

The logo features a central circular arrangement of grey dots of varying opacity, creating a sense of depth. This is overlaid on a background of thin, grey, wavy lines that resemble a sound wave or a molecular structure. A thick, dark grey arc is positioned to the left of the text, partially overlapping the wavy lines.

**ASCB | EMBO**  
**2017 meeting**

Dec. 2-6, 2017 | Philadelphia, PA

**Sunday**  
**December 3, 2017**

Daily Schedule—Sunday, December 3

7:30 am-6:00 pm	Registration Open	Registration Area
7:30 am-8:00 pm	Career Center Open	Hall D, Learning Center
8:00 am-9:30 am	Symposium 1: Structure of the Cell	Terrace Ballroom 3
8:15 am-9:15 am	Exhibitor Tech Talk Thermo Fisher Scientific Inc.: Essential tools for fluorescent imaging, labeling, and detection	Theater 2, Learning Center
9:00 am-4:00 pm	Career Coaching	Career Center, Learning Center
9:00-9:45 am	NIH Grant Process Panel: Insights from the Early Career Reviewer Program	Theater 3, Learning Center
9:30-11:00 am	Morning Refreshment Break	Learning Center
9:30-10:30 am	Exhibitor Tech Talk Hybrigenics Corp: Efficient selection of single-domain antibodies from a naïve synthetic library using phage display and exhaustive yeast two-hybrid screening	Theater 1, Learning Center
9:45 am-10:45 am	Symposium 2: Metabolism	Terrace Ballroom 3
10:00 am-12:00 pm	Lab Leadership – Roles, Values, and Expectations	Room 117
10:00 am-12:00 pm	Foundational Cell Biology Workshop: Assessment in Real-Time: It's Not All about the Final Exam	Room 126A
10:00-10:45 am	MD-PhD: Is It Right for Me?	Theater 3, Learning Center
10:45-11:45 am	Exhibitor Tech Talk GE Healthcare: Learn how GE's DeltaVision microscopes can help your lab secure more funding	Theater 1, Learning Center
10:45-11:45 am	Exhibitor Tech Talk BioLegend: Bone cell differentiation and bone cancer	Theater 2, Learning Center
10:50 am-12:00 pm	Communicating Science through Visual Media	Room 122A
11:00 am-12:00 pm	Career Discussion and Mentoring Roundtables	Roundtable Central Sections 1-2, Learning Center
11:00 am-12:00 pm	E.E. Just Award Lecture: JoAnn Trejo	Room 120B
11:00 am-12:00 pm	NIH Update: Workforce, Funding Trends, and Policy	Room 126B
11:00 am-12:00 pm	Science Discussion Tables	Roundtable Central Section 3, Learning Center
11:00 am-12:00 pm	First Timer? Making the Most of the Annual Meeting	Room 124
11:00 am-12:00 pm	Networking: The Most Effective Job Search Tool	Room 123
11:00 am-12:00 pm	New Opportunities for Researchers – Open Access to Transnational Research Infrastructures in Imaging, Structural Biology, and Compound Screening	Room 122B
11:00 am-12:10 pm	Microsymposium 1: Recent Advances in the Molecular Cell Biology of Neurons	Microsymposia Room 1, Learning Center, Hall C
11:00 am-12:10 pm	Microsymposium 2: Cytoskeletal Molecular Dynamics	Microsymposia Room 2, Learning Center, Hall C
12:00-1:30 pm	Odd-Numbered Poster Presentations	Learning Center
12:00-1:00 pm	Showing of HHMI Films	ASCB Booth 525, Learning Center

12:00-12:45 pm	Exhibitor Tech Talk Carl Zeiss Microcopy, LLC: Robust label free cell proliferation measurement with CellDiscoverer 7 and machine learning based image processing	Theater 1, Learning Center
12:00-12:45 pm	Exhibitor Tech Talk Bruker Corporation: Harnessing the power of super-resolution single molecule localization microscopy with the Vutara 352: labeling and imaging	Theater 2, Learning Center
12:00-12:45 pm	Navigating the Faculty Job Search	Theater 3, Learning Center
12:25-1:35 pm	Microsymposium 3: Cell Biology of the Nucleus	Microsymposia Room 1, Learning Center, Hall C
12:25-1:35 pm	Microsymposium 4: Cancer Cell Biology	Microsymposia Room 2, Learning Center, Hall C
1:00-1:45 pm	Careers in Science Writing, Editing, and Communication Panel	Theater 3, Learning Center
1:00-1:45 pm	Exhibitor Tech Talk Carl Zeiss Microcopy, LLC: Investigation of live cell dynamics with the Airyscan imaging technology	Theater 1, Learning Center
1:00-1:45 pm	Exhibitor Tech Talk Andor Technology: 3D and 4D microscopy image analysis in cell biology—Imaris technology for analysis of large, complex datasets and visualization of multimodal images (e.g. fluorescence, EM, transmitted light)	Theater 2, Learning Center
1:00-2:00 pm	Minorities Affairs Committee Awards Reception (by invitation only)	Roundtable Central Section 3, Learning Center
1:15-1:45 pm	Meet the ASCB Committees	ASCB Booth 525, Learning Center
1:15-1:45 pm	In-Booth Presentation ALVEOLE: Controlling the chemistry and topography of the cellular microenvironment with quantitative protein photopatterning – demo	Booth 539, Learning Center
1:30-3:00 pm	Even-Numbered Poster Presentations	Learning Center
1:30-3:30 pm	Afternoon Refreshment Break	Learning Center
1:45-2:30 pm	Meet the Editor of <i>CBE—Life Sciences Education</i>	ASCB Booth 525, Learning Center
1:50-3:00 pm	Microsymposium 5: Cell Death, Cell Volume and Cytokinesis	Microsymposia Room 1, Learning Center, Hall C
1:50-3:00 pm	Microsymposium 6: Cellular Regulation of the Cytoskeleton	Microsymposia Room 2, Learning Center, Hall C
2:00-2:45 pm	Exhibitor Tech Talk Allen Institute for Cell Science: The Allen Institute for Cell Science—resources to empower your research	Theater 1, Learning Center
2:00-2:45 pm	Exhibitor Tech Talk Thermo Fisher Scientific Inc.: Thermo Scientific™ Amira Software© for Cell Biology, a new solution for interactive visualization and advanced analysis of 3D/4D image data	Theater 2, Learning Center
2:00-2:45 pm	Careers in Industry Panel	Theater 3, Learning Center
3:00-4:00 pm	Exhibitor Tech Talk GORYO Chemical, Inc.: Fluorescent probes for intra and extracellular biology	Theater 2, Learning Center
3:00-6:00 pm	FRED Mock Review (by invitation only)	Room 107A
3:15-4:00 pm	Keith R. Porter Lecture: Scott D. Emr	Terrace Ballroom 3
4:15-5:15 pm	Exhibitor Tech Talk Horizon Discovery: Gene edited cell models for target validation or disease modeling: the application of gene modulation and modification	Theater 2, Learning Center

Daily Schedule—Sunday, December 3

4:15-6:50 pm	ASCB-NCI Emerging Topic Symposium: Mitochondrial Crosstalk in Cancer Cell Biology	Room 119A
4:15-6:50 pm	Workshop: Mass Spectrometry	Room 121B
4:15-6:50 pm	<p>Minisymposium 1: Bacterial Infection and Symbiosis</p> <p>Minisymposium 2: Functions and Mechanisms of Cytoskeletal Motors</p> <p>Minisymposium 3: Inside the Nucleus: Genome Organization and Gene Expression</p> <p>Minisymposium 4: Multicellular Interactions: Tissue Assembly and Morphogenesis</p> <p>Minisymposium 5: Organelles in Metabolism and Stress Responses</p> <p>Minisymposium 6: Regulation of Cell Size, Mitosis and Meiosis</p> <p>Education Minisymposium: Evidence-Based Education</p>	<p>Room 114</p> <p>Room 113B</p> <p>Room 115B</p> <p>Room 120B</p> <p>Room 118B</p> <p>Room 108A</p> <p>Room 124</p>
5:30-6:30 pm	<p>Exhibitor Tech Talk</p> <p>PerkinElmer, Inc.: Simple cell-based TR-FRET assays for protein phosphorylation, cell signaling, and biomarker detection</p>	Theater 2, Learning Center
9:15 pm	Satellite Event: Breakthrough Prize Live Streaming	Loews Philadelphia Hotel, Millenium Ballroom, 2nd Floor

## ● Symposium 1: Structure of the Cell

8:00-9:30 am

Terrace Ballroom 3

*Supported by the American Association of Anatomists and The Anatomical Record*

Chair: **Tobias Walther**, Harvard Medical School/HHMI

- 8:00 am S1 Unraveling the spatial and temporal dynamics of subcellular organelles. **J. Lippincott-Schwartz**<sup>1</sup>; <sup>1</sup>Janelia campus, HHMI Janelia Research Campus, Ashburn, VA
- 8:30 am S2 Cryo-Electron Tomography: Opportunities and Challenges of Structural Biology in situ. **W. Baumeister**<sup>1</sup>; <sup>1</sup>Molecular Structural Biology, Max-Planck-Institute of Biochemistry, Martinsried, Germany
- 9:00 am S3 The role of ER membrane contact sites in regulating the structure of other organelles. **G.K. Voeltz**<sup>1</sup>; <sup>1</sup>MCD Biology, University of Colorado, Boulder, Boulder, CO

## ● Exhibitor Tech Talk

8:15-9:15 am

Theater 2, Learning Center

**Thermo Fisher Scientific Inc.**  
**Essential tools for fluorescent imaging, labeling, and detection**

Presenter: Oggie Golub, PhD

Level: Intermediate

The combination of light microscopy and fluorescent reporters offers an unparalleled view into the structure and function of intact cells. Invitrogen™ Molecular Probes™ reagents have been at the cutting edge of fluorescent reporter development for over four decades. In this seminar, we will review our portfolio of long-proven tools and protocols that have enabled researchers to confidently create publication quality cell images on the first attempt. Whether you're new to cell imaging, or an experienced researcher wanting to use your imaging platform at its fullest potential, join us to learn about the latest innovations in fluorescence microscopy including high throughput imaging platforms, as well as reagents that reduce background fluorescence, amplify fluorescent signal output, prevent photobleaching, and improve spatial resolution of 3D samples.

## ● Career Coaching

9:00 am-4:00 pm

Career Center, Learning Center

Stop by the career center for the opportunity to meet with a professional career coach. During these one-on-one sessions participants will receive individualized advice including but not limited to strategies for choosing a career and individualized review of application materials.

### Coaches:

**David Taylor**, Assistant Director, Office of Postdoctoral Affairs, The Children's Hospital of Philadelphia

**Paulette McRae**, Academic Programs Officer, The Children's Hospital of Philadelphia

**Joseph Barber**, Associate Director, UPENN Career Services

**Mary Beth Davis**, Pre-Health Advisor, Drexel University Steinbright Career Development Center

**Laura Craig**, Associate Director of Career Development, Temple University

**Diane Hull**, Associate Director, UPENN Career Services

**David Prisco**, Career Counselor and Employer Relations Associate, La Salle University

**Kristy Lamb**, Associate Director of Preprofessional Advising, New York University

**Sheryl Smith**, Associate Professor, Arcadia University

**Megan Wright**, Associate Professor, Arcadia University

**Patricia Phelps**, Director, Professional Development and Career Office, Johns Hopkins University School of Medicine

**Catherine Hueston**, STEM Education Postdoctoral Fellow, Professional Development and Career Office, Johns Hopkins University School of Medicine

**Outcomes:**

1. Obtain professional one-on-one mentorship catered toward pursuing a career in science
2. Gain insight into the career options available in the life sciences
3. Learn individualized strategies to search and apply for job opportunities in your career of choice
4. Gain critical advice for editing resumes, CV's, and application materials

Target audience: graduate students and postdocs

● **NIH Grant Process Panel: Insights from the Early Career Reviewer Program**

9:00-9:45 am

Theater 3, Learning Center

*Supported by HHMI*

**George Lucian Moldovan**, Assistant Professor, Pennsylvania State University College of Medicine

**Jason Stumpff**, Assistant Professor, University of Vermont College of Medicine

**Dimitrios Vavylonis**, Professor, Lehigh University

Obtaining an NIH grant is one of the fundamental and most sought after mechanisms for ensuring funding to conduct biomedical research. In this session, panelists will discuss strategies for applying to NIH grants by participation in the Early Career Reviewer Program. The ECR program aims to train and educate qualified scientists without prior scientific review experience so they may develop into critical and well-trained reviewers. Panelists will provide a brief overview of grant writing tips and strategies, and what they have learned as participants in the Early Career Reviewer program. The rest of the session will be interactive and open to audience questions.

**Lucian Moldovan** obtained his BS in Biochemistry from the University of Bucharest, Romania. For his PhD, he joined the lab of Stefan Jentsch at Max Planck Institute for Biochemistry in Munich, Germany where he investigated the regulation of DNA replication and repair by post-translational modifications. This was followed by postdoctoral training with Alan D'Andrea at Harvard Medical School, studying mechanisms of resistance to DNA damaging cancer therapy. In 2012 he started his own lab as assistant professor at Penn State College of Medicine, where his research focuses on understanding how cancer cells regulate genomic stability and replication stress.

