, Ph.D., Harvard University**

Life History of the Menstruating Uterus

**Ellis Monk, Ph.D., Harvard University**

The Optics of Health: Race Skin Tone Minority Health and Health Disparities in the U.S.

*\*National Institute of Mental Health (NIMH)*

**Shyamal Mosalaganti, Ph.D., University of Michigan at Ann Arbor**

*In Situ* Architecture of Membrane Contact Sites Mediating Organelle Fission

*\*National Institute of General Medical Sciences (NIGMS)*

**Maral Mousavi, Ph.D., University of Southern California**

Building a Two-Way Communication System: Bio-Orthogonal Superhydrophobic Nanoparticles for Controlled Stimulation and Real-Time Sensing of Neurotransmitters

*\*National Institute of General Medical Sciences (NIGMS)*

**Ruvandhi Nathavitharana, M.D., M.P.H., Harvard Medical School**

THWART-TB: Testing Health Workers at Risk to Advance Our Understanding of TB Infection

**Hadi T. Nia, Ph.D., Boston University**

Probing Functioning Lung at the Cellular Resolution in Health and Disease

**Tagbo H. R. Niepa, Ph.D., University of Pittsburgh**

Designing a High-Throughput Platform to Bioprospect the Human Microbiome and Manipulate Its Interplay with Host Environments

*\*National Institute of General Medical Sciences (NIGMS)*

**C. Denise Okafor, Ph.D., The Pennsylvania State University**

Improving Drug Design to Eliminate Side Effects: From Computational to Animal Models

*\*Award co-funding indicator*

**Rebecca L. Pearl, Ph.D., University of Florida**

Transdiagnostic Intervention to Reduce Internalized Health-Related Stigma

**Carlos R. Ponce, M.D., Ph.D., Harvard Medical School**

Defining Mechanisms for Natural Vision in the Primate Brain with Machine Learning

**Bushra Raj, Ph.D., University of Pennsylvania**

Genomic Tools for Massively Parallel Recording of Signaling Activity at Cellular Resolution in a Brain-Wide Manner

**Viviana I. Risca, Ph.D., The Rockefeller University**

Cross-Regulation Between Loop Extrusion, Chromatin Fiber Structure, and Chromatin-Associated RNAs

*\*National Institute of General Medical Sciences (NIGMS)*

**Silvi Rouskin, Ph.D., Harvard Medical School**

Constructing The Nest—Understanding the Mechanisms of *Nidoviridae* RNA Genomes Transcription and Recombination

**Serena Sanulli, Ph.D., Stanford University**

Harnessing the Chromatin Conformational Code for Epigenetic Regulation

**Deblina Sarkar, Ph.D., Massachusetts Institute of Technology**

Circulatronics: A New Paradigm for Biomedical Implants

**Johannes Schöneberg, Ph.D., University of California, San Diego**

Decode Mitochondrial Morphology Dynamics to Predict Cell Fate Decisions

*\*National Institute of General Medical Sciences (NIGMS)*

**Debattama Sen, Ph.D., Harvard Medical School**

Dissecting the Enhancer Logic Governing Immune Cell Fate Decisions

**Xiaoyu Shi, Ph.D., University of California, Irvine**

Gel-Based Optical-Isolation Single-Cell 3D Spatial Multiomics

**Mark A. Skylar-Scott, Ph.D., Stanford University**

Trillion Cell Culture to Fuel Organ Biofabrication  
*National Institute of General Medical Sciences (NIGMS)*

**Joanna Smeeton, Ph.D., Columbia University**

Deciphering Multi-Scale Differentiation and Patterning Cues Driving Whole Craniofacial Joint Regeneration

**Berna Sozen, Ph.D., Yale University**

Deciphering Principles of Human Embryonic Patterning in Development and Disease

**Sergey Stavisky, Ph.D., University of California, Davis**

Understanding and Restoring Speech Production Using an Intracortical Brain-Computer Interface

