NIH COMMON FUND'S

2019 HIGH-RISK, HIGH-REWARD RESEARCH SYMPOSIUM

PROGRAM BOOK

NIH DIRECTOR'S PIONEER AWARD

NIH DIRECTOR'S NEW INNOVATOR AWARD

NIH DIRECTOR'S TRANSFORMATIVE RESEARCH AWARD

NIH DIRECTOR'S EARLY INDEPENDENCE AWARD

June 5 – 7, 2019

DoubleTree Hotel & Executive
Meeting Center Bethesda
8120 Wisconsin Avenue
Bethesda, MD

NIH National Institutes of Health
Office of Strategic Coordination–The Common Fund

Program Description

The NIH Common Fund, in the Office of the Director, supports programs that address key roadblocks in biomedical, behavioral, and social science research impeding basic scientific discovery and its translation into improved human health. Common Fund programs are designed to have broad impact, be catalytic, and tackle challenges that no other entity, including individual NIH Institutes, will be likely or able to do. There currently are 25 different Common Fund programs, spanning the broad mission of NIH. More information is available at commonfund.nih.gov.

The NIH Common Fund's High-Risk, High-Reward Research program was created to accelerate the pace of biomedical, behavioral, and social science 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 individual scientists of exceptional creativity at any career stage who propose bold, pioneering approaches to address major challenges.

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: Provides a mechanism for outstanding junior scientists to move rapidly into independent research positions by omitting the traditional postdoctoral training period.

Agenda

Wednesday, June 5, 2019

9:00 a.m. **Francis Collins,** NIH

Opening Remarks

Session 1

9:15 a.m. **Dana Pe'er,** Sloan Kettering Institute

The Emergent Landscape of the Mouse Gut Endoderm at Single-Cell Resolution (Pioneer Award; *Eunice Kennedy Shriver* National Institute of Child Health and Human Development[*#$]; National Institute of General Medical Sciences[$])

9:35 a.m. **Deepika Mohan**, University of Pittsburgh

How Do Doctors Think? Using Video Games to Modify Physician Decision Making (New Innovator Award; National Library of Medicine[*#])

9:55 a.m. **Alexander Gimelbrant**, Dana-Farber Cancer Institute

How to Reactivate Silenced Alleles in Genes with Monoallelic Expression (Transformative Research Award; National Institute of General Medical Sciences[*#$])

10:15 a.m. Break

Session 2

10:35 a.m. **Amy Palmer**, University of Colorado

Regulation of Cell Signaling by Zinc Dynamics (Pioneer Award; National Center for Complementary and Integrative Health[$]; National Institute of General Medical Sciences[*#$])

10:55 a.m. **Gabriel Lander**, The Scripps Research Institute

Investigating the Mechanisms of Molecular Motors with Cryo-EM (New Innovator Award; National Institute of Biomedical Imaging and Bioengineering[*#])

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11:15 a.m. **Michael Angelo**, Stanford University

High-Dimensional Imaging of Human Tissue Using MIBI-TOF (Early Independence Award; National Cancer Institute[$]; National Institute of Dental and Craniofacial Research[#])

11:40 a.m. Photos

12:00 p.m. Lunch (on your own)

Session 3

1:30 p.m. **Mala Murthy**, Princeton University

Neural Mechanisms for Dynamic Acoustic Communication (New Innovator Award; National Institute of Neurological Disorders and Stroke[*#$])

1:50 p.m. **Chenxiang Lin**, Yale University

DNA-Nanotechnology Enabled Membrane Engineering (New Innovator Award; National Institute of General Medical Sciences[*#])

2:10 p.m. **Christine Hendon**, Columbia University

High-Resolution Imaging of the Heart by Optical Coherence Tomography (New Innovator Award; National Heart, Lung, and Blood Institute[*#])

2:30 p.m. **Sheng Zhong**, University of California, San Diego

Cell-Free RNA in a Single Droplet of Human Serum Reflects Physiologic and Disease States (Pioneer Award; *Eunice Kennedy Shriver* National Institute of Child Health and Human Development[*#$])

2:50 p.m. **Weian Zhao**, University of California, Irvine

Targeting Biophysical Cues to Study, Diagnose, and Treat Cancer (New Innovator Award; National Cancer Institute[*#])

Poster Session 1

3:10–5:00 p.m. Poster Session and NIH Staff Office Hours

Networking Session 1

5:30–6:30 p.m. Networking Event and Happy Hour at the hotel rooftop bar

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Thursday, June 6, 2019

8:30 a.m. **James Anderson**, NIH

Remarks

8:40 a.m. **Ravi Basavappa**, NIH

High-Risk, High-Reward Research Program Update

Session 4

8:50 a.m. **Gregor Neuert**, Vanderbilt University

Quantitative Understanding of Single-Cell Responses to Kinetic Pathway Stimulation (New Innovator Award; National Institute of General Medical Sciences*#)