**Jason Stumpff** earned his PhD from the University of Colorado, Boulder where he used a combination of genetics and cellular imaging to investigate cell cycle control during *Drosophila* development in Tin Tin Su's lab. His postdoctoral work in Linda Wordeman's lab at the University of Washington focused on understanding the molecular basis of mitotic chromosome alignment using live cell imaging and single molecule reconstitution approaches. Stumpff is currently an assistant professor of Molecular Physiology and Biophysics at the University of Vermont, where his lab focuses on questions related to the mechanical control of cell division and chromosome organization.

**Dimitrios Vavylonis** received a Physics BSc from the University of Athens and a Physics PhD from Columbia University. He worked on actin biophysics as postdoc with Ben O'Shaughnessy and Tom Pollard before joining the faculty of the Physics Department at Lehigh University in 2006. At Lehigh he received the Libsch Early Career Research Award and was promoted to the rank of professor in 2016. His group focuses on mathematical and computational modeling of the cytoskeleton and related areas of cell biophysics. He had visiting positions at University of Lausanne, AMOLF (Amsterdam) and Kyoto University. He is an editorial board member of *Cytoskeleton and Scientific Reports* and his work has been supported by NIH and HFSP.

**Outcomes:**

1. Learn about the NIH Early Career Reviewer Program
2. Learn about strategies for effective grant writing
3. Learn about the grant review process at the NIH

Target audience: postdocs, early career faculty

## ● Morning Refreshment Break

9:30-11:00 am

Learning Center

Join us for complimentary coffee and tea while visiting exhibitors and viewing posters.

## ● Exhibitor Tech Talk

9:30-10:30 am

Theater 1, Learning Center

### Hybrigenics Corp

#### Efficient selection of single-domain antibodies from a naïve synthetic library using phage display and exhaustive yeast two-hybrid screening

Presenter: Petra Tafelmeyer

Level: Intermediate

High-affinity single-domain antibodies, like VHH, represent indispensable tools for research and clinical applications. To access VHH without Llama immunization, we have built a fully synthetic humanized naïve Llama VHH library containing 3x10<sup>9</sup> antibodies, based on a unique scaffold with random complementary determining regions (CDRs). We have set up a new platform for phage display selection of VHH and successfully selected antibodies against a variety of antigens from large proteins to haptens, soluble proteins and receptors directly selected from cell surface expression. A combination with subsequent exhaustive yeast two-hybrid (Y2H) screening allows to further favor the selection of intrabodies – antibodies working inside living cells. We will exemplify the use of this library and our platform capabilities focusing on GFP, USP7 and Tau proteins as targets.

## ● Symposium 2: Metabolism

9:45 am-10:45 am

Terrace Ballroom 3

Chair: **Jodi Nunnari**, University of California, Davis

9:45 am S4 mTOR signaling in growth and metabolism. **M.N. Hall**<sup>1</sup>; <sup>1</sup>Biozentrum, University of Basel, Basel, Switzerland

10:15 am S5 Human Genetics Provides Molecular Handles to Elucidate Pathogenesis of Fatty Liver Disease. **H.H. Hobbs**<sup>1,2</sup>, **J.C. Cohen**<sup>1,2</sup>; <sup>1</sup>Howard Hughes Medical Institute, Dallas, TX, <sup>2</sup>McDermott Center, UT Southwestern, Dallas, TX

## ● Lab Leadership – Roles, Values, and Expectations

10:00 am-12:00 pm

Room 117

*Supported by Thermo Fisher Scientific, Inc.*

**Samuel Caddick**, PhD, Project Coordinator for EMBO Lab Management at the Gesellschaft zur Förderung der Lebenswissenschaften Heidelberg GmbH

What is good leadership and why is it important for your lab? Explore your own leadership role and sub-roles and identify your current strengths and areas where you need to develop. In addition, see how the interaction of your own expectations and those of other people on you influence your leadership. Shared values help us work effectively together, so where do values come from? How can you establish values for your lab?

We encourage participants to attend all three sessions in this series (the other two are on Monday and Tuesday) because they are interrelated and build on each other.

### Outcomes:

1. Learn the foundations of good leadership and how leadership and management are different but complimentary types of work
2. Learn to identify your current roles and sub-roles and look for areas of strength and possible derailers to success
3. Learn how to establish values in the lab environment and how to identify and talk about those values and your expectations

Target audience: group leaders (PIs), senior postdocs with responsibility for lab supervision or who are about to set up their own lab

## ● Foundational Cell Biology Workshop: Assessment in Real-Time: It's Not All about the Final Exam

10:00 am-12:00 pm

Room 126A

*Supported by SimBio*

Jeff Schinske, Biology Instructor at De Anza College, Cupertino, CA

Assessment is often viewed simply as an evaluative tool used for grading students, but can in fact be used in ways that engage students and provide critical feedback and actionable evidence to instructors. This workshop will familiarize attendees with a variety of innovative assessment techniques that can be used both in and out of the classroom to gauge student progress throughout the semester rather than waiting until the final exam. The session will be interactive, modeling assessment techniques with attendee involvement and giving participants ample opportunity to discuss the workshop topics with each other. Attendees should leave with concrete ideas for how to implement “real-time” assessment in their own teaching.

### Outcomes:

1. Articulate the importance of assessment to both students and faculty
2. Compare and contrast formative and summative assessments
3. Implement in your own classrooms the formative assessments modeled during the workshop

Target audience: all attendees

## ● MD-PhD: Is It Right for Me?

10:00-10:45 am

Theater 3, Learning Center

*Supported by HHMI*

Lawrence (Skip) Brass, Professor of Medicine and Pharmacology, Associate Dean and Director, Medical Scientist Training Program (MSTP), University of Pennsylvania, Perelman School of Medicine

This workshop will demystify the physician-scientist career and the application process to pursue an MD-PhD degree. Presented by members of the MD-PhD GREAT Section of the Association of American Medical Colleges, the presentation focuses on common features of MD-PhD training programs. Topics include information on the careers of MD-PhDs, how students train to become MD-PhD physician-scientists, how to apply to MD-PhD training programs, and the credentials of a competitive applicant. The session includes time for Q&A.

### Outcomes:

1. Learn how undergraduates and postbacs should prepare for MD-PhD training
2. Gain an understanding of the application process and interviewing for MD-PhD training programs
3. Learn about MD-PhD student training programs. What is a typical MD-PhD training program and timeline like?
4. Learn what types of students matriculate into MD-PhD programs, and what careers MD-PhD graduates pursue

Target audience: undergraduates, postdocs, health career professionals, research advisors

## ● Exhibitor Tech Talk

10:45-11:45 am

Theater 1, Learning Center

**GE Healthcare**

**Learn how GE's DeltaVision microscopes can help your lab secure more funding**

Presenters: Leanna Ferrand/Trisha Koenke

Level: Intermediate

Securing future funding is on every researcher's mind these days. Combined with the need to publish quickly and be confident in your findings - you either need to create more hours in a day or find a way to be more efficient with the resources you have. See how GE's latest DeltaVision microscopes are revolutionizing lab productivity by providing reliable, accurate results faster than ever! This goes far beyond any technical specification sheet – it must also be usable by every level of researcher from novice to expert as well as stable, easy to maintain and capable of scaling with your research. Learn how the DeltaVision's widefield deconvolution technology can advance your research among most cell biology applications, including live-cell imaging and high-throughput screening.



## ● Exhibitor Tech Talk

10:45-11:45 am

Theater 2, Learning Center

### BioLegend

#### Bone cell differentiation and bone cancer

Presenter: Mohar Chattopadhyay

Level: Intermediate

Osteoclasts and osteoblasts are specialized bone cells that are responsible for bone formation, repair, maintenance, and bone remodeling. Osteoclasts are derived from the monocyte/macrophage hematopoietic lineage, whereas osteoblasts arise from mesenchymal stem cells (MSC). Several cytokines and growth factors, including Receptor Activator of Nuclear Factor-kappaB Ligand (RANKL), Sonic Hedgehog family of proteins, and macrophage colony-stimulating factor (M-CSF), play critical roles in bone cell differentiation from precursor cells. Bone homeostasis depends on the strict balance between the bone formation activity of osteoblasts and bone resorption by osteoclasts. Any imbalance in this system can result in various bone diseases. As both primary bone tumors, such as osteosarcoma, and secondary tumors (metastases), can develop in the bone, it is therefore also necessary to understand the biology in malignant bone environment. Here we present our portfolio, validation methods, and data exploring bone cell differentiation and bone cancer using several assays, such as primary bone marrow cell differentiation to macrophages and further differentiation into osteoclasts using RANKL, osteoblast differentiation, cancer cell invasion, chromatin immunoprecipitation (ChIP), magnetic cell separation, and target-ligand inhibition bioassays, among others. We also explored intra-cellular signaling pathways and mitochondrial dysfunction in osteosarcoma cells.

SUNDAY

## ● Communicating Science through Visual Media

10:50 am-12:00 pm

Room 122A

Organizers: **Janet Iwasa**, Research Assistant Professor, University of Utah; and **Sarah Goodwin**, Director, iBiology

#### Panelists:

**Janet Iwasa**, Research Assistant Professor, University of Utah: Molecular Animation in Research and Outreach

**Shannon Behrman**, Associate Director, iBiology: Using Documentary-Style Videos to Convey Complex Topics in Science and Scientific Training

**Joseph Cappella**, Gerald R. Miller Professor of Communication, University of Pennsylvania: Effective Communication of Scientific Information

**Jennifer Frazier**, Staff Scientist, Exploratorium: Creating New Genres of Museum Exhibits with Scientific Visualizations

In cell biology and other basic research fields, researchers have become increasingly interested in thinking about ways to share their research findings more broadly. Use of visual media, such as film, illustration, and animation are widely considered to be some of the most impactful means to communicate science to different audiences. This session will feature short talks from a panel of individuals who are involved in different aspects of science communication. This will be followed by a discussion that will address practical issues, such as funding opportunities for communication projects, how to get more involved in science communication, and how to evaluate effectiveness.

#### Outcomes

1. Researchers will gain practical and effective tips on how to create/become involved in visual communication
2. Attendees will learn about diverse types of scientific communication efforts
3. Graduate students and postdocs will learn about careers in science communication
4. Attendees will understand ways to evaluate and measure impact

Target audience: all attendees

## ● Career Discussion and Mentoring Roundtables

11:00 am-12:00 pm

Roundtable Central Sections 1-2,  
Learning Center

### *Supported by The Burroughs Wellcome Fund*

The Career Discussion and Mentoring Roundtables allow participants to meet informally for discussions on issues of importance to cell biologists in various stages of their careers. Conversations are moderated by individuals who have experience in various professional areas or with particular issues and also benefit from discussion around the table. The session is an excellent way to disseminate practical information on career choices, to discuss strategies for effectively developing a career, and to network with others who share career interests and concerns.

Attending these roundtables can help you overcome the intimidating aspects of the large Annual Meeting, especially for young cell biologists for whom it is critical to find mentors as they progress in their careers. Past attendees say that meeting others with common interests and concerns at this event enriched their initial contacts and provided positive feedback and excellent advice regarding a career issue of concern to them.

#### **International Science and Scientists**

International Postdocs in the U.S. and Abroad  
Visa Issues  
Newcomers to U.S. Research Establishments  
Career and Funding Options for non-U.S. Citizens/Permanent Residents in the U.S.  
Cell Biology in France: Tips and Opportunities for Research Positions  
Fast-Growing Cell Biology Society in China  
How to Make the Most of the Annual Meeting in the Context of International Attendees

#### **Career Options**

Undergraduate Research and Career Opportunities

Careers in Biotech, Pharma & Industry  
Careers in Scientific Writing & Editing  
Career Choices: Academia vs. Industry  
Careers in Core Facilities  
Careers in Biology Education  
Opportunities in Cell Biology at NASA  
New NIGMS Funding for Multidisciplinary Teams and Technology Development, and MIRA

#### **Career Advancement**

Tips for Applying to Graduate School  
The Next Step: Transition from Graduate School to a Postdoctoral Position  
Setting Up and Managing Your First Lab  
Teaching and Research in Primarily Undergraduate Institutions  
Integrating Research into Undergrad Classroom Lab Experiences

Funding Options for Research at Primarily Undergraduate Institutions  
Biology Education Research  
Improving Your Teaching Practice through a Teaching Mentoring Program  
Teaching Tools & Strategies

#### **Essential Career Skills, Resources, and Support**

Work/Life Balance  
LGBTQ+ in Science  
Establishing an Individual Development Plan and The National Research Mentoring Network

## ● E.E. Just Award Lecture

11:00 am-12:00 pm

Room 120B



**JoAnn Trejo**

PhD, MBA, Professor and Vice Chair, Department of Pharmacology,  
Associate Dean for Health Sciences Faculty Affairs, University of California, San Diego

A1 Cell Signaling by Protease-activated Receptors. **J. Trejo**<sup>1</sup>; <sup>1</sup>Pharmacology, University of California, San Diego, La Jolla, CA

## ● NIH Update: Workforce, Funding Trends, and Policy

11:00 am-12:00 pm

Room 126B

Jon Lorsch, Director, National Institute of General Medical Sciences, NIH

While NIH has made progress in reversing the decline in grant funding to early-career investigators, the percentage of NIH awards that support this group remains flat. Recent gains for early-career investigators have been offset by a decline in the percentage of NIH awards that support mid-career investigators. The only group for which the percentage of grant funding is increasing is late-career investigators. Moreover, the distribution of NIH grant funding is highly skewed, with 10% of NIH-funded investigators receiving over 40% of NIH funding. Lorsch will report on recent analyses of workforce demographics and research output, and discuss policy measures under development at NIH to bring the workforce back into equilibrium.

