# Chemical Machinery of the Cell

## scialog 2021®

The Third Scialog Conference
October 7–8, 2021

GORDON AND BETTY MOORE FOUNDATION

RESEARCH CORPORATION *for* SCIENCE ADVANCEMENT

## Objectives

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

Identify and analyze bottlenecks to advancing understanding of the chemical machinery of the cell and develop approaches for breakthroughs.

Build a creative, better-networked 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 even constructively criticize each other's ideas—in a spirit of cooperativegive and take.

Make comments concise to avoid monopolizing the dialogue.

## Diversity, Inclusion and No Harassment

Research Corporation for Science Advancement fosters an environment for listening and considering new ideas from a diverse group, with respect for all participants without regard to gender, race, ethnicity, sexual orientation, age or any other aspect of how we identify ourselves other than 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.

## From the President

Welcome to the 2021 *Scialog: Chemical Machinery of the Cell* meeting, cosponsored by Research Corporation and Gordon and Betty Moore Foundation. This is the third of three full-length Scialog meetings on this theme.

The goal of this Scialog is to catalyze theorists, computational and data scientists, and experimentalists across multiple disciplines to collaborate on developing new and innovative projects to accelerate fundamental science to drive advances in understanding the myriad reactions that are happening simultaneously in close proximity in the extremely dense and complex cellular environment.

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**, and **Silvia Ronco** (Research Corporation) and **Gary Greenburg** (Gordon and Betty Moore 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 two days to be extremely worthwhile.

This is your opportunity to air that wild idea you have been reluctant to share with others, 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 world.

We hope this third full 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
Research Corporation for Science Advancement

## From the Program Director

This year Research Corporation and Gordon and Betty Moore Foundation are cosponsoring the final meeting of *Scialog: Chemical Machinery of the Cell*. 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. The emphasis is on dialogue, networking, and building new collaborations to pursue novel, high-risk discovery research.

We have an outstanding keynote speaker to set the stage for breakout discussions:
**Rigoberto Hernandez**, Johns Hopkins University

We have a team of terrific discussion facilitators: **Rommie Amaro** (University of California, San Diego), **Holly Goodson** (University of Notre Dame), **Martin Gruebele** (University of Illinois at Urbana-Champaign), **Rigoberto Hernandez** (Johns Hopkins University), **Neil Kelleher** (Northwestern University), **Gang-yu Liu** (University of California, Davis), **Andreas Matouschek** (University of Texas at Austin), **Erika Matunis** (Johns Hopkins University), **Cathy Murphy** (University of Illinois at Urbana-Champaign), and **Paul Selvin** (University of Illinois at Urbana-Champaign).

Program representatives from our cosponsor **Gary Greenburg** (Gordon and Betty Moore Foundation), along with **Daren Ginete** (Science Philanthropy Alliance), **Jim Mitchell** (The Shurl and Kay Curci Foundation), **Sandra J. Laney** (Walder Foundation), and **Sandra Schmid** (Chan Zuckerberg Biohub) 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 discussions. 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 toward a deeper understanding of chemical machinery and reactions in the intact cell. We believe these breakthroughs can be accelerated by chemists, biologists, engineers, and physicists working collaboratively on novel, high-risk projects, particularly when theorists and experimentalists are combining efforts.

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 Senior Program Directors, **Andrew Feig** and **Silvia Ronco**, 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