9:10 a.m. **Mark Andermann**, Beth Israel Deaconess Medical Center

Reactivation of Salient Experiences in Association Cortex Links Cues to Outcomes (New Innovator Award; National Institute of Diabetes and Digestive and Kidney Diseases*#$)

9:30 a.m. **Gwendalyn Randolph**, Washington University in St. Louis

Altered Lymphatic Transport and Metabolism of Chylomicrons in Crohn's Disease (Pioneer Award; National Institute of Diabetes and Digestive and Kidney Diseases*#$)

9:50 a.m. **Amanda Randles**, Duke University

Simulating Hemodynamics in the Human Vasculature on the Systemic Scale at Cellular Resolution (Early Independence Award; National Cancer Institute$; National Institute of Dental and Craniofacial Research#)

10:10 a.m. Break

Session 5

10:30 a.m. **Leonard Lipovich**, Wayne State University

Forward and Reverse Genetics Identifies Primate-Specific Long Non-Coding RNA Genes as Contributors to and Therapeutics Targets in Cancer and Diabetes (New Innovator Award; National Cancer Institute*#)

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10:50 a.m. **Hu Cang**, Salk Institute for Biological Studies

Expansion Microscopy Reveals a Fibrous Scaffold of Human Chromosomes (New Innovator Award; National Institute of Biomedical Imaging and Bioengineering*#)

11:10 a.m. **Chang Liu**, University of California, Irvine

Synthetic Genetic Systems for Rapid Mutation and Continuous Evolution *In Vivo* (New Innovator Award; National Institute of General Medical Sciences*#)

11:30 a.m. **Ramsey Badawi** and **Simon Cherry**, University of California, Davis

EXPLORER: Initial Human Studies from the First Medical Scanner That Simultaneously Captures 3-D Images of the Entire Human Body (Transformative Research Award; National Cancer Institute*#$; National Institute of Biomedical Imaging and Bioengineering$)

11:50 a.m. **Cato Laurencin**, University of Connecticut

Regenerative Engineering: Convergence of Material Importance (Pioneer Award; National Institute of Arthritis and Musculoskeletal and Skin Diseases*#$)

12:10 p.m. Lunch (on your own)

Session 6

1:40 p.m. **Nancy Allbritton, Scott Bultman**, **Shawn Gomez**, and **Scott Magness**, The University of North Carolina at Chapel Hill

Development of Human Intestinal Simulacra (Transformative Research Award; National Center for Complementary and Integrative Health$; National Institute of Diabetes and Digestive and Kidney Diseases*#$; National Institute of Environmental Health Sciences$)

2:00 p.m. **Steven Schiff**, The Pennsylvania State University

Control of the Neonatal Septisome and Hydrocephalus in Sub-Saharan Africa (Pioneer Award; John E. Fogarty International Center$; *Eunice Kennedy Shriver* National Institute of Child Health and Human Development*#$; National Institute of Neurological Disorders and Stroke$)

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2:20 p.m. **Daniel Jarosz**, Stanford University

Remembering the Past: A New Form of Protein-Based Inheritance (New Innovator Award; National Institute of General Medical Sciences*#$)

2:40 p.m. **Robert Judson-Torres**, The University of Utah

The Recreationally Used "Barbie Drug," Melanotan II, Induces Aggressive Behavior in Human Melanoma Cells

(Early Independence Award; National Institute of Dental and Craniofacial Research#)

Poster Session 2

3:00–5:00 p.m. Poster Session and NIH Staff Office Hours

Networking Session 2

5:30–6:30 p.m. Happy Hour at the hotel rooftop bar

Friday, June 7, 2019

Session 7

8:30 a.m. **Michael McAlpine**, University of Minnesota

3-D Printed Nano-Bionic Organs (New Innovator Award; National Institute of Biomedical Imaging and Bioengineering*#)

8:50 a.m. **Denise Montell**, University of California, Santa Barbara

Near-Death Experiences at the Cellular Level (Pioneer Award; National Cancer Institute*#$)

9:10 a.m. **Marie Bragg**, New York University School of Medicine

Does Racially Targeted Food Advertising Work? Black Adolescents Show Stronger Preferences for Racially Congruent Food Ads Than White Adolescents (Early Independence Award; National Heart, Lung, and Blood Institute$; National Institute of Dental and Craniofacial Research#; National Library of Medicine$)

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9:30 a.m. **Shahin Rafii**, Weill Cornell Medicine

Programming Adaptable Human Vascular Niche Cells for Organotypic Stem Cell Regeneration (Transformative Research Award; National Heart, Lung, and Blood Institute*#$)

9:50 a.m. Break

Session 8

10:10 a.m. **Wendell Lim**, University of California, San Francisco

Redesigning the T Cell (Transformative Research Award; National Cancer Institute*#$; National Institute of Allergy and Infectious Diseases$)

10:30 a.m. **Chenghua Gu**, Harvard Medical School

Molecular Mechanisms Governing the Function of the Blood-Brain Barrier (Pioneer Award; National Cancer Institute$; National Institute of Neurological Disorders and Stroke*#$)