### Outcomes:

1. Gain insights into trends in the biomedical workforce and NIH grant funding
2. Get updated on policy developments

Target audience: all attendees

## ● Science Discussion Tables

11:00 am-12:00 pm

Roundtable Central Section 3, Learning Center

Take advantage of this special networking opportunity! Select your interest area and bring your questions to the ASCB Learning Center.

Table	Presenter	Topic
1	<b>Diane Barber</b>	Actin Architectures Relative to Cell Behaviors
2	<b>Clemens Cabernard</b>	Asymmetric Cell Division
3	<b>Ora Weisz</b>	Basic Science in Clinical Departments
4	<b>Arne Gennerich</b>	Cellular Cytoskeleton and Associated Motor Proteins
5	<b>Adrian Salic</b>	Choosing a Postdoc, Applying for Jobs
6	<b>Bob Goldstein &amp; Mansi Srivastava</b>	Emerging Model Organisms
7	<b>Feng Shao</b>	Innate Immunity and Cell Death
8	<b>Sabine Petry</b>	Microtubule Architecture and Function
9	<b>Rebecca Heald</b>	Mitosis and Size Control
10	<b>Jennifer Lippincott-Schwartz</b>	Multispectral Imaging, Organelle-Organelle Contacts and Dynamics, Super Resolution Imaging
11	<b>Stephanie Gupton</b>	Neuronal Cell Biology
12	<b>Richard Cyr</b>	NSF Career Program
13	<b>Martin Beck</b>	The Nuclear Envelope and Nucleocytoplasmic Exchange
14	<b>Brendan D. Manning</b>	Nutrient Sensing, Signal Transduction, and Control of Cell Metabolism
15	<b>Gia Voeltz</b>	Organelle Dynamics and Membrane Contact Sites
16	<b>Anthony Hyman</b>	Phase Transitions
17	<b>Anne Spang</b>	Principles of Intracellular Organization
18	<b>Elly Tanaka</b>	Regeneration
19	<b>Valentina Greco</b>	Regeneration, Epithelial Biology, Cell Behaviors
20	<b>Ram Dixit</b>	Starting out as an Independent PI

## ● First Timer? Making the Most of the Annual Meeting

11:00 am-12:00 pm

Room 124

**Natalie Lundsteen**, PhD, Assistant Professor of Psychiatry and Assistant Dean for Career and Professional Development, Graduate School of Biomedical Sciences, University of Texas Southwestern Medical Center

**Michael Matrone**, PhD, Postdoctoral Affairs Officer, Oregon Health & Science University

You made it to Philadelphia. Now—create a strategy to orient yourself to the annual meeting, and maximize your time and opportunities. Over the next few days, you will be able to build your science knowledge, but you can also grow your network of contacts, learn about potential career fields, and maybe, just maybe, start a conversation that could lead to a fantastic research collaboration or even a job offer. In this session, we will discuss tips and tricks for taking advantage of all kinds of annual meeting situations and interactions, including how to make a great impression, what to ask employers and industry reps, practice delivering introductions, and planning for follow-up communication. Members of the ASCB Committee for Postdocs and Students (COMPASS) will describe events happening throughout the meeting that will give you opportunities to meet others and network. Please bring your questions, a positive attitude, business cards (if you have them\*), as well as something on which to take notes!

\*If you need basic business cards, check out VistaPrint online or visit a Staples or OfficeMax for card-printing in the \$10 range.

### Outcomes:

1. Practice introductions and communication skills
2. Learn about events and opportunities during the annual meeting
3. Meet COMPASS members
4. Learn networking strategies and how to continue communication following the annual meeting

Target audience: any first-time attendee, especially students (undergraduate or graduate) and postdoctoral researchers

## ● Networking: The Most Effective Job Search Tool

11:00 am-12:00 pm

Room 123

**Natalie Chernets**, Administrative Postdoctoral Fellow, Postdoctoral Affairs Office, Thomas Jefferson University, Philadelphia

**Lisa Kozlowski**, Associate Dean, Student and Postdoctoral Affairs, Thomas Jefferson University, Philadelphia

You probably know that most jobs are obtained through networking and not by uploading your resume online. You may have attended a networking event or two (or hope to attend one at ASCB) where you collected a ton of business cards and added contacts to your LinkedIn profile. Effective networking is not about the number of cards that you collect; it is about building relationships, following up after the event, and providing value to your network. Attendees will discuss the basics of networking and try out their new skills. They will practice an informational interview, examine a good LinkedIn profile and learn the best practices for using LinkedIn. Through digital brainstorming, attendees will deliberate on how they can bring value to their network.

### Outcomes:

1. Differentiate good and bad networking practices
2. Practice the principles of an effective Informational Interview, including creating potential questions
3. Discover how to build an effective LinkedIn profile
4. Identify ways to bring value to your network

Target audience: undergraduate students, graduate students, postdocs, administrators

## ● New Opportunities for Researchers – Open Access to Transnational Research Infrastructures in Imaging, Structural Biology, and Compound Screening

11:00 am-12:00 pm

Room 122B

Jan Ellenberg, EMBL

Bahne Stechmann, FMP Leibniz Institute of Molecular Pharmacology

Claudia Alen Amaro, Instruct-ERIC/University of Oxford

In recent years, an increasing number of academic institutions are joining forces within pan-European research infrastructures to offer open access to their state-of-the-art technology platforms in, for example, imaging, structural biology, and compound screening. Here, three pan-European research infrastructures, Euro-Biolmaging, Instruct-ERIC, and EU-OPENSREEN, will present how international researchers can benefit from them to achieve their research goals. Modern life science research often sees a dissociation between the researcher, who leads a scientific project, and the technology expert, who has the expertise to perform the required experiments. Often, an interdisciplinary approach as well as access to innovative technologies and services is needed. Our new research infrastructures aim to fill this gap and provide a solution to allow all scientists open access to the desired technologies and services.

### Outcomes:

1. Increased awareness for openly accessible services and technologies offered by European research infrastructures
2. Practical information on how scientists can boost their projects with the support of Instruct-ERIC, EU-OPENSREEN, and Euro-Biolmaging
3. Introduction to the application portals and first contact with research infrastructure experts on-site at the ASCB/EMBO Meeting

**Target Audience:** international scientists at all career levels, with a general interest in life sciences and a particular interest in applying structural biology methods, high-throughput chemical compound screening or high-end biological and medical imaging technologies in their research projects.

## ● Microsymposium 1: Recent Advances in the Molecular Cell Biology of Neurons

11:00 am-12:10 pm

Microsymposia Room 1, Learning Center, Hall C

Moderators: **Gregory Cook**, Oklahoma State University - Center for Health Sciences; and **Cristian Suarez**, University of Chicago

- |          |    |  |
|----------|----|--|
| 11:00 am | E1 | Cytoskeletal regulation of neurodevelopment in a human iPSC-derived autism model. <b>T. Rudisill<sup>1</sup>, B. Kirk<sup>1</sup>, C. Johnson<sup>1</sup>, A. Orbita<sup>1</sup>, P. Pakala<sup>1</sup>, H. Dar<sup>1</sup>, S. Davis<sup>1</sup>, A.R. Horwitz<sup>2</sup>, M.J. McConnell<sup>3</sup>, K.A. Litwa<sup>1,2</sup></b> ; <sup>1</sup> Anatomy and Cell Biology, East Carolina University Brody School of Medicine, Greenville, NC, <sup>2</sup> Cell Biology, University of Virginia, Charlottesville, VA, <sup>3</sup> Biochemistry and Molecular Genetics, University of Virginia, Charlottesville, VA                          |
| 11:10 am | E2 | Regulation of axon initial segment cytoskeletal architecture and function by $\beta$ IV-spectrin. <b>S.L. Jones<sup>1</sup>, T.M. Svitkina<sup>1</sup></b> ; <sup>1</sup> Biology, University of Pennsylvania, Philadelphia, PA  |
| 11:20 am | E3 | The microtubule plus-end-tracking protein TACC3 promotes persistent axon outgrowth and mediates responses to axon guidance signals during development. <b>B. Erdogan<sup>1</sup>, G. Cammarata<sup>1</sup>, E. Lee<sup>1</sup>, B. Pratt<sup>1</sup>, L.A. Lowery<sup>1</sup></b> ; <sup>1</sup> Biology, Boston College, Chestnut Hill, MA  |
| 11:30 am | E4 | Pharmaco-genetic toolsets for cell-specific subcellular cGMP and calcium manipulation in vivo. <b>O. Ros<sup>1</sup>, K. Loulier<sup>1</sup>, S. Ribes<sup>1</sup>, S. Couvet<sup>1</sup>, Y. Zagar<sup>1</sup>, D. Ladarré<sup>2</sup>, Z. Lenkei<sup>2</sup>, X. Nicol<sup>1</sup></b> ; <sup>1</sup> Vision Institute, Sorbonne Universités, CNRS, Inserm, Paris, France, <sup>2</sup> Brain Plasticity Unit, PSL Research University, ESPCI, CNRS, Paris, France   |
| 11:40 am | E5 | Mice without c-Abl tyrosine kinase at the CNS show improved learning and memory and increased gene expression of synaptic plasticity. <b>A. Gonzalez<sup>1</sup></b> ; <sup>1</sup> Señalización Celular, Pontificia Universidad Católica de Chile, Santiago de Chile, Chile   |
| 11:50 am | E6 | Long-term adaptation of G-protein signalling in the brain is facilitated by active G-proteins' feedback control of the amount of RGS proteins. <b>M.E. Fina<sup>1</sup>, S.R. Tummala<sup>2</sup>, N. Vardi<sup>1</sup>, A. Kashina<sup>1</sup>, D.W. Dong<sup>1,3,4</sup></b> ; <sup>1</sup> Biomedical Sciences, University of Pennsylvania, Philadelphia, PA, <sup>2</sup> Department of Bioengineering, University of Pennsylvania, Philadelphia, PA, <sup>3</sup> Institute for Biomedical Informatics, University of Pennsylvania, Philadelphia, PA, <sup>4</sup> Department of Neuroscience, University of Pennsylvania, Philadelphia, PA |

- 12:00 pm E7 Determining the localization and function of schizophrenia-linked protein tSNARE1b in the endolysosomal system of developing neurons. **M. Plooster**<sup>1</sup>, **G. Rossi**<sup>2</sup>, **M.S. Farrell**<sup>3</sup>, **P.F. Sullivan**<sup>3,4</sup>, **S.L. Gupton**<sup>2,5,6</sup>, **P. Brennwald**<sup>2</sup>; <sup>1</sup>Cell Biology and Physiology Curriculum, University of North Carolina, Chapel Hill, NC, <sup>2</sup>Department of Cell Biology and Physiology, University of North Carolina, Chapel Hill, NC, <sup>3</sup>Department of Genetics, University of North Carolina, Chapel Hill, NC, <sup>4</sup>Department of Psychiatry, University of North Carolina, Chapel Hill, NC, <sup>5</sup>Neuroscience Center, University of North Carolina, Chapel Hill, NC, <sup>6</sup>Lineberger Comprehensive Cancer Center, University of North Carolina, Chapel Hill, NC

## ● Microsymposium 2: Cytoskeletal Molecular Dynamics

11:00 am-12:10 pm

Microsymposia Room 2, Learning Center, Hall C

Moderators: **Courtney Schroeder**, Fred Hutchinson Cancer Research Center; and **Pinar Gurel**, The Rockefeller University