**AJ te Velthuis, Ph.D., Princeton University**

Structure and Dynamics of RNA Elements Regulating Viral Aberrant RNA Synthesis

**Summer Thyme, Ph.D., University of Alabama, Birmingham**

Defining the Chemical Perturbome of Neural Development and Activity

**Caroline Uhler, Ph.D., Harvard Medical School**

Causal Representation Learning for the Spatial Analysis of Transcriptomic and Imaging Data in Tissue

**David Van Valen, M.D., Ph.D., California Institute of Technology**

Unraveling the Genetic Basis of Cellular Behaviors with Deep Learning and Imaging-Based Reverse Genetics

*\*National Institute of General Medical Sciences (NIGMS)*

**Chao Wang, Ph.D., Arizona State University**

Integrated Nano-Opto-Fluidic System on Sapphire Towards Single-Molecule Protein Sequencing

*\*National Institute of General Medical Sciences (NIGMS)*

**Sihong Wang, Ph.D., University of Chicago**

Immunocompatible Electronic Polymers and Devices for Implantable Sensors and Stimulators That Resist Foreign-Body Responses

**Wenjing Wang, Ph.D., University of Michigan, Ann Arbor**

New Classes of Optogenetic and Chemogenetic Tools with a Feedback Control

**Amy M. Weeks, Ph.D., University of Wisconsin, Madison**

Post-Translational Modification Proteomics in 4D: Cemoenzymatic Tools to Map the Dynamic Spatial Organization of Eukaryotic Signaling Pathways

*\*National Institute of General Medical Sciences (NIGMS)*

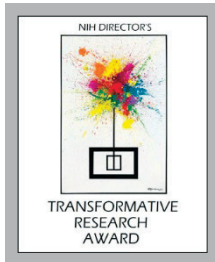
**Aaron T. Whiteley, Ph.D., University of Colorado**

Deciphering the Crosstalk Between Bacteria and Their Mammalian Hosts

**Aaron J. Young, Ph.D., Georgia Institute of Technology**

A New Framework for Self-Adaptive Artificial Intelligence to Personalize Assistance for Patients Using Robotic Exoskeletons and Prostheses





## **NIH Director's Transformative Research Awardees**

**Julie K. Andersen, Ph.D.,** Buck Institute for Research on Aging

A Smart Cell Drug (SmaCD) Delivery Platform for Mobile, Targetable, and Self-Regulated Combination Therapy: A Model Project to Rescue Antibodies from Alzheimer's Disease (AD) Clinical Trial Failures

**Eva S. Anton, Ph.D.,** University of North Carolina at Chapel Hill

Primary Cilia: A Novel Signaling Gateway to Neural Circuit Modulation

**Theodore P. Beauchaine, Ph.D.,** University of Notre Dame

Leveraging Noninvasive Transcutaneous Vagus Nerve Stimulation and Smartphone Technology to Reduce Suicidal Behaviors and Suicide Among Highly Vulnerable Adolescents

**Faraz Bishehsari, M.D., Ph.D.,** Rush University Medical Center

Development of a Precision Medicine Platform for Circadian-Based Therapeutics in Pancreatic Cancer

**Donita C. Brady, Ph.D.,** University of Pennsylvania

Unlocking the Chemical Space of Cancer-Associated Perturbations

**George M. Burslem, Ph.D.,** University of Pennsylvania

Unlocking the Chemical Space of Cancer-Associated Perturbations

**Luca Busino, Ph.D.,** University of Pennsylvania

Unlocking the Chemical Space of Cancer-Associated Perturbations

**Michael Fischbach, Ph.D.,** Stanford University

Building the Foundations of Commensal Vaccines

**Terence P. Gade, M.D., Ph.D.,** University of Pennsylvania

Unlocking the Chemical Space of Cancer-Associated Perturbations

**Chris Garcia, Ph.D.,** Stanford University

A Global Map of Interactions Among Human Cell Surface Proteins and Secreted Ligands