10:50 a.m. **Sarah Cobey**, The University of Chicago

Natural and Artificial Selection on Influenza Viruses (New Innovator Award; National Institute of Allergy and Infectious Diseases*#)

11:10 a.m. **Andrew Goodwin**, University of Colorado

In Search of *In Vivo* Biopsy: Studies in Stimulus-Responsive Colloids for Biosensing (New Innovator Award; National Institute of Biomedical Imaging and Bioengineering*#)

11:30 a.m. **Sanjay Jain**, Johns Hopkins University

Bugs, Drugs, and the Local Milieu: Using Molecular Imaging to Gain New Insights (Transformative Research Award; National Institute of Biomedical Imaging and Bioengineering*#$)

11:50 a.m. Closing Remarks

12:00–5:00 p.m. Informal opportunities for awardee networking

NIH Institutes are designated by program responsibilities (*), grants management responsibilities (#), and/or award co-funding ($) [excludes the Office of the Director].

Poster Sessions

Wisconsin Room

Poster Number 1
Usama Bilal
Drexel University
Urban Scaling of Mortality in U.S. Cities

Poster Number 2
Marie-Abele Bind
Harvard University
Bridging Observational Studies and Randomized Experiments by Embedding the Former in the Latter

Poster Number 3
Alia Crum
Stanford University
Mind Over Genome? Learning One's Genetic Risk Changes Physiology Independent of Actual Genetic Risk

Poster Number 4
Melissa Gymrek
University of California, San Diego
Multi-Tissue Analysis Reveals Short Tandem Repeats as Ubiquitous Regulators of Gene Expression and Complex Traits

Poster Number 5
Sergey Ovchinnikov
Harvard University
Towards a Unified Model of Protein Evolution

Poster Number 6
Manish Saggar
Stanford University
Using Brain Dynamics as a Lens to Anchor Psychiatric Nosology into Biological Features

Poster Number 7
Steven Benner
Foundation for Applied Molecular Evolution
Transforming Life Sciences: Artificial Life

Poster Number 8
Michael Erb
The Scripps Research Institute
Transcriptional Control of Leukemia Growth by ENL YEATS Inhibition

Poster Number 9
Raymond Moellering
The University of Chicago
Taming Undruggable Targets with Novel Synthetic Biologics

Poster Number 10
Nicholas Stephanopoulos
Arizona State University
Chemical Synthesis of Full-Length Proteins Using Sequential DNA-Templated Reactions

Poster Number 11
Shawn Demehri
Massachusetts General Hospital
Immunotherapy Directed Against Skin Cancer Precursors Prevents Skin Cancer

Poster Number 12
Sergei Doulatov
University of Washington
Hematopoietic Stem Cell Ontogeny and Clonal Evolution

Poster Number 13
Rajan Jain
University of Pennsylvania
An LMNA Variant Causes Tissue-Specific Changes in Spatial Genome Organization and Cardiomyocyte Lineage Instability

Poster Number 14
Michelle Janelsins
University of Rochester
Clinical and Translational Approaches to Cognitive Impairments in Breast Cancer

Poster Number 15
Adam Sonabend
Northwestern University
MAPK Pathway Activation Is Correlated with Glioblastoma Recognition by CD8+ T-Cells: Evidence of Immunoediting and Implications for Anti-PD-1 Immunotherapy

Poster Number 16
Nicola Mason and Aimee Payne
University of Pennsylvania
A Comparative Approach to De-Risking Next-Generation Cellular Immunotherapies for Cancer and Autoimmunity

Poster Number 17
Aimee Payne and Nicola Mason
University of Pennsylvania
Translating Cellular Immunotherapies for Autoimmunity to Canine Clinical Trials

Poster Number 18
Carlos Vargas-Irwin
Brown University
Synergistic Effector/Environment Encoding: A New Perspective on Motor Cortex and Brain-Computer Interfaces

Poster Number 19
Lijie Grace Zhang
The George Washington University
3D Bioprinting Complex Vascularized Tissues

Poster Number 20
Paul Blainey
The Broad Institute of MIT and Harvard
Live Cell Transcriptomics

Poster Number 21
Luke Gilbert
University of California, San Francisco
Mapping the Genetic Landscape of Human Cells

Poster Number 22
Greg Delgoffe
University of Pittsburgh
Metabolic Symbiosis Between Tumor Cells and Regulatory T Cells Promotes Immunosuppression in Cancer

Poster Number 23
Tijana Ivanovic
Brandeis University
Particle Size Variation Is a Viral Adaptation Strategy Against Changing Evolutionary Pressure

Poster Number 24
Kevin King
University of California, San Diego
Emergency Hematopoiesis and the Sterile Tissue Injury Response

Poster Number 25
Lingyin Li
Stanford University
2'3'-cGAMP Is an Immunotransmitter Produced by Cancer Cells and Regulated by ENPP1

Poster Number 26
Steven Schiff
The Pennsylvania State University
Predictive Personalized Public Health (P3H): A Novel Paradigm to Treat Infectious Disease