- 11:00 am E8 Reconstitution of aster movement and cell division plane positioning in *Xenopus* egg extract. **J.F. Pelletier**<sup>1,2,3</sup>, **C.M. Field**<sup>1,2</sup>, **N. Fakhri**<sup>3</sup>, **J.S. Oakey**<sup>2,4</sup>, **J.C. Gatlin**<sup>2,5</sup>, **T.J. Mitchison**<sup>1,2</sup>; <sup>1</sup>Department of Systems Biology, Harvard Medical School, Boston, MA, <sup>2</sup>Marine Biological Laboratory, Woods Hole, MA, <sup>3</sup>Department of Physics, Massachusetts Institute of Technology, Cambridge, MA, <sup>4</sup>Department of Chemical Engineering, University of Wyoming, Laramie, WY, <sup>5</sup>Department of Molecular Biology, University of Wyoming, Laramie, WY
- 11:10 am E9 Controlling cytoskeletal organization and cellular dynamics by localized optical modulation of microtubule dynamics. **J. van Haren**<sup>1</sup>, **A. Ettinger**<sup>2</sup>, **R. Charafeddine**<sup>1</sup>, **H. Wang**<sup>3</sup>, **K.M. Hahn**<sup>3</sup>, **T. Wittmann**<sup>1</sup>; <sup>1</sup>Department of Cell and Tissue Biology, UCSF, San Francisco, CA, <sup>2</sup>Institute of Epigenetics and Stem Cells, Helmholtz Center Munich, Munich, Germany, <sup>3</sup>Department of Pharmacology, UNC Chapel Hill, Chapel Hill, NC
- 11:20 am E10 Rac1 promotes septin-mediated guidance of CAMSAP-associated microtubules to focal adhesions. **D.G. Merenich**<sup>1</sup>, **S. Donovan**<sup>1</sup>, **A. Jacobs**<sup>1</sup>, **K.A. Myers**<sup>1</sup>; <sup>1</sup>Biological Sciences, University of the Sciences in Philadelphia, Philadelphia, PA
- 11:30 am E11 *C. elegans* microtubules are highly dynamic and have non-canonical lattices. **S. Chaaban**<sup>1</sup>, **C. Hsu**<sup>1</sup>, **S. Redemann**<sup>2</sup>, **T. Müller-Reichert**<sup>2</sup>, **J.M. Kollman**<sup>3</sup>, **H.K. Bui**<sup>4</sup>, **G.J. Brouhard**<sup>1</sup>; <sup>1</sup>Biology, McGill University, Montréal, QC, <sup>2</sup>Technische Universität Dresden, Dresden, Germany, <sup>3</sup>Biochemistry, University of Washington, Seattle, WA, <sup>4</sup>Anatomy and Cell Biology, McGill University, Montréal, QC
- 11:40 am E12 Cytoskeletal dynamics during wound reepithelialization in vivo. **A.S. Kennard**<sup>1</sup>, **J.A. Theriot**<sup>1,2,3</sup>; <sup>1</sup>Biophysics Program, Stanford University, Stanford, CA, <sup>2</sup>Biochemistry, Stanford University, Stanford, CA, <sup>3</sup>Howard Hughes Medical Institute, Stanford University, Stanford, CA
- 11:50 am E13 The cykinetic ring is composed of local contractile units that propagate contractility along the ring circumference using time delayed negative feedback. **M.E. Werner**<sup>1</sup>, **A. Sattler**<sup>1</sup>, **D. Cortes**<sup>1</sup>, **A. Patra**<sup>1</sup>, **F. Jug**<sup>2</sup>, **A.S. Maddox**<sup>1</sup>; <sup>1</sup>Biology, University of North Carolina Chapel Hill, Chapel Hill, NC, <sup>2</sup>Center for Systems Biology, Max Planck Institute of Molecular Cell Biology and Genetics, Dresden, Germany
- 12:00 pm E14 BMW is an exceptionally potent actin assembly factor from a human parasite. **M. Winterhoff**<sup>1</sup>, **S. Brühmann**<sup>1</sup>, **M. Kollmar**<sup>2</sup>, **R. Schnabel**<sup>3</sup>, **U. Curth**<sup>1</sup>, **J. Faix**<sup>1</sup>; <sup>1</sup>Institut of Biophysical Chemistry, Hannover Medical School, Hannover, Germany, <sup>2</sup>Department of NMR-based Structural Biology, Max-Planck-Institute for Biophysical Chemistry, Göttingen, Germany, <sup>3</sup>Institute for Genetics, Technical University Braunschweig, Braunschweig, Germany

## ● Odd-Numbered Poster Presentations

12:00-1:30 pm

Learning Center

## ● Showing of HHMI Films

12:00-1:00 pm

ASCB Booth 525, Learning Center

### Selections from the *I Contain Multitudes* Series and a not yet released short film

The *I Contain Multitudes* series is based on the book of the same name. The series premiered online in Fall 2017 with weekly episodes. Some are visits to a scientist's lab with Ed Yong as the guide. Others show intriguing animal behavior as Yong explains the hidden microbial backstory. In others, Yong answers viewers' questions while tackling the biggest misconceptions about the microbial world.

HHMI BioInteractive short films are compelling stories, in fields ranging from evolutionary biology and genetics to earth science, which provide concrete examples of how science works, how evidence is weighed and tested, and how conclusions are reached. Each film runs for 10 to 30 minutes and is accompanied by a collection of supporting materials, including film guides, quizzes, hands-on activities, and lesson plans, for educators to use to increase the impact of the films in their instruction.

## ● Exhibitor Tech Talk

12:00-12:45 pm

Theater 1, Learning Center

**Carl Zeiss Microcopy, LLC**

**Robust label free cell proliferation measurement with Celldiscoverer 7 and machine learning based image processing**

Presenter: Dr. Christoph Moehl

Level: Advanced

Label-free cell proliferation assays based on contrast imaging can be easily applied on an automated microscopy setup to test toxicity of compounds. No additional assay development steps such as reporter-systems or stably transfected cell models need to be established and the same assay approach can be introduced for several cell models with low effort. However, the image analysis of transmitted light contrast images is much more demanding than simple intensity thresholding, which is often sufficient for fluorescent micrographs. Here we present a robust workflow for cell proliferation measurements where images are taken at large scale with the Zeiss Celldiscoverer 7 and subsequently analyzed with big data analysis techniques based on supervised machine learning.

## ● Exhibitor Tech Talk

12:00-12:45 pm

Theater 2, Learning Center

**Bruker Corporation**

**Harnessing the power of super-resolution single molecule localization microscopy with the Vutara 352: labeling and imaging**

Presenter: Manasa V. Gudheti, PhD

Level: Introductory

Single molecule localization microscopy (SMLM) has made a significant impact in the field of biology by enabling a 10-fold enhancement in resolution. Key factors in achieving this enhanced resolution is to optimally label and image the specimen. Numerous labeling strategies exist to tag structures in cells, bacteria, virus, tissue sections, *C. elegans* and *Drosophila* to make the best use of SMLM. Examples include DNA- and Oligo-Paint, antibody/nanobody labeling with organic dyes, Halo and SNAP-tag dyes, and photo-switchable fluorescent proteins. Choosing a sub-optimal labeling method for a given biological sample will result in loss of achievable resolution. Once a specimen has been optimally labeled and imaged, the acquired localization data can then be readily quantified via statistical analysis to test experimental hypotheses.

## ● Navigating the Faculty Job Search

12:00-12:45 pm

Theater 3, Learning Center

**Supported by HHMI**

**David Breslow**, Assistant Professor, Yale University

**Sophie Dumont**, Assistant Professor, University of California, San Francisco

**Lillian Fritz-Laylin**, Assistant Professor, University of Massachusetts Amherst

Despite seeking a position as a faculty member, many trainees often do not receive the proper training required for navigating the faculty job search. This panel will discuss the process behind the faculty job search: What can be expected during this search, and what sort of strategies have proven effective in obtaining the optimal faculty position for one's research program? The moderator and audience will discuss the following three phases of the faculty job search: 1) the application process, 2) the interview (Skype and onsite), and 3) negotiation of a job offer and startup package. This session will be very interactive as it is fully based on questions from the audience.

**David Breslow** is an assistant professor at Yale University in the Department of Molecular, Cellular and Developmental Biology. Breslow was previously a graduate student at UCSF in Jonathan Weissman's lab, where he developed tools for yeast functional genomics and studied mechanisms of sphingolipid homeostasis. Breslow conducted his postdoctoral work in Maxence Nachury's lab at Stanford University, where he used a semi-permeabilized cell system to study protein entry into primary cilia and developed a CRISPR/Cas9-based screening platform to investigate ciliary signaling. A central focus of his work is applying systematic approaches to address fundamental questions in cell biology, with a current emphasis on the regulation and functions of the mammalian primary cilium.

**Sophie Dumont** joined UCSF's Department of Cell & Tissue Biology as an assistant professor in 2012. Her lab studies the self-organization and mechanics of cell division. Dumont received her PhD from UC Berkeley working with Carlos Bustamante, and was a postdoctoral fellow with Tim Mitchison at Harvard Medical School.

**Lillian Fritz-Laylin** joined the faculty in the Biology Department at the University of Massachusetts, Amherst as an assistant professor in 2017. Her group is using diverse organisms, from crawling fungi to brain-eating amoebae, to study the evolution of actin-based cell migration. She received her PhD from University of California, Berkeley, working with Zac Cande and was a Helen Hay Whitney postdoctoral fellow in the lab of Dyche Mullins at the UCSF.

Outcomes:

1. Learn about the application components and the strategies of successful trainees who have obtained interviews for faculty positions
2. Learn what is to be expected for an interview for a faculty position, including the presentation, chalk talk, or Skype interview
3. Learn the tactics of negotiating an offer for a faculty position in order to obtain the best startup package for one's lab
4. Gain insight into how to choose a research institute that will be the best fit and set up your new lab for future success

Target audience: graduate students and postdocs

### ● **Microsymposium 3: Cell Biology of the Nucleus**

12:25-1:35 pm

Microsymposia Room 1, Learning Center, Hall C

Moderators: **Chenshu Liu**, University of California, Berkeley; and **Margherita Perillo**, Boston College

12:25 pm	E15	LITE imaging: a high numerical aperture, low photobleaching fluorescence imaging technology. <b>T.C. Fadero<sup>1</sup>, T.M. Gerbich<sup>1</sup>, K. Rana<sup>2</sup>, A. Suzuki<sup>1</sup>, M. DiSalvo<sup>3,4</sup>, K. Schaefer<sup>1</sup>, J. Heppert<sup>1</sup>, T.C. Boothby<sup>2</sup>, B. Goldstein<sup>1</sup>, M. Peifer<sup>1</sup>, N.L. Allbritton<sup>3,4</sup>, A.S. Gladfelter<sup>1</sup>, A.S. Maddox<sup>1</sup>, P.S. Maddox<sup>1</sup></b> ; <sup>1</sup> Biology, UNC-Chapel Hill, Chapel Hill, NC, <sup>2</sup> Chemistry, UNC-Chapel Hill, Chapel Hill, NC, <sup>3</sup> Biomedical Engineering, UNC-Chapel Hill, Chapel Hill, NC, <sup>4</sup> Biomedical Engineering, North Carolina State University, Raleigh, NC
12:35 pm	E16	Myofibril contraction and cross-linking drive nuclear movement to the periphery of skeletal muscle. <b>W. Roman<sup>1,2</sup>, J.P. Martins<sup>1</sup>, F.A. Carvalho<sup>1</sup>, R. Voituriez<sup>3,4</sup>, J.V. Abella<sup>5</sup>, N.C. Santos<sup>1</sup>, B. Cadot<sup>2</sup>, M. Way<sup>5</sup>, E.R. Gomes<sup>1</sup></b> ; <sup>1</sup> Instituto de Medicina Molecular, Faculdade de Medicina, Universidade de Lisboa, Lisbon, Portugal, <sup>2</sup> Sorbonne Universités, UPMC Univ Paris 06, , INSERM UMR5974, CNRS FRE3617, Center for Research in Myology, Paris, France, <sup>3</sup> Laboratoire de Physique Théorique de la Matière Condensée, CNRS UMR 7600; Université Pierre et Marie Curie, Paris, France, <sup>4</sup> Laboratoire Jean Perrin; CNRS FRE 3231, Université Pierre et Marie Curie, Paris, France, <sup>5</sup> Cellular Signalling and Cytoskeletal Function, The Francis Crick Institute, London, United Kingdom
12:45 pm	E17	Regulating interactions between SUN and KASH proteins to mediate nuclear migration and anchorage. <b>N. Cain<sup>1</sup>, Z. Jahed<sup>2</sup>, H. Hao<sup>1</sup>, M. Mofrad<sup>2</sup>, G. Luxton<sup>3</sup>, D.A. Starr<sup>1</sup></b> ; <sup>1</sup> Molecular and Cellular Biology, University of California, Davis, Davis, CA, <sup>2</sup> Bioengineering and Mechanical Engineering, University of California, Berkeley, Berkeley, CA, <sup>3</sup> Genetics, Cell Biology, and Development, University of Minnesota, Minneapolis, MN
12:55 pm	E18	The LINC complex contributes to epithelial cell homeostasis. <b>V. Narayanan<sup>1</sup>, P.T. Arsenovic<sup>1</sup>, C. Mayer<sup>1</sup>, G. Luxton<sup>2</sup>, D.E. Conway<sup>1</sup></b> ; <sup>1</sup> Biomedical Engineering, Virginia Commonwealth University, Richmond, VA, <sup>2</sup> Genetics, Cell Biology, and Development, University of Minnesota, Minneapolis, MN
1:05 pm	E19	Nanoscale nuclear envelope dynamics and spatial organization of the muscular dystrophy protein emerin. <b>A. Fernandez<sup>1</sup>, M. Bautista<sup>2</sup>, T. Chung<sup>1</sup>, F. Pinaud<sup>1,2,3</sup></b> ; <sup>1</sup> Biological Sciences, University of Southern California, Los Angeles, CA, <sup>2</sup> Chemistry, University of Southern California, Los Angeles,



- 1:15 pm E20 CA, <sup>3</sup>Physics and Astronomy, University of Southern California, Los Angeles, CA  
High-throughput FISH-based screening approaches to identify regulators of 3D genome organization. **E. Joyce**<sup>1,2</sup>, **L.F. Rosin**<sup>1</sup>, **S. Nguyen**<sup>1</sup>; <sup>1</sup>University of Pennsylvania, Philadelphia, PA, <sup>2</sup>Penn Epigenetics Institute, Philadelphia, PA
- 1:25 pm E21 Mutations in nucleoporin NUP88 cause lethal neuromuscular disorder. **E. Bonnin**<sup>1,2</sup>, **P. Cabochette**<sup>2</sup>, **M. Hezwani**<sup>1</sup>, **B. Vanhollebeke**<sup>2</sup>, **B. Fahrenkrog**<sup>1</sup>; <sup>1</sup>IBMM, Biology of the Cell Nucleus, Universite Libre de Bruxelles, Charleroi, Belgium, <sup>2</sup>IBMM, Laboratory of Neurovascular Signaling, Universite Libre de Bruxelles, Charleroi, Belgium