## Conference Agenda (Optional activities in green)
## October 7–8, 2021

### Thursday, October 7 *(all times listed in Pacific time zone)*

| | | |
|---|---|---|
| 8:00 – 8:30 am | **Early login, Informal dialog, BYO breakfast/lunch** | Zoom Main Room & Breakout Rooms |
| 8:30 – 8:40 am | **Welcome**<br>Richard Wiener, *RCSA*<br>Gary Greenburg, *Moore Foundation* | Zoom Main Room |
| 8:40 – 8:55 am | **Conference Overview & Desired Outcomes**<br>Richard Wiener, *RCSA* | Zoom Main Room |
| 8:55 – 9:30 am | **Small Group Ice Breakers** | Zoom Breakout Rooms |
| 9:30 – 10:05 am | **Keynote Presentation & Discussion**<br>*Middle Scales of the Cell*<br>Rigoberto Hernandez, *Johns Hopkins University* | Zoom Main Room |
| 10:05 – 10:20 am | **Break** | |
| 10:20 – 10:30 am | **Directions for Breakout Sessions** | Zoom Main Room |
| 10:30 – 11:45 am | **Breakout Session I** | Zoom Breakout Rooms |
| 11:45 am – 12:15 pm | **Report Out** | Zoom Main Room |
| 12:15 – 12:30 | **Directions for Mini Breakout Sessions** | Zoom Main Room |
| 12:30 – 1:30 pm | **Lunch** | Zoom Main Room |
| 1:30 – 2:15 pm | **Mini Breakout Session I (Fellows only)** | Gather Rooms |
| 2:15 – 2:30 pm | **Break** | |
| 2:30 – 3:15 pm | **Mini Breakout Session II (Fellows only)** | Gather Rooms |
| 3:15 – 5:00 pm | **Break** | |
| 5:00 – 7:00 pm | **Social Mixer** | Gather Rooms |

### Friday, October 8 *(all times listed in Pacific time zone)*

| | | |
|---|---|---|
| 8:00 – 8:30 am | **Early login, Informal dialog, BYO breakfast/lunch** | Zoom Main Room |
| 8:30 – 8:40 am | **Check in regarding Thursday Sessions** | Zoom Main Room |
| 8:40 – 9:00 am | **Proposal Writing and Team Formation** | Zoom Main Room |
| 9:00 – 10:15 am | **Breakout Session II** | Zoom Breakout Rooms |
| 10:15– 10:45 am | **Report Out** | Zoom Main Room |
| 10:45 – 11:00 am | **Break** | |
| 11:00 am – 12:15 pm | **Breakout Session III** | Zoom Breakout Rooms |
| 12:15 – 12:45 pm | **Report Out** | Zoom Main Room |
| 12:45 – 1:00 pm | **Wrap-up** | Zoom Main Room |
| 1:00 – 2:00 pm | **Lunch** | Zoom Main Room |
| 2:00 – 2:45 pm | **Mini Breakout Session III (Fellows only)** | Gather Rooms |
| 2:45 – 3:00 pm | **Break** | |
| 3:00 – 3:45 pm | **Mini Breakout Session IV (Fellows only)** | Gather Rooms |
| 3:45 – 5:00 pm | **Break** | |
| 5:00 – 7:00 pm | **Social Mixer** | Gather Rooms |

**Keynote Presentation**

# Middle Scales of the Cell

**Rigoberto Hernandez**
*The Gompf Family Professor at the Johns Hopkins University and Director of the Open Chemistry Collaborative in Diversity Equity (OXIDE)*

**Abstract:** We know the governing equations for atoms, though we can't necessarily keep track of every atom or describe how they assemble into molecules, aggregate, and form even larger structures of a cell. While Feynman recognized that there was a lot of room—that is combinatoric complexity—at the atomic scale, we see that the combinatorics increase quickly at the middle scales where a myriad of heterostructures (of submicron size) have been assembled and aggregated within a cell. Within Scialog CMC we have tackled questions that interrogate these structures and elucidate their function. We have also addressed other unknown knowns to discern how molecular identity (and control) can lead to larger scale changes in cellular functions. We will suggest that there remain many unknown unknowns in understanding the molecular machinery of the cell. Where to look? First, we can recognize that all of the machinery is presumably operating under nonequilibrium conditions. What are the multiscale mechanics describing the dynamics and evolution of these chemical machines? Is this an emergent function or are there regulators—or governors—directing processes at some or all of these scales? We thus propose that the search for the unknown unknowns in describing and controlling the chemical machinery of the cell must start at the middle scales.