Poster Number 27
Mark Sellmyer
University of Pennsylvania
Imaging in the Time of Precision Medicine

Poster Number 28
Amy Wesolowski
Johns Hopkins University
Quantifying the Connectivity of Malaria Parasites Using Human Mobility and Parasite Genetic Data

Poster Number 29
Anne Andrews
University of California, Los Angeles
Aptamer-Field-Effect Transistor Neuroprobes: Towards Multimodal Sensing

Poster Number 30
Eun Ji Chung
University of Southern California
A Nanomedicine Approach to Polycystic Kidney Disease

Poster Number 31
Angela Pannier
University of Nebraska–Lincoln
High-Throughput Screening of Clinically Approved Drugs That Prime Transfection in Human Mesenchymal Stem Cells

Poster Number 32
Xiaojing Zhang
Dartmouth College
Implantable Cardiac Energy Harvesting Devices Using Geometrically Structured Piezoelectric Thin Films

Poster Number 34
Mona Batish
University of Delaware
EWSFLI1 Mediated Alternative Splicing of ARID1A in Ewing's Sarcoma

Poster Number 35
Alistair Boettiger
Stanford University
Tracing 3D DNA Paths and Visualizing Transcription in Single Cells

Poster Number 36
Hu Cang
Salk Institute of Biological Studies
Expansion Microscopy Reveals a Fibrous Scaffold of Human Chromosomes

Poster Number 37
Jessica Feldman
Stanford University
Patterning the Microtubule Cytoskeleton During Development

Poster Number 38
Kendra Frederick
The University of Texas Southwestern Medical Center
Structural Biology in Cellular Environments Using Sensitivity Enhanced NMR

Poster Number 39
Ethan Garner
Harvard University
Dissecting the Mechanisms Underlying Bacterial Shape: How Two Different Cytoskeletal Polymers Create Rod-Shaped Cells and Divide Them in Two

Poster Number 40
Charles Gawad
St. Jude Children's Research Hospital
Accurate Genomic Variant Detection in Single Cells with Primary Template-Directed Amplification

Poster Number 41
Sue Hammoud
University of Michigan Ann Arbor
Sperm Chromatin and Role in Development

Poster Number 42
Scott Hansen
The Scripps Research Institute
Apolipoprotein E (ApoE) Tightly Regulates the Ratio of α- and β-Secretase Through Disruption of Lipid Rafts

Poster Number 43
William Israelsen
The University of Texas Southwestern Medical Center
Hibernation in a Dish: Cell-Autonomous Response of Mammalian Cells to Low Temperatures

Poster Number 44
Prashant Mishra
The University of Texas Southwestern Medical Center
Regulation of Stem Cell Health Drives Muscular Atrophy During Aging

Poster Number 45
Reyna Gordon
Vanderbilt University Medical Center
Can You Clap to the Beat? Findings from the First Genome-Wide Association Study of a Musical Rhythm Trait in 606,825 Individuals

Poster Number 46
SaraH Zanders
Stowers Institute for Medical Research
The wtf4 Meiotic Driver Utilizes Programmed Protein Aggregation to Enact Targeted Gamete Killing

Poster Number 47
Amy Palmer
University of Colorado Boulder
Regulation of Cell Signaling by Zinc Dynamics

Poster Number 48
Medha Pathak
University of California, Irvine
Localized Piezo1 Ca2+ Flickers Are Evoked by Myosin-II Mediated Traction Forces

Poster Number 49
Jessica Blackburn
University of Kentucky
The Role of a Novel Microvascular Network in Cancer Progression and Relapse

Cordell Room

Poster Number 50
Nikolai Slavov
Northeastern University
Mass-Spectrometry of Single Mammalian Cells Quantifies Proteome Heterogeneity During Cell Differentiation

Poster Number 51
Junjie Guo
Yale School of Medicine
ALS/FTD-Associated Toxic Peptides Inhibit UPF1-Mediated RNA Decay

Poster Number 52
Denis Titov
University of California, Berkeley
Genetically Encoded Tools for Manipulation of Bioenergetics

Poster Number 53
Elizabeth Villa
University of California, San Diego
Opening Windows into Parkinson's Disease: Revealing the *In Situ* Structure of a Pathogenic Mutant of LRRK2

Poster Number 54
Ke Xu
University of California, Berkeley
Super-Resolution Displacement Mapping of Unbound Single Molecules Reveals Nanoscale Heterogeneities in Intracellular Diffusivity

Poster Number 55
Naoki Yamanaka
University of California, Riverside
A Membrane Transporter Is Required for Steroid Hormone Uptake in *Drosophila*

Poster Number 56
Chen Yang
University of Colorado Boulder
Real-Time Visualization of the Inception of Drug Tolerance in Single Melanoma Cells

Poster Number 57
Huanghe Yang
Duke University
"Eat Me" or "Fuse Me": A Story of a Lipid Scramblase in Trophoblast Fusion and Beyond

Poster Number 58
Yongxin Zhao
Carnegie Mellon University
New Expansion Microscopy Tools Towards Whole-Organism Nanoscale Imaging and Highly Multiplex Nanoscopy