#### ● Microsymposium 4: Cancer Cell Biology

**12:25-1:35 pm** **Microsymposia Room 2, Learning Center, Hall C**

- Moderators: **Scott Wilkinson**, NIH; and **Peter Yu**, Ohio State University
- 12:25 pm E22 Metastasis by tumor epithelial clusters requires E-cadherin expression. **V. Padmanaban**<sup>1</sup>, **A.J. Ewald**<sup>1</sup>; <sup>1</sup>Departments of Cell Biology and Oncology, Center for Cell Dynamics, Johns Hopkins University School of Medicine, Baltimore, MD
- 12:35 pm E23 Leader cells are defined by DNA hypermethylation and aberrant gene expression during collective lung cancer invasion. **E.R. Summerbell**<sup>1,2</sup>, **J. Bell**<sup>3,4</sup>, **J. Konen**<sup>1,2</sup>, **J. Kowalski**<sup>5</sup>, **P.M. Vertino**<sup>4</sup>, **A.I. Marcus**<sup>2</sup>; <sup>1</sup>Graduate Program in Cancer Biology, Emory University, Atlanta, GA, <sup>2</sup>Department of Hematology and Medical Oncology, Emory University, Atlanta, GA, <sup>3</sup>Graduate Program in Genetics and Molecular Biology, Emory University, Atlanta, GA, <sup>4</sup>Department of Radiation Oncology, Emory University, Atlanta, GA, <sup>5</sup>Department of Biostatistics and Bioinformatics, Emory University, Atlanta, GA
- 12:45 pm E24 Loss of MTSS1 results in increased metastatic potential in pancreatic cancer. **A.E. Zeleniak**<sup>1,2</sup>, **W. Huang**<sup>2,3</sup>, **M.K. Brinkman**<sup>2,3</sup>, **R. Hill**<sup>2,3</sup>; <sup>1</sup>Integrated Biomedical Sciences, University of Notre Dame, South Bend, IN, <sup>2</sup>Harper Cancer Research Institute, South Bend, IN, <sup>3</sup>Biological Sciences, University of Notre Dame, South Bend, IN
- 12:55 pm E25 Identification of drivers of chromosome instability in breast tumors. **K. Pfister**<sup>1</sup>, **J.L. Pipka**<sup>1</sup>, **C. Chiang**<sup>2</sup>, **R. Clark**<sup>1</sup>, **M.J. Guertin**<sup>1</sup>, **I. Hall**<sup>2</sup>, **T. Stukenberg**<sup>1</sup>; <sup>1</sup>Biochemistry and Molecular Genetics, University of Virginia, School of Medicine, Charlottesville, VA, <sup>2</sup>McDonnell Genome Institute, Washington University, St. Louis, St Louis, MO
- 1:05 pm E26 Prdm14-containing protein complexes regulate chromatin in stem cells, development and cancer. **N. Nady**<sup>1</sup>, **A. Gupta**<sup>2</sup>, **N. Arora**<sup>1</sup>, **T. Swigut**<sup>1</sup>, **A. Koide**<sup>2</sup>, **S. Koide**<sup>2</sup>, **J. Wysocka**<sup>1</sup>; <sup>1</sup>Department of Chemical and Systems Biology, Stanford University, Stanford, CA, <sup>2</sup>Department of Biochemistry and Molecular Pharmacology, New York University, New York, NY
- 1:15 pm E27 Analysis of the nature of Paclitaxel resistance in APC knockdown breast cancer cells. **B.J. Berkeley**<sup>1,2,3,4</sup>, **A.H. Arnason**<sup>2,3</sup>, **J.R. Prosper**<sup>1,2,3</sup>; <sup>1</sup>Biochemistry and Molecular Biology, Indiana University School of Medicine, South Bend, IN, <sup>2</sup>Biological Sciences, University of Notre Dame, South Bend, IN, <sup>3</sup>Harper Cancer Research Institute, South Bend, IN, <sup>4</sup>Smurfit Institute of Genetics, Trinity College Dublin, Dublin, Republic of Ireland
- 1:25 pm E28 HPV oncoproteins cause specific types of chromosomal instability in head and neck cancer. **L.C. Funk**<sup>1,2,3</sup>, **D.L. Lee**<sup>3</sup>, **P.F. Lambert**<sup>3,4</sup>, **R.J. Kimple**<sup>4,5</sup>, **B.A. Weaver**<sup>1,2,3</sup>; <sup>1</sup>Cell and Regenerative Biology, University of Wisconsin-Madison, Madison, WI, <sup>2</sup>Molecular and Cellular Pharmacology, University of Wisconsin-Madison, Madison, WI, <sup>3</sup>Oncology, University of Wisconsin-Madison, Madison, WI, <sup>4</sup>Carbone Cancer Center, University of Wisconsin-Madison, Madison, WI, <sup>5</sup>Human Oncology, University of Wisconsin-Madison, Madison, WI

#### ● Careers in Science Writing, Editing, and Communication Panel

**1:00-1:45 pm**

**Theater 3, Learning Center**

*Supported by HHMI*

**Veronica C. Casina**, Medical Writer, ETHOS Health Communications

**Connie Lee**, Assistant Dean, University of Chicago

**John Timmer**, Instructor, Alan Alda Center for Communicating Science, Stony Brook University

Pursuing a career in science communications is a popular alternative career; however, many students are not well informed of the options available within science communications. This panel will provide attendees the ability to interact with professionals

pursuing careers in science communication beyond journal editing. This session will be very interactive as it is fully based on questions from the audience.

**Veronica C. Casina** is a medical writer at ETHOS Health Communications, located in Yardley, PA. Casina received her BS in biochemistry from the University of Delaware and went on to Wake Forest University for her PhD in biochemistry. She returned to the Philadelphia area in January 2012 and did a 2.5 year postdoctoral fellowship at the Children's Hospital of Philadelphia, studying the enzyme ADAMTS13 and its role in the pathophysiology of thrombotic thrombocytopenic purpura (TTP). Following her postdoc, she worked for a year at a contract research organization before moving into medical communications as an account manager at AlphaBioCom. She has a passion for science and belonged in content development, so she moved to ETHOS in November 2016 and has been there for just over a year.

**Connie Lee** is the Associate Dean for Basic Science in the Biological Sciences Division at the University of Chicago, where she works to promote the research and graduate education missions. She received her PhD in the Molecular and Cellular Biology Program from the University of Wisconsin-Madison. After a postdoctoral fellowship in Munich, she worked for 11 years as a scientific editor at three different journals, including *FEBS Letters*, *EMBO Journal*, and *Cell*. Lee transitioned to academic administration roles at University of California, San Francisco in 2011 and has been at University of Chicago since 2014. In addition to her duties as Associate Dean, she currently chairs the ASCB Public Policy Committee and serves as an ASCB delegate to the Coalition for the Life Sciences Board of Directors.

**John Timmer** is the science editor at Ars Technica, where he writes and edits articles for an audience of technology and science enthusiasts. He also teaches for the Alan Alda Center for Communicating Science, where he focuses on getting scientists to communicate with the public more effectively. He received his PhD from the University of California, Berkeley, and did more than a decade of research at Cornell Medical College and Memorial Sloan-Kettering.

#### Outcomes:

1. Develop an understanding of the variety of career paths available for those interested in working in science communication
2. Gain an appreciation for the concrete steps you can take toward transitioning into careers in science writing and developing communications skills
3. Network with other people interested in science communications
4. Get feedback on your own communications project and ideas from science writing professionals

Target audience: graduate students, postdocs, faculty

## ● Exhibitor Tech Talk

1:00-1:45 pm

Theater 1, Learning Center

**Carl Zeiss Microcopy, LLC**

**Investigation of live cell dynamics with the Airyscan imaging technology**

Presenter: Dr. B. Christoffer Lagerholm

Level: Advanced

The Airyscan technology, which combines confocal imaging with a 0.2 AU pinhole, deconvolution, and pixel-reassignment in order to enhance both the spatial resolution and signal-to-noise-ratio, was recently developed to cover the gap between conventional confocal and super-resolution microscopy. Here, we present comparative results of the performance of the Airyscan technology by imaging of a variety of reference and biological specimens. These results show that the spatial resolution of Airyscan images, processed at default deconvolution settings, are similar to confocal images with a 0.2 AU pinhole setting but with significantly improved signal-to-noise-ratio. Our results also show that further resolution gains, up to a point, are possible by careful manipulation of the deconvolution settings. Finally, we show applications demonstrating the Airyscan imaging compatibility with live cell applications.

- **Exhibitor Tech Talk**

1:00-1:45 pm

Theater 2, Learning Center

**Andor Technology**

**3D and 4D microscopy image analysis in cell biology – Imaris technology for analysis of large, complex datasets and visualization of multimodal images (e.g. fluorescence, EM, transmitted light)**

Presenter: Meredith Price

Level: Intermediate

This session will focus on the improved technology for automated 3D/4D analysis of large microscopy images (100s GBs) and analysis tools for cell biologists including segmentation of cells, tissues or organs, tracking with cell division detection and system dynamics. Relevant applications include the following: tissue assembly and morphogenesis, nuclear organization, cell interactions, microtubule dynamics, neurobiology and cell migration. New possibilities for simultaneous visualization of multimodal images, including correlative light and electron microscopy, transmitted light or phase contrast will also be showcased.

- **Minorities Affairs Committee Awards Reception (by invitation only)**

1:00-2:00 pm

Roundtable Central Section 3, Learning Center

*Supported by the Burroughs Wellcome Fund*

This event showcases the winners of the judged poster session for undergraduate and graduate students, postdocs, and junior faculty awarded travel grants by the Minorities Affairs Committee (MAC). Prize winners give short oral presentations summarizing their work, and the reception offers an opportunity for networking among travel awardees, their faculty mentors, and committee members.

- **Meet the ASCB Committees**

1:15-1:45 pm

ASCB Booth 525, Learning Center

Members from the Public Information, Public Policy, and Membership Committees will be on hand to answer any questions you have.

- **In-Booth Presentation**

1:15-1:45 pm

Booth 539, Learning Center

**ALVEOLE**

**Controlling the chemistry and topography of the cellular microenvironment with quantitative protein photopatterning – demo**

Presenters: Matthieu Opitz, H el ene Delobel

We will show how PRIMO new photopatterning technology allows researchers to generate with high flexibility any shape of micropattern with multiple proteins, controlled density and precise alignment on all standard cell culture substrates (soft or stiff, flat or microstructured) and to fabricate microstructured substrates, in order to control the cellular microenvironment.

- **Even-Numbered Poster Presentations**

1:30-3:00 pm

Learning Center

- **Afternoon Refreshment Break**

1:30-3:30 pm

Learning Center

Join us for iced tea and snacks while visiting exhibitors and viewing posters.

● **Meet the Editor of CBE—Life Sciences Education**

1:45-2:30 pm

ASCB Booth 525, Learning Center



**Erin Dolan**  
University of Georgia  
Editor-in-Chief

Stop by for an informal discussion about the journal with Editor-in-Chief Erin Dolan.

● **Microsymposium 5: Cell Death, Cell Volume and Cytokinesis**

1:50-3:00 pm

Microsymposia Room 1, Learning Center, Hall C

Moderator: **Roberta Sala**, Stanford University

- 1:50 pm E29 Stem cell proliferation is induced by engulfment of apoptotic bodies from adjacent dying cells during epithelial tissue maintenance. **C.K. Brock**<sup>1</sup>, **S.T. Wallin**<sup>1</sup>, **A. Mandal**<sup>1</sup>, **E.A. Sumner**<sup>1</sup>, **G.T. Eisenhoffer**<sup>1</sup>; <sup>1</sup>Department of Genetics, The University of Texas MD Anderson Cancer Center, Houston, TX
- 2:00 pm E30 Two small GTPases function antagonistically in corpse removal of a developmental non-apoptotic dying cell. **L.M. Kutscher**<sup>1</sup>, **W. Keil**<sup>1</sup>, **S. Shaham**<sup>1</sup>; <sup>1</sup>Laboratory of Developmental Genetics, The Rockefeller University, New York, NY
- 2:10 pm E31 Cell tension and mechanical regulation of cell volume. **N.P. Gonzalez**<sup>1</sup>, **J. Tao**<sup>2</sup>, **N.D. Rochman**<sup>1</sup>, **K. Guan**<sup>3</sup>, **D. Wirtz**<sup>1</sup>, **S.X. Sun**<sup>1,2</sup>; <sup>1</sup>Chemical and Biomolecular Engineering, Johns Hopkins University, Baltimore, MD, <sup>2</sup>Mechanical Engineering, Johns Hopkins University, Baltimore, MD, <sup>3</sup>Pharmacology, UC San Diego, La Jolla, CA
- 2:20 pm E32 A cdc2 homolog is required for completion of oral development during regeneration and cell division in the giant ciliate *Stentor coeruleus*. **S.B. Reiff**<sup>1</sup>, **W.F. Marshall**<sup>1</sup>; <sup>1</sup>Biochemistry & Biophysics, UCSF, San Francisco, CA
- 2:30 pm E33 A novel correction mechanism regulates nuclear position and ensures proper DNA segregation during late cytokinesis. **A. Pacquelet**<sup>1</sup>, **M. Jousseau**<sup>1</sup>, **G. Michaux**<sup>1</sup>; <sup>1</sup>Institut de Génétique et de Développement de Rennes, CNRS, Université Rennes 1, Rennes, France
- 2:40 pm E34 FLIRT: Fast local infrared thermoptogenetics for spatiotemporal control of ts protein function during cytokinesis. **S. Hirsch**<sup>1</sup>, **S. Sundaramoorthy**<sup>2</sup>, **Y. Zhuravlev**<sup>1</sup>, **T. Davies**<sup>2</sup>, **J.C. Waters**<sup>3</sup>, **M.M. Shirasu-Hiza**<sup>1</sup>, **J. Dumont**<sup>4</sup>, **J.C. Canman**<sup>2</sup>; <sup>1</sup>Genetics and Development, Columbia University Medical Center, New York, NY, <sup>2</sup>Pathology and Cell Biology, Columbia University Medical Center, New York, NY, <sup>3</sup>Cell Biology, Harvard Medical School, Boston, MA, <sup>4</sup>Cell Division and Reproduction, Institut Jacques Monod, Paris, France
- 2:50 pm E35 Precise tuning of cortical contractility regulates mechanical equilibrium during cell division. **N. Taneja**<sup>1</sup>, **M.R. Bersi**<sup>2</sup>, **A.M. Fenix**<sup>1</sup>, **J.C. Snider**<sup>2</sup>, **J.A. Cooper**<sup>1</sup>, **R. Ohi**<sup>1</sup>, **V. Gama**<sup>1</sup>, **W.D. Merryman**<sup>2</sup>, **D.T. Burnette**<sup>1</sup>; <sup>1</sup>Cell and Developmental Biology, Vanderbilt University, Nashville, TN, <sup>2</sup>Biomedical Engineering, Vanderbilt University, Nashville, TN