## 2021 Proposal Guidelines and Collaborative Awards

**Scialog: Chemical Machinery of the Cell**

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. Two-page proposals should describe the project and the role of each team member. No budget is necessary. A third page may be used for references.
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 CMC 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. 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..
7. Teams are encouraged (but not required) to:
   a. Include members with different research approaches and methods.
   b. Include members from different disciplines.
8. Proposals must be submitted electronically by 11:59 p.m. PDT on **October 15, 2021**. Instructions for submission will be provided at the meeting.
9. Awards are anticipated to start on **January 1, 2022.**

## 2018 Collaborative Awards

***A Plant-Based Cell Platform to Target Human Proteostasis Diseases***
**Kathryn Haas**, Chemistry, St. Mary's College
**Alice Soragni**, Biochemistry, University of California, Los Angeles
**Jing-Ke Weng**, Biology, Massachusetts Institute of Technology

***Breaking the Central Dogma: Reverse Translation of the Proteome***
**Christian Kaiser**, Biology, Johns Hopkins University
**David Limmer**, Chemistry, University of California, Berkeley
**Rebecca Voorhees**, Biology, California Institute of Technology

***Finding Mitochondrial Memory***
**Abhishek Chatterjee**, Chemistry, Boston College
**Gulcin Pekkurnaz**, Neurobiology, University of California, San Diego
**Juan Perilla**, Chemistry, University of Delaware

***Identifying and Detecting Diseases prior to Physical Presentation of Symptoms***
**Laura Sanchez**, Pharmaceutical Sciences, University of California, Santa Cruz
**Judith Su**, Optical Sciences and Biomedical Engineering, University of Arizona

***Optical Mind Reading***
**Markita del Carpio Landry**, Chemical and Biomolecular Engineering, University of California, Berkeley
**Gulcin Pekkurnaz**, Neurobiology, University of California, San Diego
**Jennifer Prescher**, Chemistry, University of California, Irvine

***Synthetic Organelle Biology: Engineering Photosynthetic Animal Cells***
**Markita del Carpio Landry**, Chemical and Biomolecular Engineering, University of California, Berkeley
**Jing-Ke Weng**, Biology, Massachusetts Institute of Technology
**Joshua Widhalm**, Horticulture, Purdue University

***Understanding Biological Systems Using Resonator-Mediated Single-Molecule Raman Detection and Spectroscopy***
**Judith Su**, Optical Sciences and Biomedical Engineering, University of Arizona
**Lu Wei**, Chemistry, California Institute of Technology

***What Does "Self" Look Like?***
**Kamil Godula**, Chemistry, University of California, San Diego
**Jennifer Heemstra**, Chemistry, Emory University
**Abhishek Singharoy**, Molecular Sciences, Arizona State University

## 2019 Collaborative Awards

***Metabolite Pools: Where are They, Who's Using Them, and Can We?***
**Caitlin Davis**, Chemistry, Yale University
**Elizabeth Read**, Chemical and Biomolecular Engineering, University of California, Irvine
**Kamil Godula**, Chemistry, University of California, San Diego

***ProFIDs: Probes to Fold the Intrinsically Disordered***
**Alice Soragni**, Orthopaedic Surgery, University of California, Los Angeles
**Matthias Heyden**, School of Molecular Sciences, Arizona State University

***Reconstructing Time-resolved Single-cell Genome Organization***
**Bin Zhang**, Chemistry, Massachusetts Institute of Technology
**Brian Liau,** Chemistry, Harvard University
**G.W. Gant Luxton**, Genetics, Cell Biology, and Development, University of Minnesota

***Seeing the Forces of Life***
**Rongsheng (Ross) Wang**, Chemistry, Temple University
**Abhishek Singharoy**, School of Molecular Sciences, Arizona State University
**Alison Ondrus**, Division of Chemistry and Chemical Engineering, California Institute of Technology

***Small-Molecule Cathodophores for Multicolor Electron Microscopy***
**Maxim Prigozhin**, Molecular and Cellular Biology, and Applied Physics, Harvard University
**Xin Zhang**, Chemistry, and Biochemistry and Molecular Biology, Pennsylvania State University
**Jefferson Chan**, Chemistry, University of Illinois at Urbana-Champaign