Poster Number 59
Hsiao-Tuan Chao
Baylor College of Medicine
Elucidating the Pathogenic Role of EBF3 Loss-of-Function in Neurodevelopmental Disorders

Poster Number 60
Daniel Colon-Ramos
Yale University
Building a Brain: Systematic Examination of the Logic of Brain Connectivity in *C. elegans*

Poster Number 61
Megan Dennis
University of California, Davis
The Role of Duplicated Genes in Human Brain Evolution and Disease

Poster Number 62
Matthew Kayser
University of Pennsylvania
Building Brains in Our Sleep: Evidence from Fruit Flies

Poster Number 63
Melanie Samuel
Baylor College of Medicine
Synaptic Reprogramming of Developing and Adult Neurons

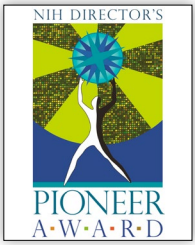
Poster Number 64
Greg Schwartz
Northwestern University
A New Target to Stop the Global Epidemic of Myopia

Poster Number 65
Stephen Smith and Randal Burns
Allen Institute for Brain Science and Johns Hopkins University
Synaptomes of Mouse and Man

Poster Number 66
Kevin Yackle
University of California, San Francisco
Identification of a Putative Vocalization Command Center

Poster Number 67
Jesse Goldberg
Cornell University
Cortical Contribution to Lingual Kinematics as the Tongue Reaches for, and Misses, Targets

2019 Awardees



NIH Director's Pioneer Awardees

Janelle S. Ayres, Ph.D.
Salk Institute for Biological Studies
Host-Microbe Interactions: Harnessing Co-Evolution to Treat Disease

Daniel A. Colón-Ramos, Ph.D.
Yale University School of Medicine
Powering the Brain: The Cell Biology of Neuroenergetics

Christina Curtis, Ph.D., M.Sc.
Stanford University School of Medicine
Forecasting Tumor Evolution: Can the Past Reveal the Future?

Viviana Gradinaru, Ph.D.
California Institute of Technology
Circuit-Specific Delivery of Large Cargo Across the Nervous Systems of Adult Mammals and Embryos via Novel Engineered Systemic Vectors

Jonathan (Jony) Kipnis, Ph.D.
University of Virginia, School of Medicine
Neural Code of the Immune Responses

Hyungbae Kwon, Ph.D.
Max Planck Florida Institute for Neuroscience
Cracking the Neuromodulation Code at Single Cell Resolution

Michelle Monje, M.D., Ph.D.
Stanford University
Glioma Circuitry: Bridging Systems Neuroscience and Cancer

Gabriel D. Victora, Ph.D.
Rockefeller University
Quantifying Cell-Cell Interactions in the Immune System by Trans-Synaptic Labeling

Amy J. Wagers, Ph.D.
Harvard University, Harvard Medical School, and Joslin Diabetes Center
Uncovering Molecular Effectors of Mammalian Aging

Peng Yin, Ph.D.
Harvard University
High-Throughput Single-Molecule Protein Identification via Super-Resolution Imaging

NIH Director's New Innovator Awardees

Alistair N. Boettiger, Ph.D.
Stanford University
High-Resolution Imaging of Genome Structure and Gene Regulation in Development

Gemma L. Carvill, Ph.D.
Northwestern University Feinberg School of Medicine
Cell-Free DNA Sequencing Approaches to Define the Genetic Etiology of Unexplained Epilepsy

Jerry L. Chen, Ph.D.
Boston University
Cracking Genetically Defined Neocortical Circuits Across Learning and Behavior

Sidi Chen, Ph.D.
Yale University
High-Throughput *In Vivo* Genetics for Immunotherapy Target Discovery

Nicolas Chevrier, Ph.D.
The University of Chicago
Building a Predictive Framework for Adjuvant Combinatorics in Vaccine Development

Eun Ji Chung, Ph.D.
University of Southern California
A Revolutionary Approach for Polycystic Kidney Disease: Oral Nanotherapeutics

Megan Y. Dennis, Ph.D.
University of California, Davis School of Medicine
The Function of Duplicated Genes in Human Brain Evolution and Disease

Zoe R. Donaldson, Ph.D.
University of Colorado Boulder
Neuronal Basis of Social Motivation and the Failure to Adapt to Loss

Sergei Doulatov, Ph.D.
University of Washington
Uncovering Epigenetic Barriers to Hematopoietic Stem Cell Formation

Rachel Dutton, Ph.D.
University of California, San Diego
Molecular Mechanisms That Shape Microbial Communities

Katherine B. Ehrlich, Ph.D.
The University of Georgia
Innovative Approaches to the Study of Social Determinants of Health in Children

Evan H. Feinberg, Ph.D.
University of California, San Francisco
High-Resolution Neural Circuit Dissection with Controllers Locally Affecting Synaptic Partners (CLASP)