● **Microsymposium 6: Cellular Regulation of the Cytoskeleton**

1:50-3:00 pm

Microsymposia Room 2, Learning Center, Hall C

Moderator: **Ashley Lakoduk**, University of Texas Southwestern Medical Center, Dallas

- 1:50 pm E36 Non-centrosomal microtubules and not the centrosome control endothelial cell polarity and sprouting angiogenesis. **M. Martin**<sup>1</sup>, **A. Veloso**<sup>1</sup>, **J. Wu**<sup>1</sup>, **F. Dequiedt**<sup>2</sup>, **E. Katrukha**<sup>1</sup>, **A. Akhmanova**<sup>1</sup>; <sup>1</sup>Cell Biology, Utrecht University, Utrecht, Netherlands, <sup>2</sup>GIGA-Molecular Biology in Diseases, University of Liège, Liege, Belgium

2:00 pm	E37	Non-random $\gamma$ -TuNA-dependent spatial patterning of microtubule nucleation at the Golgi. <b>A.A. Sanders<sup>1</sup>, K. Chang<sup>1</sup>, X. Zhu<sup>1</sup>, R.J. Thoppil<sup>1</sup>, W.R. Holmes<sup>2</sup>, I. Kaverina<sup>1</sup></b> ; <sup>1</sup> Cell and Developmental Biology, Vanderbilt University, Nashville, TN, <sup>2</sup> Physics and Astronomy, Vanderbilt University, Nashville, TN
2:10 pm	E38	The mitotic spindle is chiral due to torques generated by motor proteins. <b>J. Simunic<sup>1</sup>, B. Polak<sup>1</sup>, M. Novak<sup>2</sup>, Z. Boban<sup>2</sup>, B. Kuzmić<sup>1</sup>, N. Pavin<sup>2</sup>, I.M. Tolić<sup>1</sup></b> ; <sup>1</sup> Division of Molecular Biology, Ruđer Bošković Institute, Zagreb, Croatia, <sup>2</sup> Department of Physics, Faculty of Science, University of Zagreb, Zagreb, Croatia
2:20 pm	E39	Inhibitable kinesin motors to study intracellular trafficking. <b>M.F. Engelke<sup>1</sup>, B. Waas<sup>1</sup>, B.L. Allen<sup>1</sup>, K.J. Verhey<sup>1</sup></b> ; <sup>1</sup> Cell & Developmental Biology, University of Michigan Medical School, Ann Arbor, MI
2:30 pm	E40	Two isoforms of myosin-II cooperate to organize the fission yeast cytokinetic ring for maximal tension production. <b>S. Wang<sup>1</sup>, H.F. Chin<sup>2</sup>, S. Thiyagarajan<sup>1</sup>, E. Karatekin<sup>3</sup>, T.D. Pollard<sup>4</sup>, B. O'Shaughnessy<sup>2</sup></b> ; <sup>1</sup> Department of Physics, Columbia University, New York, NY, <sup>2</sup> Department of Chemical Engineering, Columbia University, New York, NY, <sup>3</sup> Department of Cellular and Molecular Physiology, Yale University, New Haven, CT, <sup>4</sup> Department of Molecular Cellular and Developmental Biology, Yale University, New Haven, CT
2:40 pm	E41	A novel role for nonmuscle myosin II monomers in regulation of focal adhesion dynamics. <b>M. Shutova<sup>1</sup>, T.M. Svitkina<sup>1</sup></b> ; <sup>1</sup> Biology, University of Pennsylvania, Philadelphia, PA
2:50 pm	E42	B cell mechanosensing: is it a myth? <b>S. Shaheen<sup>1</sup>, Z. Wan<sup>1</sup>, Z. Li<sup>1</sup>, W. Liu<sup>1</sup></b> ; <sup>1</sup> School of Life Sciences, Institute for Immunology, Tsinghua University, Beijing, China

### ● Exhibitor Tech Talk

2:00-2:45 pm

Theater 1, Learning Center

#### Allen Institute for Cell Science

#### The Allen Institute for Cell Science – resources to empower your research

Presenter: Allen Institute for Cell Science

Level: Introductory

We will introduce you to the publicly available data, tools, observations, methods, and cell lines produced by the Allen Institute for Cell Science. Learn about our legacy collection of endogenous fluorescently tagged human induced pluripotent stem cell lines highlighting key structures within the cell. See examples of, and how to navigate, our large, high replicate 3D image data sets showing the subcellular localization of each of these tagged structures, and hear about our microscopy pipeline. We will discuss instrumentation, automation, quality control, and 3D segmentations using the recently released CellProfiler 3.0. These data are integrated using deep neural networks to generate unified, integrated cell models. Take a guided tour through our website (<http://www.allencell.org>) and find out how our work can help you.

### ● Exhibitor Tech Talk

2:00-2:45 pm

Theater 2, Learning Center

#### Thermo Fisher Scientific Inc.

#### Thermo Scientific™ Amira Software© for Cell Biology, a new solution for interactive visualization and advanced analysis of 3D/4D image data

Presenter: Trevor Lancon

Level: Intermediate

Processing and analyzing experimental data to understand living cells and their processes can represent a unique challenge. During this talk we will present Amira Software for Cell Biology, which provides a comprehensive array of tools for the flexible and accurate analysis of time series data of cellular processes. Attendees will be able to discover the new tools and workflows for cell and particle tracking and analysis, filament tracing and editing, CLEM workflows, out-of-core volume management now supporting Bio-Formats, and also the flexible data import and new Python integration. Don't miss our talk!

## ● Careers in Industry Panel

2:00-2:45 pm

Theater 3, Learning Center

### *Supported by HHMI*

Panelist List:

**Greg Gatto**, Scientific Leader and GSK Fellow, GlaxoSmithKline  
**John Lich**, Scientific Leader, Scientific Investigator, GlaxoSmithKline  
**Michael Quigley**, Senior Director of Immunology, Bristol Myers Squibb

Pursuing a career in science research in industry is a logical alternative career path to pursuing an academic-based career. In fact, there are more than 22,000 people with PhDs in biology pursuing careers in industry, making it a very popular career choice. The goal of this session is to expose trainees to different career paths in industry and provide them with advice on how to successfully pursue a position in industry. The audience will guide the conversation, ensuring that topics are focused on the interests of the attendees.

**Greg Gatto** earned his MD/PhD from The Johns Hopkins University School of Medicine and went on to complete an NIH postdoctoral fellowship at Harvard Medical School. He is a biochemist and enzymologist with 10+ years' experience in pharmaceutical drug discovery. Gatto currently manages new target identification and validation efforts for heart failure indications at GlaxoSmithKline. He recently served as leader for a multidisciplinary program team focused on validation and lead optimization of a cardiac-specific protein kinase inhibitor. Gatto's scientific interests include early target identification strategies, mechanistic analysis of enzyme inhibition and receptor binding, biochemical assay development, and the study of protein structure/function by biophysical techniques.

**John Lich** is a Program Leader within the Immuno-Inflammation Therapeutic Area at GlaxoSmithKline. He earned his PhD in Microbiology and Immunology at the Indiana University School of Medicine in 2000 and completed his postdoctoral studies at the University of North Carolina Lineberger Comprehensive Cancer Center in 2006. After this, he was an assistant professor in the Department of Microbiology and Immunology at University of North Carolina before joining GSK in 2008. Since joining the company, Lich has been involved in early discovery, target validation, and translational studies for several programs including two that are currently in clinical trials for autoimmune disease.

**Michael Quigley** received his PhD in Immunology from Duke University, where his thesis work was centered on defining the mechanisms governing CD8 T cell memory differentiation in response to acute viral infection. He then went on to complete a postdoctoral fellowship at the Dana-Farber Cancer Institute and Harvard University focused on the molecular characterization and regulation of T cell differentiation in cancer and chronic viral infections. In 2009, Quigley transitioned to a position in biopharma with MedImmune, LLC, in Gaithersburg, MD and started his career in preclinical drug discovery research. Since then he has held positions of increasing responsibility in the preclinical oncology and immuno-oncology drug development space. He is now Senior Director of Immuno-Oncology Discovery Research at Bristol-Myers Squibb in Princeton, NJ.

Outcomes:

1. Learn the daily responsibilities for a variety of scientific research careers in industry
2. Gain insight into how to prepare and apply for a career in industry
3. Network with successful industry scientists

Target audience: undergraduate students, graduate students, postdocs, faculty

## ● Exhibitor Tech Talk

3:00-4:00 pm

Theater 2, Learning Center

### **GORYO Chemical, Inc.** **Fluorescent probes for intra and extracellular biology**

Presenter: Raj Singh, PhD

Level: Intermediate

Fluorescent probes are an essential suite of reagents to probe and elucidate extracellular as well as intracellular processes in biology. A number of unique, highly specific reactive oxygen species (ROS) probes, metallo detectors, acid sensors and enzymatic fluoros for glycobiology as well as proteases differentiated from existing probes through a single cleavage to liberate maximum

fluorescence will be presented. A series of silicon rhodamine based fluors for super resolution live cell imaging under physiological conditions in microscopy, as well as the corresponding highly photostable fluorescent (Stella Fluor™) derivatives that have been adapted as labels for cell permeable as well as impermeable applications such as flow cytometry will be described, in particular next generation Ca sensing probes that do not need detergents for permeabilization.

## ● FRED Mock Review (by invitation only)

3:00-6:00 pm

Room 107A

*Supported by a grant from the National Science Foundation*

### Faculty Research and Education Development (FRED) Mentoring Program Mock Grant Review Panel Session

This invitation-only session will assist FRED Program mentees in gaining a better understanding of the grant review process. The FRED Program is targeted toward junior faculty and senior postdoctoral fellows who are either from under-represented groups or are employed at colleges/universities that demonstrate a commitment to serving underrepresented minorities. The 2017-2018 FRED Program mentors and mentees will review the draft proposals and provide specific feedback for the FRED Program mentees with the aim of improving their future grant submissions.

## ● Keith R. Porter Lecture

3:15-4:00 pm

Terrace Ballroom 3



**Scott D. Emr**

Weill Institute for Cell and Molecular Biology, Cornell University

A2 Sorting out protein traffic in the endocytic pathway. **S.D. Emr**<sup>1</sup>; <sup>1</sup>Department of Molecular Biology and Genetics, Weill Institute, Cornell University, Ithaca, NY

### Past Porter Lecturers:

2016 – Eva Nogales  
2015 – Jonathan S. Weissman  
2014 – Michael P. Sheetz  
2013 – Timothy J. Mitchison  
2012 – Ari Helenius  
2011 – Jennifer Lippincott-Schwartz  
2010 – Tom Rapoport  
2009 – Ronald Vale  
2008 – Joseph Gall  
2007 – Lucille Shapiro  
2006 – Joseph Schlessinger  
2005 – Randy Schekman

2004 – Edward Salmon  
2003 – Roger Tsien  
2002 – Eric Wieschaus  
2001 – Susan Lindquist  
2000 – Joan Massague  
1999 – Elizabeth Blackburn  
1998 – James Spudich  
1997 – Pietro De Camilli  
1996 – Elaine Fuchs  
1995 – Leland Hartwell  
1994 – James Darnell  
1993 – Masatoshi Takeichi  
1992 – Joan Steitz

1991 – Christiane Nusslein-Volhard  
1990 – Kai Simons  
1989 – Thomas Pollard  
1988 – Marc Kirschner  
1987 – Michael S. Brown and Joseph L. Goldstein  
1986 – Gunter Blobel  
1985 – John Heuser  
1984 – David D. Sabatini  
1983 – J. Richard McIntosh  
1982 – Lewis G. Tilney

## ● Exhibitor Tech Talk

4:15-5:15 pm

Theater 2, Learning Center

### Horizon Discovery

**Gene edited cell models for target validation or disease modeling: the application of gene modulation and modification**

Presenter: Daniella Steel

Level: Intermediate

Horizon is at the forefront of gene editing and has a decade of executing over 2,000 gene editing projects, in more than 70 cell lines to provide customer focused solutions. Horizon builds human cell models to broaden the understanding of basic biological pathways, as well as gain knowledge of genetic drivers of diseases and targets for drug discovery. Here we will discuss the application

of the latest techniques of gene modulation and modification including 1) an introduction to CRISPR-Cas9 genome engineering, 2) important considerations to take when initiating your gene engineering project, 3) applications of CRISPR-Cas9 cell models, and 4) introduction and applications of CRISPRa and CRISPRi.