**Hani Goodarzi, Ph.D., University of California, San Francisco**

Leveraging Natural Phenotypic Variations of Heterogenous ALS Populations-In-A-Dish to Enable Scalable Drug Discovery

**Justin Ichida, Ph.D., University of Southern California**

Leveraging Natural Phenotypic Variations of Heterogenous ALS Populations-In-A-Dish to Enable Scalable Drug Discovery

**Jeff Lichtman, M.D., Ph.D., Harvard University**

Primary Cilia: A Novel Signaling Gateway to Neural Circuit Modulation

**Arielle H. Sheftall, Ph.D., University of Rochester**

Leveraging Noninvasive Transcutaneous Vagus Nerve Stimulation and Smartphone Technology to Reduce Suicidal Behaviors and Suicide Among Highly Vulnerable Adolescents

**Matthew Thomson, Ph.D., California Institute of Technology**

A Global Map of Interactions Among Human Cell Surface Proteins and Secreted Ligands

**Kristin Valentino, Ph.D., University of Notre Dame**

Leveraging Noninvasive Transcutaneous Vagus Nerve Stimulation and Smartphone Technology to Reduce Suicidal Behaviors and Suicide Among Highly Vulnerable Adolescents

**Mark J. Van Ryzin, Ph.D., University of Oregon**

Transforming Adolescent Mental Health Through Accessible, Scalable, Technology-Supported Small-Group Instruction

**Eric Witze, Ph.D., University of Pennsylvania**

Unlocking the Chemical Space of Cancer-Associated Perturbations

**Ryohei Yasuda, Ph.D., Max Planck Florida Institute for Neuroscience**

Primary Cilia: A Novel Signaling Gateway to Neural Circuit Modulation

**Kai Zinn, Ph.D., California Institute of Technology**

A Global Map of Interactions Among Human Cell Surface Proteins and Secreted Ligands



## **NIH Director's Early Independence Awardees**

**Corina Amor Vegas, M.D., Ph.D.,** Cold Spring Harbor Laboratory

Deconstructing Aging with Senolytic CAR T Cell

**Andrew J. Beel, M.D., Ph.D.,** Stanford University

Structure and Pharmacologic Modulation of the Mitotic Chromosomes  
Central Axis

**Alexander Gitlin, M.D., Ph.D.,** Memorial Sloan Kettering Cancer Center

Insights from Complex Immune Disorders: How an Apoptotic Caspase  
Unleashes Inflammation

**Gary Grajales-Reyes, M.D., Ph.D.,** Washington University St. Louis

CAR-Based Approaches for the Treatment of Alzheimer's Disease

\* *National Institute on Aging (NIA)*

**Lisa C. Hiura, Ph.D.,** University of Colorado

Functional Ontogeny of Pair Bonding Neural Circuits

**Magnus Hoffmann, Ph.D., M.Pharm.,** California Institute of Technology

Self-Assembling Spike-EBR Nanoparticles as a Vaccine Platform  
Technology Against SARS-CoV-2 and Future Pandemic Coronaviruses

**Yun Rose Li, M.D., Ph.D.,** City of Hope National Medical Center

Biomarkers, Mechanisms and Modulation of Oxidative Stress Associated  
Risk Factors in Carcinogenesis

**Danny E. Miller, M.D., Ph.D.,** University of Washington

Long-Read DNA and RNA Sequencing to Identify Disease-Causing  
Genetic Variation and Streamline Testing

**Sarah R. Ocañas, Ph.D., Oklahoma Medical Research Foundation**

Sex Chromosomal Regulation of Hippocampal Microglial Activation with Alzheimer's Disease and Aging

**Margaux Pinney, Ph.D., University of California, San Francisco**

Leveraging Adaptive Evolution and High-Throughput Techniques to Dissect the Link Between Biochemical Function and Fitness