Stephen N. Floor, Ph.D.
University of California, San Francisco, and Helen Diller Family Comprehensive Cancer Center
The Impact of Human RNA Diversity on Protein Production and Cell Fate

Kendra K. Frederick, Ph.D.
The University of Texas Southwestern Medical Center
High Sensitivity NMR for Structure Determination of Neurodegenerative Disease Associated Protein Aggregates in Native Contexts

Daniel Gallego-Perez, Ph.D.
The Ohio State University
Novel Nanoscale Approaches to Whole-Tissue Reprogramming

Charles Gawad, M.D., Ph.D.
St. Jude Children's Research Hospital
Creating a Catalog of Cancer Clonotype Drug Sensitivities with Single-Cell Genome Sequencing

Luke Gilbert, Ph.D.
University of California, San Francisco
A Genetic Interaction Map of the Human Nucleus

Yiyang Gong, Ph.D.
Duke University
Voltage Imaging Dissection of the Mammalian Cortex

Reyna L. Gordon, Ph.D.
Vanderbilt University Medical Center, Vanderbilt University
Biomarkers of Rhythmic Communication: Integrating Foundational and Translational Approaches

Junjie Guo, Ph.D.
Yale University School of Medicine
Molecular and Cellular Determinants of RNA Repeat-Associated Properties

Rizal F. Hariadi, Ph.D.
Arizona State University
Nanoscale Reconstruction of Mechanical Systems Involved in Disease Pathogenesis

Jun Huang, Ph.D.
The University of Chicago
Molecular Mechanism of Natural Killer Cell Recognition

Rajan Jain, M.D.
Perelman School of Medicine, University of Pennsylvania
Deciphering Nuclear Lamina-Chromatin Organization in Cellular Competence and Cardiac Development

Matthew S. Kayser, M.D., Ph.D.
Perelman School of Medicine, University of Pennsylvania
Building Brains in Our Sleep: A *Drosophila* Larval Platform for Examining Sleep and Neurogenesis

Justin Kim, Ph.D.
Dana–Farber Cancer Institute and Harvard Medical School
Post-Translational Modification of Protein Surfaces

Kevin R. King, M.D., Ph.D.
University of California, San Diego
Elucidating Cell Communication Networks During Tissue Inflammation, Fibrosis, and Regeneration

Ester J. Kwon, Ph.D.
University of California, San Diego
Nanoscale Biomaterials for Targeted Repair in Traumatic Brain Injury

Dan A. Landau, M.D., Ph.D.
Weill Cornell Medicine and New York Genome Center
Shapeshifters in Cancer: Defining the Fundamental Forces of Leukemia Evolution

Shixin Liu, Ph.D.
The Rockefeller University
Probing Symmetry Breaking in Epigenetic Inheritance: From Single Molecules to Systems Biology

Po-Ru Loh, Ph.D.
Brigham and Women's Hospital, Harvard Medical School, and the Broad Institute of MIT and Harvard
Revealing Somatic Genome Alterations and Their Clinical Sequelae: Ultrasensitive Computational Detection of Mosaic Structural Variants

Carolyn (Lindy) McBride, Ph.D.
Princeton University
Mapping the Combinatorial Olfactory Inputs That Drive Mosquito Host Attraction

Prashant Mishra, M.D., Ph.D.
Children's Medical Center Research Institute at The University of Texas Southwestern Medical Center
Engineering Faithful Animal Models of Mitochondrial Disease

Michael J. Mitchell, Ph.D.
University of Pennsylvania
A Data-Driven Drug Delivery (4D) Platform for Probing and Treating the Chemoresistant Bone Marrow Microenvironment

Darcie L. Moore, Ph.D.
University of Wisconsin–Madison
The Mechanisms and Functional Role of the Asymmetric Segregation of Cellular Cargoes in Stem Cells

Medha M. Pathak, Ph.D.
University of California, Irvine
Building the Brain: How Mechanical Forces Shape Human Neural Development

Srivatsan Raman, Ph.D.
University of Wisconsin–Madison
Understanding Molecular Rules Governing Protein Allostery by Deep Mutational Scanning

Jeremy Rock, Ph.D.
Rockefeller University
Towards a Molecular Understanding of Persistent Tuberculosis Infection

Kole T. Roybal, Ph.D.
University of California, San Francisco
Engineering the Next Generation of Custom Immune Cell Therapies

Warren Ruder, Ph.D.
University of Pittsburgh
Creating Magnetically Inducible Synthetic Gene Networks for Cell and Tissue Therapies

Nasia Safdar, M.D., Ph.D.
University of Wisconsin and William S. Middleton Memorial Veterans Hospital
Modeling Applications and Systems Engineering to Reduce Infections—The MASTERI Study

Manish Saggar, Ph.D.
Stanford University
Only Time Will Tell: A Computational Psychiatry Approach to Model Temporal Transitions in Brain Activity as a Lens Towards Developing Better Diagnostic Nosology for Psychiatric Illness

Tiffany C. Scharschmidt, M.D.
University of California, San Francisco
Decoding and Harnessing Microbial Tuning of T Cell Responses in Early Life