***Understanding the Dark Side of the Genome***
**Ronit Freeman**, Applied Physical Sciences, University of North Carolina at Chapel Hill
**Alexis Komor**, Chemistry and Biochemistry, University of California, San Diego
**Davide Donadio**, Chemistry, University of California, Davis

## Scialog Fellows

**Keri Backus** kbackus@mednet.ucla.edu
University of California, Los Angeles,
Biological Chemistry
*Chemoproteomic approaches to study the functional and druggable protein interactome.*

**Julien Berro** julien.berro@yale.edu
Yale University, Molecular Biophysics and Biochemistry
*Understanding how mechanics and chemistry crosstalk in cells, with a focus on actin and endocytosis.*

**Lulu Cambronne** lulu@austin.utexas.edu
University of Texas at Austin, Molecular Biosciences
*How does cell metabolism impact health and disease? Developer and user of genetically-encoded fluorescent biosensors to study the subcellular partitioning of metabolites. NAD connoisseur.*

**Seth Childers** wschild@pitt.edu
University of Pittsburgh, Chemistry
*The Childers lab studies the role of phase separation in organizing the bacterial cytoplasm and applies biochemistry, synthetic biology, and chemical biology approaches to bacterial signal transduction.*

**Caitlin Davis** c.davis@yale.edu
Yale University, Chemistry
*How do protein and RNA dynamics control life? We mix spectroscopy and microscopy to quantify biophysics inside cells.*

**Nate DeYonker** ndyonker@memphis.edu
University of Memphis, Chemistry
*My research group develops software that can automate the design and quantum mechanics-based molecular-level protein simulations. The software package improves reproducibility and reduced barriers for entry into the field of quantum chemical modeling of biomolecules.*

**Stefano Di Talia** stefano.ditalia@duke.edu
Duke University, Cell Biology
*I am interested in understanding the mechanisms that guide the spatiotemporal organization of embryos and regenerating tissues with particular emphasis to mechanisms of long-range coordination.*

**Davide Donadio** ddonadio@ucdavis.edu
University of California, Davis, Chemistry
*We use molecular multiscale simulations to study nonequilibrium phenomena in soft matter and the functional properties of nanomaterials.*

**Michelle Farkas** farkas@chem.umass.edu
University of Massachusetts Amherst, Chemistry
*Chemical Biology Approaches to Track and Perturb Circadian Rhythms and Macrophage Phenotypes in Disease-Relevant Models.*

**Ronit Freeman** ronitfree@gmail.com
University of North Carolina at Chapel Hill,
Applied Physical Sciences
*Developing biomimetic materials using self-assembling biological components.*

**Stephen D. Fried** sdfried@jhu.edu
Johns Hopkins University, Chemistry
*We repurpose proteomics technologies to study protein folding globally, sensitively, and in vivo.*

**Kamil Godula** kgodula@ucsd.edu
University of California, San Diego,
Chemistry and Biochemistry
*Biological functions of glycans and chemical approaches to engineer glycan functions in cells.*

**Alexander A. Green** aagreen@bu.edu
Boston University, Biomedical Engineering
*We engineer self-assembling nucleic acids that can sense, report, and respond to molecular cues.*

**Stephanie Gupton (She/Her)** sgupton@unc.edu
University of North Carolina at Chapel Hill,
Cell Biology and Physiology
*Cellular morphogenesis and function, the role of cytoskeletal dynamics and membrane remodeling, and regulation by protein modification.*

**Kathryn L. Haas** kathryn.haas@duke.edu
Duke University, Chemistry
*How do proteins control Cu redox chemistry in extracellular environments?*

## Scialog Fellows Continued

**Matthias Heyden** mheyden1@asu.edu
Arizona State University, Molecular Sciences
*We utilize molecular simulations to study the interactions of proteins with each other and their molecular environments in the crowded intracellular medium of cells and in aqueous solutions.*

**Masha Kamenetska** mkamenet@bu.edu
Boston University, Physics and Chemistry
*Experimental physicist/chemist, probing molecular interactions on the single molecule level.*