**Andy Terker, M.D., Ph.D., Vanderbilt University Medical Center**

Innovative Therapeutic Approaches to Treat Chronic Kidney Disease

**Mary D. Willis, Ph.D., M.P.H., Boston University Medical Campus**

A Preconception Cohort Study on Oil and Gas Development, Fertility, and Pregnancy

**Bo Xia, Ph.D., Harvard University**

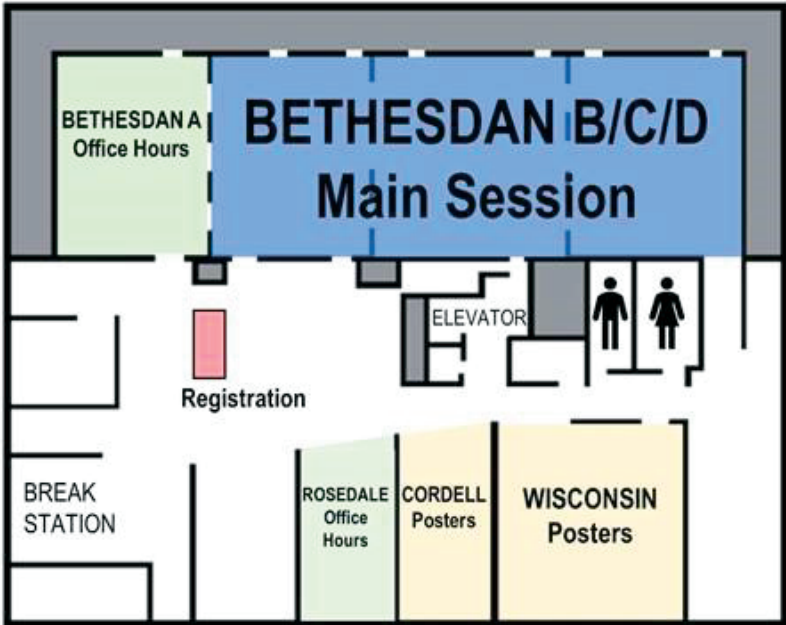
Transposable Element Interaction and Its Impact on Human Development and Health

**Andrew C. Yang, Ph.D., University of California, San Francisco**

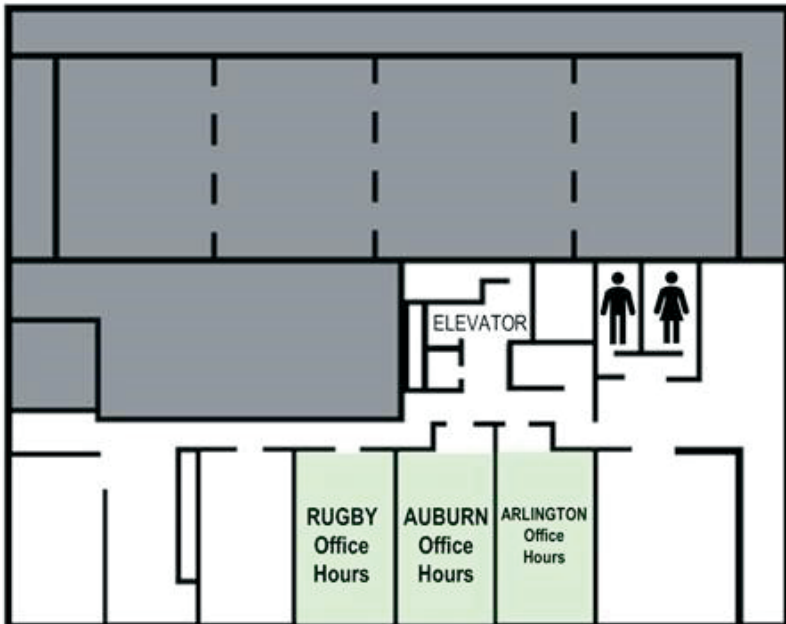
Molecular Tools to Decipher Communication Across the Blood-Brain Barrier

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## 2<sup>nd</sup> Floor



## 3<sup>rd</sup> Floor



















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