Mark Sheffield, Ph.D., M.Sc.
The University of Chicago
Sub-Cellular Resolution Functional Imaging and Optogenetic Manipulation of Identified Memory Circuits During Behavior

Ellen M. Sletten, Ph.D.
University of California, Los Angeles
Bioorthogonal Host-Guest Chemistry for Tandem Imaging and Therapy

Sabrina Leigh Spencer, Ph.D.
University of Colorado Boulder
Proliferation-Quiescence Control in Single Cells: Integration of Mitogen, Nutrient, and Stress Signaling

Nicholas Stephanopoulos, Ph.D.
Arizona State University
Chemical Synthesis of G Protein–Coupled Receptors Using Sequential DNA-Templated

Michael R. Tadross, M.D., Ph.D.
Duke University
Interrogating Dynamics of Whole-Brain Volumes with Cell Type–Specific Pharmacology

Denis Titov, Ph.D.
University of California, Berkeley
Genetically Encoded Tools for Manipulation of Metabolism *In Vivo*

Raju Tomer, Ph.D.
Columbia University
A Comparative Approach for Decomposing the Mammalian Brain Architectural Complexity

Carlos Ernesto Vargas-Irwin, Ph.D.
Brown University
Synergistic Effector/Environment Encoding: A New Perspective on Motor Cortex and Brain-Computer Interfaces

Shigeki Watanabe, Ph.D.
Johns Hopkins University School of Medicine
Reviving Electron Microscopy for Synaptic Cell Biology

Amy Wesolowski, Ph.D.
Johns Hopkins Bloomberg School of Public Health
Disease Emergence and Elimination: Using Mobility Data to Inform Spatial Disease Dynamics

Kathryn A. Whitehead, Ph.D.
Carnegie Mellon University
Fate, Function, and Genetic Engineering of Breast Milk Cells for Infant Therapy

Erik S. Wright, Ph.D.
University of Pittsburgh
Uncovering Synergistic Antibiotic Cocktails with Comparative Genomics

Ke Xu, Ph.D.
University of California, Berkeley, and Chan-Zuckerberg Biohub
Intracellular Phase Separation at the Nanoscale: A Functional Super-Resolution Approach

Naoki Yamanaka, Ph.D.
University of California, Riverside
Membrane Steroid Hormone Transporters in Development and Reproduction

SaraH E. Zanders, Ph.D.
The Stowers Institute for Medical Research, University of Kansas Medical Center
Models of Selfishness: Molecular and Evolutionary Analyses of the Wtf Meiotic Drivers

Yongxin (Leon) Zhao, Ph.D.
Carnegie Mellon University
Highly Multiplexed Nanoscale Imaging Platforms for Profiling and Interrogation of Complex Diseases

NIH Director's Transformative Research Awardees

Dinu F. Albeanu, Ph.D.
Cold Spring Harbor Laboratory
A High-Throughput Sequencing and Imaging Approach to Understand the Functional Basis of Olfaction

Zhirong Bao, Ph.D.
Sloan Kettering Institute
An Integrative Cellular Blueprint of Vertebrate Tissue Development

Anne Brunet, Ph.D.
Stanford University
Brain-Wide Screen for a Neural Pacemaker of Aging

Steven A. Carr, Ph.D.
Broad Institute of MIT and Harvard
Mapping Protein Communication Between Organs in Homeostasis and Disease

Karl Deisseroth, M.D., Ph.D.
Stanford University and Howard Hughes Medical Institute
Brain-Wide Screen for a Neural Pacemaker of Aging

Jan Huisken, Ph.D.
Morgridge Institute for Research and University of Wisconsin–Madison
An Integrative Cellular Blueprint of Vertebrate Tissue Development

Thomas Kodadek, Ph.D.
The Scripps Research Institute
Phenotypic Screening Using DNA-Encoded Libraries

Roger D. Kornberg, Ph.D.
Stanford University
Three-Dimensional Structure of Eukaryote Chromosomes

Alexei Koulakov, Ph.D.
Cold Spring Harbor Laboratory
A High-Throughput Sequencing and Imaging Approach to Understand the Functional Basis of Olfaction

Richard T. Lee, M.D.
Harvard University
Novel Age-Dependent DNA Modifications

Nicola Mason, Ph.D., B.Vet.Med.
University of Pennsylvania School of Veterinary Medicine
Translating Cellular Immunotherapies for Autoimmunity to Canine Clinical Trials

Andrew P. McMahon, Ph.D.
University of Southern California
Mapping Protein Communication Between Organs in Homeostasis and Disease

Aimee S. Payne, M.D., Ph.D.
University of Pennsylvania
Translating Cellular Immunotherapies for Autoimmunity to Canine Clinical Trials

Norbert Perrimon, Ph.D.
Harvard Medical School and Howard Hughes Medical Institute
Mapping Protein Communication Between Organs in Homeostasis and Disease