**Lydia Kisley** lydia.kisley@case.edu
Case Western Reserve University, Physics, Chemistry
*Super-resolution imaging of biomolecule dynamics within the extracellular matrix & effect on cell response; biomaterials and microscopy.*

**Alexis C. Komor** akomor@ucsd.edu
University of California, San Diego,
Chemistry and Biochemistry
*We develop new genome editing tools and use them to study how point mutations in DNA repair protein genes impact human health.*

**Dmitri Kosenkov** dkosenkov@monmouth.edu
Monmouth University, Chemistry and Physics
*Development and application of computational chemistry and machine learning methods to study dynamics of biological molecules.*

**Markita Landry** landry@berkeley.edu
University of California, Berkeley, Chemical Engineering
*The development of nanomaterials-based tools to image neuromodulators in the brain, and for the delivery of genetic cargoes in plants.*

**Kathy Liu** liufg@pennmedicine.upenn.edu
University of Pennsylvania, Biochemistry and Biophysics

**Tania Lupoli** tjl229@nyu.edu
New York University, Chemistry
*Our laboratory studies the assembly of the multi-protein machines that construct bacterial cell surface glycans with defined sugar patterns that act as molecular barcodes for recognition.*

**GW Gant Luxton** ggluxton@ucdavis.edu
University of California, Davis,
Molecular and Cellular Biology
*The Luxton laboratory is interested in understanding the mechanisms underlying the physical coupling of the nucleus and the cytoskeleton and how they enable fundamental cellular processes, including DNA damage repair, differentiation, and mechanotransduction.*

**Shankar Mukherji** smukherji@physics.wustl.edu
Washington University in St Louis,
Physics and Cell Biology & Physiology
*Systems cell biology: how the eukaryotic cell coordinates systems-wide organelle biogenesis and cellular metabolism to achieve growth and homeostasis.*

**Allie Obermeyer** aco2134@columbia.edu
Columbia University, Chemical Engineering
*We engineer protein interactions and phase separation with other (bio)polymers to help us understand cell biology and for applications in biomedicine and textiles.*

**Alison E. Ondrus** aondrus@caltech.edu
California Institute of Technology, Chemistry
*Decoding information in the structure of human metabolites*

**Gulcin Pekkurnaz** gpekkurnaz@ucsd.edu
University of California, San Diego, Neurobiology
*Metabolic homeostasis mechanisms and mitochondrial functions in neurons.*

**Juan R. Perilla** jperilla@udel.edu
University of Delaware, Chemistry and Biochemistry
*Molecular mechanisms of viral infection*

**Lars Plate** lars.plate@vanderbilt.edu
Vanderbilt University,
Chemistry and Biological Sciences
*Developing mass spectrometry and chemical biology tools to study dynamic protein interactions. We are interested in applying these tools to study protein misfolding diseases and viral infections.*

**Taras Pogorelov** pogorelo@illinois.edu
University of Illinois at Urbana-Champaign, Chemistry
*Biophysics of complex cellular environments that governs signaling, protein and membrane dynamics: advancing modeling and theory.*

## Scialog Fellows Continued

**Elizabeth Read** elread@uci.edu
University of California, Irvine,
Chemical and Biomolecular Engineering
*We combine theory and simulation of stochastic processes in cell biology with statistical inference to learn about various aspects of cellular behavior, including gene regulation, epigenetics, and cell signaling.*

**Laura M. Sanchez** lmsanche@ucsc.edu
University of California, Santa Cruz,
Chemistry and Biochemistry
*We use imaging mass spectrometry to discover how microbes and cells use small molecules in different microenvironments.*

**Gabriela Schlau-Cohen** gssc@mit.edu
Massachusetts Institute of Technology, Chemistry
*Single-molecule and ultrafast spectroscopy to investigate the dynamics of membrane proteins.*

**Neel Shah** neel.shah@columbia.edu
Columbia University, Chemistry
*My lab is interested in dissecting mechanisms of interaction specificity and dynamic regulation in eukaryotic signaling proteins. We primarily focus on tyrosine kinases and phosphatases, and we explore these enzymes using synthetic chemistry, biochemistry, and cell biology.*