## ● ASCB-NCI Emerging Topic Symposium: Mitochondrial Crosstalk in Cancer Cell Biology

4:15-6:50 pm

Room 119A

*Jointly supported by the National Cancer Institute, NIH, and ASCB*

### Organizers and Speakers:

**Michael Graham Espey**, *Organizer*, National Cancer Institute, NIH

**Jodi Nunnari**, *Organizer*, University of California, Davis

Peroxisome-Mito Crosstalk in Cancer. **Cheryl Walker**, Baylor University

Emerging Roles of Mitochondrial SUMOylation in Cancer Biology. **Heidi McBride**, McGill University

Stromal to Cancer Cell mtDNA Transfer. **Jackie Bromberg**, Memorial Sloan Kettering Cancer Center

Mito-nuclear Signaling through Acetyl-CoA. **Kathryn Wellen**, University of Pennsylvania

All cells coordinate the number, connectivity, and organization of their various organelles to perform an assortment of specialized functions. Cancer cells can exploit inter-organelle networks in unique ways to transit functional states, generate heterogeneity, and overcome obstacles in adaptive responses. This interdisciplinary symposium will highlight basic mechanistic advances in how mitochondrial-organelle crosstalk is altered in cancer, and inform on the dynamic integrative nature of inter-organelle communication.

## ● Workshop: Mass Spectrometry

4:15-6:50 pm

Room 121B

### Modern Mass Spectrometry: How to Use MS for Quantitative and Functional Exploration of Proteins and Metabolites

#### Organizers and Speakers:

**Josephine Bunch**, *Co-Organizer*, National Physical Laboratory, Teddington, UK

**Sara Zanivan**, *Co-Organizer*, Cancer Research UK Beatson Institute, Glasgow, UK

**Richard Goodwin**, AstraZeneca, Cambridge, UK

**Joshua Rabinowitz**, Princeton University

Modern mass spectrometry (MS) has become a powerful technology that provides unprecedented insights into the composition, functions, and dynamics of proteomes and metabolism. This workshop will describe the principles underlying MS-based strategies and the wide range of applications of MS to quantitatively and functionally assess proteins and metabolites. In the first part of the workshop, we will discuss state-of-the-art MS technology and its use for proteomics in cell biology and for exploring metabolism at the organism level. In the second part we will review current performance of imaging mass spectrometry methods, for analysis of drugs, tissue metabolites, and proteins—from subcellular resolution to high throughput tissue imaging. The workshop will finish with a question-and-answer session with the speakers. Questions related to how to integrate MS to answer specific questions in your research are welcome. No previous background is required.

## ● Minisymposium 1: Bacterial Infection and Symbiosis

4:15-6:50 pm

Room 114

Co-Chairs: **Marek Basler**, Biozentrum, University of Basel; and **Feng Shao**, National Institute of Biological Sciences, Beijing

4:15 pm Introduction

4:20 pm M1 Pyroptosis: from innate immunity to cancer. **F. Shao**<sup>1</sup>; <sup>1</sup>National Institute of Biological Sciences, Beijing, China

4:35 pm M2 Spatial organization of the human tongue dorsum microbiome at the micron scale. **S.A. Wilbert**<sup>1</sup>, **J.L. Mark Welch**<sup>2</sup>, **F.E. Dewhirst**<sup>1,3</sup>, **G.G. Borisy**<sup>1,3</sup>; <sup>1</sup>The Forsyth Institute, Cambridge, MA, <sup>2</sup>Marine Biological Laboratory, Woods Hole, MA, <sup>3</sup>Harvard School of Dental Medicine, Boston, MA



- \*4:50 pm M3 Microbe-host mitochondria signaling crosstalk in metabolic health and longevity. **M.C. Wang**<sup>1,2</sup>; <sup>1</sup>Molecular and Human Genetics, Baylor College of Medicine, Houston, TX, <sup>2</sup>Huffington Center on Aging, Baylor College of Medicine, Houston, TX
- 5:05 pm M4 Monte Carlo simulations of *Listeria monocytogenes* cell-cell spread predict a stratified spreading behavior crucial for survival in the intestinal epithelium. **F.E. Ortega**<sup>1</sup>, **E.F. Koslover**<sup>2</sup>, **J.A. Theriot**<sup>1,3,4</sup>; <sup>1</sup>Biochemistry, Stanford School of Medicine, Stanford, CA, <sup>2</sup>Physics, University of California San Diego, San Diego, CA, <sup>3</sup>Microbiology and Immunology, Stanford School of Medicine, Stanford, CA, <sup>4</sup>Howard Hughes Medical Institute, Stanford, CA
- 5:20 pm M5 Chlamydia interfere with an interaction between the mannose-6-phosphate receptor and sorting nexins to counteract host restriction. **C. Elwell**<sup>1</sup>, **N. Czudnochowski**<sup>1</sup>, **K. Pha**<sup>1</sup>, **J. Von Dollen**<sup>2</sup>, **J. Johnson**<sup>2</sup>, **R. Nakagawa**<sup>1</sup>, **J. Sherry**<sup>3</sup>, **K. Mirrashidi**<sup>1</sup>, **N. Krogan**<sup>2</sup>, **O. Rosenberg**<sup>1</sup>, **J.N. Engel**<sup>1,4</sup>; <sup>1</sup>Medicine, University of California, San Francisco, San Francisco, CA, <sup>2</sup>Cellular and Molecular Pharmacology, University of California, San Francisco, San Francisco, CA, <sup>3</sup>Biochemistry, University of California, San Francisco, San Francisco, CA, <sup>4</sup>Microbiology/Immunology, University of California, San Francisco, San Francisco, CA
- 5:35 pm M6 Structure, function and dynamics of the bacterial Type VI secretion systems. **M. Basler**<sup>1</sup>; <sup>1</sup>Biozentrum, University of Basel, Basel, Switzerland
- 5:50 pm M7 A Rab32 trafficking pathway that prevents bacterial infections. **M. Baldassarre**<sup>1</sup>, **V. Solano-Collado**<sup>1</sup>, **D. Mancuso**<sup>1</sup>, **S. Spano**<sup>1</sup>; <sup>1</sup>Institute of Medical Sciences, University of Aberdeen, Aberdeen, United Kingdom
- 6:05 pm M8 Linking ISG15 to Cellular Stress Responses: Lessons from *Listeria* infection. **L. Radoshevich**<sup>1,2</sup>, **M. Foecke**<sup>1</sup>, **F. Impens**<sup>3</sup>, **K. Knobloch**<sup>4</sup>, **P. Cossart**<sup>1</sup>; <sup>1</sup>Bacteria Cell Interactions, Institut Pasteur, Paris, France, <sup>2</sup>Microbiology, University of Iowa, Iowa City, IA, <sup>3</sup>Proteomics Expertise Center, VIB, University of Ghent, Ghent, Belgium, <sup>4</sup>Institute of Neuropathology, University Clinic Freiburg, Freiburg, Germany
- 6:20 pm M9 *Neisseria gonorrhoeae* modifies its infectivity based on the properties of human cervical epithelial cells. **Q. Yu**<sup>1</sup>, **L. Wang**<sup>1</sup>, **D.C. Stein**<sup>1</sup>, **W. Song**<sup>1</sup>; <sup>1</sup>Cell Biology and Molecular Genetics, University of Maryland, College Park, MD
- 6:35 pm M10 Zebrafish modeling defines complex innate immune mechanisms in sepsis and repetitive intestinal injury. **L. Chuang**<sup>1</sup>, **N. Hsu**<sup>1</sup>, **P. Labrias**<sup>1</sup>, **S. Nayar**<sup>1</sup>, **J. Facey**<sup>1</sup>, **K. Gettler**<sup>2</sup>, **N. Villaverde**<sup>1</sup>, **G. Boschetti**<sup>3</sup>, **M.A. Mucci**<sup>1</sup>, **E. Chen**<sup>1</sup>, **M. Giri**<sup>1</sup>, **Y. Sharma**<sup>1</sup>, **M. Merad**<sup>3</sup>, **J. Chu**<sup>4</sup>, **J. Cho**<sup>1</sup>; <sup>1</sup>Department of Genetics and Genomic Sciences, Icahn School of Medicine at Mount Sinai, New York, NY, <sup>2</sup>Department of Genetics, Yale University, New Haven, CT, <sup>3</sup>Department of Oncological Sciences, Icahn School of Medicine at Mount Sinai, New York, NY, <sup>4</sup>Department of Pediatrics and Mindich Institute for Child Health, Icahn School of Medicine at Mount Sinai, New York, NY  
\* Meng Wang is the 2017 ASCB Early Career Life Scientist Awardee.

## ● Minisymposium 2: Functions and Mechanisms of Cytoskeletal Motors

4:15-6:50 pm

Room 113B

- Co-Chairs: **Arne Gennerich**, Albert Einstein College of Medicine; and **Andrew Carter**, MRC Laboratory of Molecular Biology
- 4:15 pm Introduction
- 4:20 pm M11 Mitochondria distribution to filopodia by the actin-based motor Myo19. **B.I. Shneyer**<sup>1</sup>, **M. Usaj**<sup>1</sup>, **N. Wiesel-Motiuk**<sup>1</sup>, **R. Regev**<sup>1</sup>, **A. Henn**<sup>1</sup>; <sup>1</sup>Biology, Technion-Israel Institute of Technology, Haifa, Israel
- 4:35 pm M12 The 3.5Å cryoEM structure of a fast dynein/dynein complex. **L. Urnavicius**<sup>1</sup>, **C.K. Lau**<sup>1</sup>, **M.M. Elshenawy**<sup>2</sup>, **E. Morales**<sup>1</sup>, **A. Yildiz**<sup>2</sup>, **A.P. Carter**<sup>1</sup>; <sup>1</sup>MRC LMB, Cambridge, United Kingdom, <sup>2</sup>UC Berkeley, Berkeley, CA
- 4:50 pm M13 KIF1C1, a mitotic motor protein expressed throughout the life of the neuron, is enriched in the distal region of the axon where it crosslinks microtubules in a manner that opposes axon retraction. **H. Muralidharan**<sup>1</sup>, **X. Sun**<sup>1</sup>, **P.W. Baas**<sup>1</sup>; <sup>1</sup>Neurobiology & Anatomy, Drexel University College of Medicine, Philadelphia, PA
- 5:05 pm M14 Molecular mechanism of dynein's direction-dependent microtubule-binding strength. **L. Rao**<sup>1</sup>, **F. Berger**<sup>2</sup>, **M.P. Nicholas**<sup>1</sup>, **A. Gennerich**<sup>1</sup>; <sup>1</sup>Anatomy and Structural Biology, Albert Einstein College of Medicine, Bronx, NY, <sup>2</sup>Rockefeller University, New York, NY
- 5:20 pm M15 Myosin IIA controls red blood cell membrane morphology and mechanical properties. **A.S. Smith**<sup>1</sup>,