Steven J. Schiff, M.D., Ph.D.
The Pennsylvania State University
Predictive Personalized Public Health (P3H): A Novel Paradigm to Treat Infectious Disease

Peter L. Strick, Ph.D.
University of Pittsburgh
The Neural Basis of the Brain-Body Connection

Alice Ting, Ph.D.
Stanford University
Mapping Protein Communication Between Organs in Homeostasis and Disease

David Traver, Ph.D.
University of California, San Diego
An Integrative Cellular Blueprint of Vertebrate Tissue Development

NIH Director's Early Independence Awardees

Samuel F. Bakhoum, M.D., Ph.D.
Memorial Sloan Kettering Cancer Center
The Role of Chromosomal Instability in Tumor Evolution

Usama Bilal, M.D., Ph.D., M.P.H.
Drexel Dornsife School of Public Health
The Health Consequences of Urban Scaling

Hsiao-Tuan Chao, M.D., Ph.D.
Baylor College of Medicine, Jan and Dan Duncan Neurological Research Institute, and Texas Children's Hospital
Illuminating GABAergic Signaling in Neurodevelopmental Disorders

Carl DeSelm, M.D., Ph.D.
Washington University in St. Louis
Immune Activating CAR-Modified Antigen Presenting Cells

Michael A. Erb, Ph.D.
The Scripps Research Institute
Targeting Crotonyl-Lysine Chromatin Readers to Disrupt Pathogenic Gene Expression in Leukemia

Alison Gould, Ph.D.
California Academy of Sciences
Investigating Mechanisms of Specificity in a Bioluminescent Vertebrate-Bacteria Symbiosis

Jasper Heinsbroek, Ph.D.
University of Colorado Denver Anschutz Medical School
Dissecting Ventral Pallidal Subcircuit Contributions to Drug Seeking in Addiction

Isha H. Jain, Ph.D.
University of California, San Francisco
Redesigning a Neuron's Breath: A Modern Twist to Classical Oxygen Biology

Kristin Knouse, M.D., Ph.D.
Whitehead Institute for Biomedical Research
Dissecting and Engineering Reversible Cell Cycle States

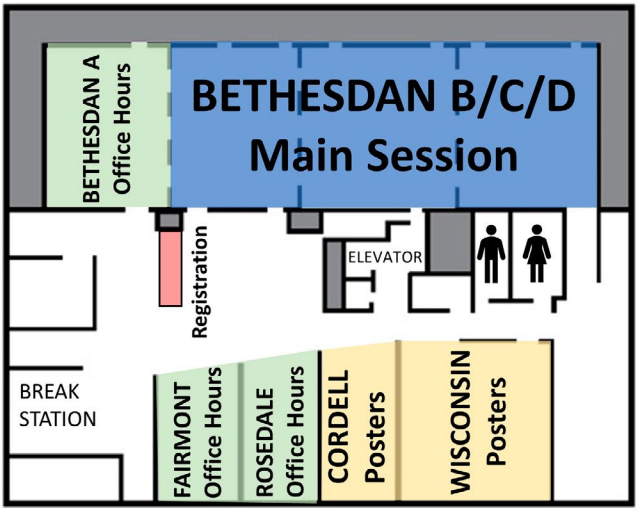
Sergey Ovchinnikov, Ph.D.
Harvard University
Exploring the Unknown Protein Universe Using Evolutionary Information

Mark A. Sellmyer, M.D., Ph.D.
University of Pennsylvania
Next-Generation Tools for Imaging Bacterial Infection and Its Relationship to the Immune System

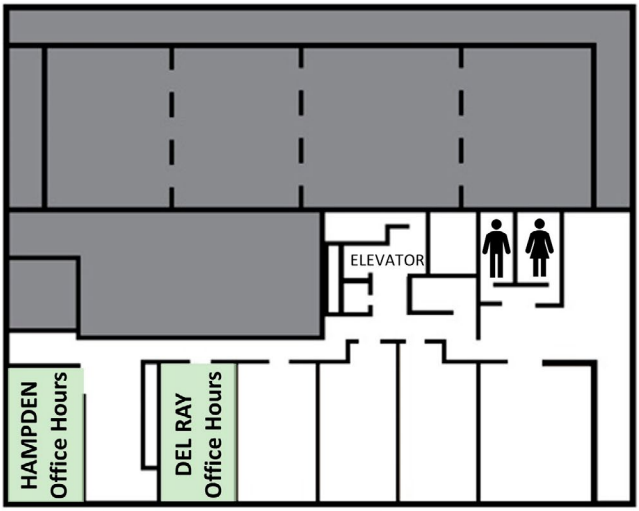
Anna Wexler, Ph.D.
University of Pennsylvania
Do-It-Yourself and Direct-to-Consumer Medicine and Science: Assessing the Public Health Issues and Regulatory Gaps

DoubleTree Map

2nd Floor



3rd Floor



Social networking event & happy hour will be held at hotel rooftop bar

Notes

Please scan this QR Code to visit the 2019 High-Risk High-Reward Research Symposium website.

https://commonfund.nih.gov/symposium

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