**Abhi Singharoy** asinghar@asu.edu
Arizona State University, Biodesign Institute
*Integrative modeling of cellular energy metabolism.*

**Anna Marie Sokac** asokac@illinois.edu
University of Illinois at Urbana Champaign,
Cell and Developmental Biology
*Actin biology including how actin shapes cells, contributes to stress response and influences nuclear homeostasis.*

**Alice Soragni** alices@mednet.ucla.edu
University of California, Los Angeles,
Orthopaedic Surgery
*Protein aggregation in cancer and 3D models of disease.*

**Jan Spille** jhspille@uic.edu
University of Illinois at Chicago, Physics
*Imaging structure and function of the cell nucleus one molecule at a time.*

**Grace Stokes** gstokes@scu.edu
Santa Clara University, Chemistry and Biochemistry
*Santa Clara undergrads and I use nonlinear optical spectroscopies to study adsorption of drug-like molecules to lipid membranes so we can predict & understand physiological effects.*

**Judith Su** judy@optics.arizona.edu
University of Arizona, Optical Sciences
*Label-free single molecule detection and spectroscopy for fundamental science and translational medicine.*

**Cheemeng Tan** cmtan@ucdavis.edu
University of California, Davis, Biomedical Engineering
*The Tan Lab investigates artificial cellular systems (also called biohybrid or biomimetic cells), which are hybrid material-bacteria systems that have broad applications in biosensing, bioremediation, disease treatment, and basic biological study.*

**Lu Wang** lwang@chem.rutgers.edu
Rutgers University, Chemistry and Chemical Biology
*The Wang group uses theoretical and computational tools to study the structure, dynamics and functions of biological macromolecules. We are elucidating how quantum effects and electrostatic fluctuations impact the functions and spectroscopic features of the biological systems.*

**Rongsheng (Ross) Wang** rosswang@temple.edu
Temple University, Chemistry
*Probing and understanding protein-protein interactions during post-translational modifications.*

**Wenjing Wang** wenjwang@umich.edu
University of Michigan,
Chemistry and Life Sciences Institute
*We are interested in designing optogenetic sensors and actuators to study the neuromodulatory system.*

**Lu Wei** lwei@caltech.edu
California Institute of Technology,
Chemistry and Chemical Engineering
*Optical-Spectroscopy, Bioimaging, Biophysics, Molecular vibrations, Multiplex imaging, Cellular metabolism.*

## Scialog Fellows Continued

**Joshua Weinstein** jaweinst@uchicago.edu
University of Chicago,
Medicine and Molecular Engineering
*DNA-based technologies for high-throughput encoding and decoding of biological information; statistical mechanics of multicellular systems.*

**Stephen Yi** stephen.yi@austin.utexas.edu
University of Texas at Austin,
Biomedical Engineering and Oncology
*My lab research is at the interface of human genetics, chemical biology and informatics in the modern era of precision medicine. I am interested in fundamental questions underlying genotype-phenotype relationships and cell network perturbations in disease.*

**Yan Yu** yy33@iu.edu
Indiana University, Chemistry
*Interactions at the nano-bio interface.*

**Haoran Zhang** Haoran.Zhang@rutgers.edu
Rutgers University,
Chemical and Biochemical Engineering
*My research focuses on developing new approaches to investigate and manipulate cellular behaviors. In particular, we utilize metabolite biosensors to dynamically regulate cellular activities in the context of mono-cultures and co-cultures.*

**Brian M. Zid** zid@ucsd.edu
University of California, San Diego,
Chemistry and Biochemistry
*My lab explores how gene expression can be modulated during fluctuating environmental conditions, especially at the post-transcriptional level.*

## Discussion Facilitators

**Rommie Amaro** ramaro@ucsd.edu
University of California, San Diego,
Chemistry and Biochemistry
*Molecular modeling at the mesoscale, including multiscale methods to bridge chemical and biological complexity.*

**Holly Goodson** hgoodson@nd.edu
University of Notre Dame, Chemistry and Biochemistry
*Mechanisms of subcellular self-organization, focusing on the cytoskeleton. Evolution of proteins and biochemical processes, with applications to cell biology. Collaborative projects include whole-cell biosensors for applications in the environment and human health.*

**Martin Gruebele** mgruebel@illinois.edu
University of Illinois at Urbana-Champaign,
Chemistry, Physics, Biophysics, College of Medicine
*Dynamics of biomolecules, quantum systems, and excited state nanomaterials.*

**Rigoberto Hernandez** r.hernandez@jhu.edu
Johns Hopkins University, Chemistry
*Theoretical and Computational Chemistry @ JHUChemistry, nonequilibrium dynamics: reactions, TST, sustainable nanoparticles, proteins, machine learning, autonomous computing materials - @EveryWhereChem @Hernandez_Lab @OxideChem*

**Neil Kelleher** n-kelleher@northwestern.edu
Northwestern University, Chemistry
*Proteoform biology and measurement; better detection and assignment of function to post-translational modifications.*

## Discussion Facilitators Continued

**Gang-yu Liu** gyliu@ucdavis.edu
University of California, Davis, Chemistry
*Using nanotechnology including 3D nanoprinting to regulate and control cellular signaling processes.*

**Erika Matunis** matunis@jhmi.edu
Johns Hopkins University School of Medicine, Cell Biology
*The Matunis lab combines genetics, live imaging, and genome-wide approaches to study the molecular signals that establish and maintain stem cell niches.*

**Cathy Murphy** murphycj@illinois.edu
University of Illinois at Urbana-Champaign, Chemistry
*Synthesis, physical properties, surface chemistry, bio applications of nanomaterials*

**Paul Selvin** selvin@illinois.edu
University of Illinois at Urbana-Champaign, Physics
*Single molecule fluorescence with super-resolution applied to neuroscience (Alzheimer's Disease) and Multiple Molecular Motors (Myosin, Kinesin, Dynein) and to Cancer (Estrogen Receptor, p53).*

## Guests

**Daren Ginete** dginete@sciphil.org
Science Philanthropy Alliance

**Gary Greenburg** gary.greenburg@moore.org
Gordon and Betty Moore Foundation, Science
*The Gordon and Betty Moore Foundation fosters path-breaking scientific discovery, environmental conservation, patient care improvements and preservation of the special character of the Bay Area.*

**Sandra J. Laney, PhD** slaney@walderfoundation.org
Walder Foudation, Science Innovation
*Purpose-inspired Life Science and Science Innovation Equity.*

**Jim Mitchell** james_g_mitchell@yahoo.com
The Shurl and Kay Curci Foundation,
Science Advisory Board
*I am interested in basic research on the machinery of the cell, including gene editing, computational biology, and cancer modifications.*

**Sandra L. Schmid** sandra.schmid@czbiohub.org
Chan Zuckerberg Biohub, Quantitative Cell Science
*As CSO at the CZ Biohub, my goal is to facilitate collaborative, high-risk/high impact research in an environment that brings fundamental research together with technology development.*

## Gordon and Betty Moore Foundation

**Gary Greenburg** gary.greenburg@moore.org
Gordon and Betty Moore Foundation, Science

## Research Corporation

**Jennifer Dukes** jdukes@rescorp.org
Program & Award Administrator, Senior

**Laura Esham** lesham@rescorp.org
Program Assistant

**Andrew Feig** afeig@rescorp.org
Senior Program Director

**Danny Gasch** dgasch@rescorp.org
Chief Financial Officer

**Angela Hagen** ahagen@rescorp.org
Communications Director

**Kimberly Huynh** khuynh@rescorp.org
Data Analytics Specialist

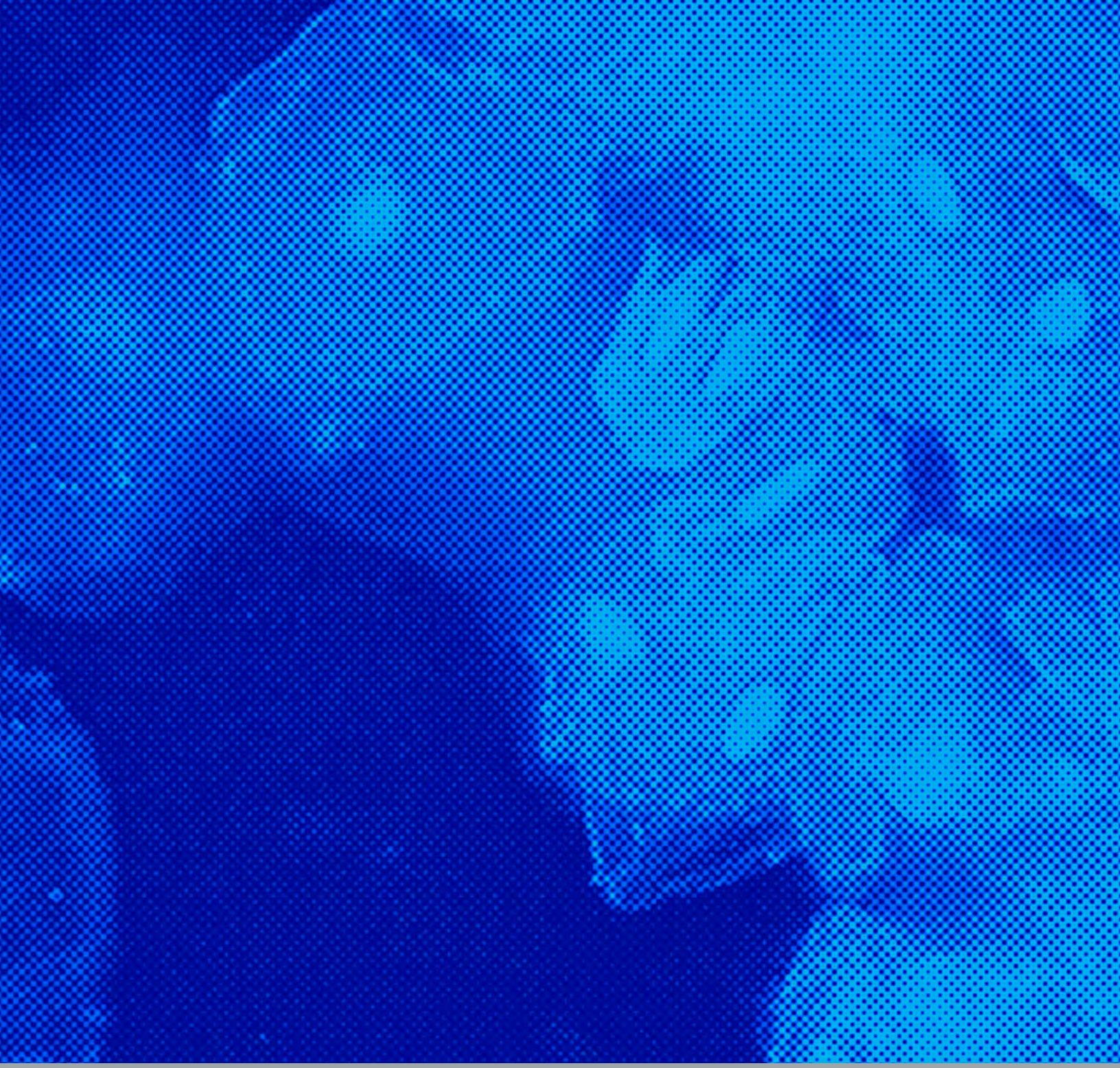
**Dan Linzer** dlinzer@rescorp.org
President

**Meg Martin** mmartin@rescorp.org
Pre & Post Award Manager

**Aileen Quezada** aquezada@rescorp.org
Program & Award Administrator

**Silvia Ronco** sronco@rescorp.org
Senior Program Director

**Richard Wiener** rwiener@rescorp.org
Senior Program Director



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