		<b>R.B. Nowak<sup>1</sup>, S. Zhou<sup>2</sup>, J. Wan<sup>2</sup>, I.C. Ghiran<sup>3</sup>, V.M. Fowler<sup>1</sup></b> ; <sup>1</sup> Molecular Medicine, The Scripps Research Institute, La Jolla, CA, <sup>2</sup> Microsystems Engineering, Rochester Institute of Technology, Rochester, NY, <sup>3</sup> Medicine, Beth Israel Deaconess Medical Center, Boston, MA
5:35 pm	M16	IDA3 associates with IFT in growing cilia to selectively mediate transport and assembly of axonemal I1 dynein. <b>E.L. Hunter<sup>1</sup>, J. Hwang<sup>1</sup>, G. Fu<sup>2</sup>, L.M. Alford<sup>3</sup>, A. Gokhale<sup>1</sup>, R. Yamamoto<sup>4</sup>, R. Kamiya<sup>5</sup>, H. Lin<sup>6</sup>, F. Yang<sup>7</sup>, D. Nicastro<sup>2</sup>, K.F. Lehtreck<sup>8</sup>, M. Wirschell<sup>7</sup>, S.K. Dutcher<sup>6</sup>, W.S. Sale<sup>1</sup></b> ; <sup>1</sup> Department of Cell Biology, Emory University, Atlanta, GA, <sup>2</sup> Department of Cell Biology and Biophysics, UT Southwestern Medical Center, Dallas, TX, <sup>3</sup> Department of Biology, Oglethorpe University, Atlanta, GA, <sup>4</sup> Department of Biological Sciences, Osaka University, Osaka, Japan, <sup>5</sup> Department of Biological Sciences, Chuo University, Tokyo, Japan, <sup>6</sup> Department of Genetics, Washington University School of Medicine, St. Louis, MO, <sup>7</sup> Department of Biochemistry, University of Mississippi Medical Center, Jackson, MS, <sup>8</sup> Department of Cellular Biology, University of Georgia, Athens, GA
5:50 pm	M17	Kinesin-2 motors adapted their stepping behaviour for progressive transport on axonemes and microtubules. <b>W. Stepp<sup>1</sup>, G. Merck<sup>1</sup>, F. Mueller-Planitz<sup>2</sup>, Z. Ökten<sup>1,3</sup></b> ; <sup>1</sup> Department für Physik, Technische Universität München, Munich, Germany, <sup>2</sup> Biomedical Center, Ludwigs Maximilians Universität, Munich, Germany, <sup>3</sup> Munich Center for Integrated Protein Science, Munich, Germany
6:05 pm	M18	She1 affects dynein by interactions with the microtubule and the dynein microtubule-binding domain. <b>K. Ecklund<sup>1</sup>, T. Morisaki<sup>1</sup>, L.G. Lammers<sup>1</sup>, M.G. Marzo<sup>1</sup>, T.J. Stasevich<sup>1</sup>, S.M. Markus<sup>1</sup></b> ; <sup>1</sup> Biochemistry & Molecular Biology, Colorado State University, Fort Collins, CO
6:20 pm	M19	Regulated autoinhibition of kinesin-1 is essential to polarized dendritic transport. <b>M.T. Kelliher<sup>1</sup>, Y. Yue<sup>2</sup>, A. Ng<sup>1</sup>, D. Kamiyama<sup>3</sup>, B. Huang<sup>4</sup>, K.J. Verhey<sup>2</sup>, J. Wildonger<sup>1</sup></b> ; <sup>1</sup> Biochemistry, University of Wisconsin - Madison, Madison, WI, <sup>2</sup> Cell and Developmental Biology, University of Michigan, Ann Arbor, MI, <sup>3</sup> Cellular Biology, University of Georgia, Athens, GA, <sup>4</sup> Department of Pharmaceutical Chemistry, University of California - San Francisco, San Francisco, CA
6:35 pm	M20	CDK5-dependent activation of dynein in the axon initial segment regulates polarized cargo transport in neurons. <b>E. Klinman<sup>1</sup>, M. Tokito<sup>2</sup>, E.L. Holzbaur<sup>2</sup></b> ; <sup>1</sup> Neuroscience, Perelman School of Medicine at the University of Pennsylvania, Philadelphia, PA, <sup>2</sup> Physiology, Perelman School of Medicine at the University of Pennsylvania, Philadelphia, PA

### ● Minisymposium 3: Inside the Nucleus: Genome Organization and Gene Expression

4:15-6:50 pm

Room 115B

#### Supported by The Journal of Cell Biology

Co-Chairs: **Trevor K. Archer**, National Institute of Environmental Health Sciences, NIH; and **Clifford Brangwynne**, Princeton University

4:15 pm		Introduction
4:20 pm	M21	RICC-seq: Variable chromatin structure revealed by in situ spatially correlated DNA cleavage mapping. <b>V.I. Risca<sup>1</sup>, S.K. Denny<sup>2</sup>, A.F. Straight<sup>3,4</sup>, W.J. Greenleaf<sup>1</sup></b> ; <sup>1</sup> Genetics, Stanford University School of Medicine, Stanford, CA, <sup>2</sup> Biophysics, Stanford University, Stanford, CA, <sup>3</sup> Biochemistry, Stanford University School of Medicine, Stanford, CA, <sup>4</sup> Chemical and Systems Biology, Stanford University School of Medicine, Stanford, CA
4:35 pm	M22	Chromatin dependent glucocorticoid receptor plasticity within the genome. <b>J.A. Hoffman<sup>1</sup>, K.W. Trotter<sup>1</sup>, T.K. Archer<sup>1</sup></b> ; <sup>1</sup> Epigenetics and Stem Cell Biology Laboratory, National Institute of Environmental Health Sciences, Research Triangle Park, NC
4:50 pm	M23	Single-Molecule Analysis of Transcription Factors in the Nucleus of Living Cells. <b>V. Paakinaho<sup>1</sup>, D.M. Presman<sup>1</sup>, D.A. Ball<sup>1</sup>, T.S. Karpova<sup>1</sup>, E.E. Swinstead<sup>1</sup>, G.L. Hager<sup>1</sup></b> ; <sup>1</sup> NCI, NIH, Bethesda, MD
5:05 pm	M24	CRISPR-Based DNA Imaging in Living Cells Reveals Cell Cycle-Dependent Chromosome Dynamics. <b>H. Ma<sup>1</sup>, L. Tu<sup>2</sup>, A. Naseri<sup>3</sup>, Y. Chung<sup>4</sup>, D. Grunwald<sup>2</sup>, S. Zhang<sup>3</sup>, T. Pederson<sup>1</sup></b> ; <sup>1</sup> Biochemistry and Molecular Pharmacology, University of Massachusetts Medical School, Worcester, MA, <sup>2</sup> RNA Therapeutics Institute, University of Massachusetts Medical School, Worcester, MA, <sup>3</sup> Department of Computer Science, University of Central Florida, Orlando, MA, <sup>4</sup> Kavli Institute for the Physics and Mathematics of the Universe, University of Tokyo, Tokyo, Japan
5:20 pm	M25	Interphase chromatin is adaptively folded by ongoing transcription and RNA accumulation. <b>L. Hilbert<sup>1,2,3</sup>, Y. Sato<sup>4</sup>, H. Kimura<sup>4</sup>, F. Julicher<sup>2,3</sup>, A. Honigmann<sup>1</sup>, V. Ziburdaev<sup>2,3</sup>, N. Vastenhouw<sup>1</sup></b> ; <sup>1</sup> Max Planck Institute of Molecular Cell Biology and Genetics, Dresden, Germany, <sup>2</sup> Max Planck Institute for the Physics of Complex Systems, Dresden, Germany, <sup>3</sup> Center for Systems Biology

		Dresden, Dresden, Germany, <sup>4</sup> Tokyo Institute of Technology, Tokyo, Japan
5:35 pm	M26	Chromatin state contributes to nuclear mechanics. <b>J.F. Johnston<sup>1</sup>, S. Mochrie<sup>2,3</sup>, M.C. King<sup>1</sup></b> ; <sup>1</sup> Department of Cell Biology, Yale School of Medicine, New Haven, CT, <sup>2</sup> Department of Physics, Yale University, New Haven, CT, <sup>3</sup> Department of Applied Physics, Yale University, New Haven, CT
5:50 pm	M27	Lamin A regulates the activity and dynamics of nucleoli. <b>A.L. Buchwalter<sup>1</sup>, M.W. Hetzer<sup>1</sup></b> ; <sup>1</sup> Molecular and Cell Biology Laboratory, The Salk Institute for Biological Studies, La Jolla, CA
6:05 pm	M28	Optogenetic control of nuclear body assembly. <b>H. Zhang<sup>1</sup>, C. Aonbangkhen<sup>2</sup>, M. Liu<sup>1</sup>, R. Dilley<sup>3</sup>, R.A. Greenberg<sup>3</sup>, D.M. Chenoweth<sup>2</sup>, M.A. Lampson<sup>1</sup></b> ; <sup>1</sup> Biology, University of Pennsylvania, Philadelphia, PA, <sup>2</sup> Chemistry, University of Pennsylvania, Philadelphia, PA, <sup>3</sup> Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA
6:20 pm	M29	Contribution of Nucleus Size and Cell Size to Genome Activation. <b>C. Hui<sup>1</sup>, R. Fuentes<sup>1</sup>, M.C. Mullins<sup>1</sup>, M.C. Good<sup>1,2</sup></b> ; <sup>1</sup> Cell and Developmental Biology, University of Pennsylvania, Philadelphia, PA, <sup>2</sup> Bioengineering, University of Pennsylvania, Philadelphia, PA
6:35 pm	M30	Nuclear organogenesis requires nuclear surface area regulation through nucleo-cytoplasmic trafficking. <b>V. Boudreau<sup>1,2</sup>, J. Hazel<sup>3</sup>, J. Sellinger<sup>1</sup>, H.G. Garcia<sup>2,4,5</sup>, J.F. Allard<sup>6</sup>, J.C. Gatlin<sup>3</sup>, P.S. Maddox<sup>1</sup></b> ; <sup>1</sup> Biology, University of North Carolina at Chapel Hill, Chapel Hill, NC, <sup>2</sup> Physiology Course, Marine Biological Laboratory, Woods Hole, MA, <sup>3</sup> Molecular Biology, University of Wyoming, Laramie, WY, <sup>4</sup> Molecular Cell Biology, University of California, Berkeley, Berkeley, CA, <sup>5</sup> Physics, University of California, Berkeley, Berkeley, CA, <sup>6</sup> Mathematics, University of California, Irvine, Irvine, CA

#### ● Minisymposium 4: Multicellular Interactions: Tissue Assembly and Morphogenesis

4:15-6:50 pm		Room 120B
		Co-Chairs: <b>Matthew J. Tyska</b> , Vanderbilt University; and <b>Danelle Devenport</b> , Princeton University
4:15 pm		Introduction
4:20 pm	M31	Fish scales dictate the pattern of adult skin innervation. <b>J.P. Rasmussen<sup>1</sup>, N. Vo<sup>1</sup>, A. Sagasti<sup>1</sup></b> ; <sup>1</sup> Molecular, Cellular and Developmental Biology, University of California, Los Angeles, Los Angeles, CA
*4:35 pm	M32	Profiling the gene set controlling <i>C. elegans</i> embryonic development using an automated method that enables phenotypic comparison in 4D imaging data. <b>R.A. Green<sup>1,2</sup>, R. Khaliullin<sup>1,2</sup>, S. Ochoa Mikrut<sup>2</sup>, Z. Zhao<sup>1,2</sup>, S. Wang<sup>3</sup>, J. Hendel<sup>1,2</sup>, R. Biggs<sup>4</sup>, A. Gerson<sup>1</sup>, A.B. Desai<sup>1,2</sup>, K. Oegema<sup>1,2</sup></b> ; <sup>1</sup> Ludwig Institute for Cancer Research, La Jolla, CA, <sup>2</sup> Cellular and Molecular Medicine, University of California, San Diego, La Jolla, CA, <sup>3</sup> National Institutes of Health/NIDCR, Bethesda, MD, <sup>4</sup> Department of Molecular Biosciences, Northwestern University, Evanston, IL
4:50 pm	M33	Counter-rotational cell flows drive morphological and cell fate asymmetries in mammalian hair follicles. <b>M. Cetera<sup>1</sup>, L. Leybova<sup>1</sup>, B. Joyce<sup>1</sup>, D. Devenport<sup>1</sup></b> ; <sup>1</sup> Molecular Biology, Princeton University, Princeton, NJ
5:05 pm	M34	Planar polarized Rab35 functions as an oscillatory ratchet during cell intercalation. <b>C. Jewett<sup>1</sup>, T. Vanderleest<sup>2</sup>, H. Miao<sup>1</sup>, Y. Xie<sup>1</sup>, D. Loerke<sup>2</sup>, J.T. Blankenship<sup>1</sup></b> ; <sup>1</sup> Biological Sciences, University of Denver, Denver, CO, <sup>2</sup> Physics, University of Denver, Denver, CO
5:20 pm	M35	Erk-dependent control of epithelial morphogenesis. <b>H.E. Johnson<sup>1</sup>, S.Y. Shvartsman<sup>2,3</sup>, J.E. Toettcher<sup>1</sup></b> ; <sup>1</sup> Molecular Biology, Princeton University, Princeton, NJ, <sup>2</sup> Chemical and Biological Engineering, Princeton University, Princeton, NJ, <sup>3</sup> Lewis-Sigler Institute for Integrative Genomics, Princeton University, Princeton, NJ
5:35 pm	M36	Role of Cdc42 Pathways in Regulating Group Cooperation and the Transition to Differentiated Multicellularity. <b>J. Chow<sup>1</sup>, H.M. Dionne<sup>1</sup>, A. Prabhakar<sup>1</sup>, A. Mehrotra<sup>1</sup>, J. Somboothum<sup>1</sup>, M. Edgerton<sup>2</sup>, P.J. Cullen<sup>1</sup></b> ; <sup>1</sup> Biological Sciences, SUNY-Buffalo, Buffalo, NY, <sup>2</sup> Oral Biology, SUNY-Buffalo, Buffalo, NY
5:50 pm	M37	Cytoneme-mediated cell-cell communication creates a morphogenetic gradient of FGF during branching morphogenesis of <i>Drosophila</i> trachea. <b>L. Du<sup>1</sup>, S. Roy<sup>1</sup></b> ; <sup>1</sup> Cell Biology and Molecular Genetics, University of Maryland, College Park, MD
6:05 pm	M38	Cell-cell fusion facilitates aneuploidy tolerance in a developing organ. <b>N.G. Peterson<sup>1</sup>, K.P. Schoenfelder<sup>2</sup>, B.M. Stormo<sup>1</sup>, R. Lee<sup>2</sup>, D.T. Fox<sup>2</sup></b> ; <sup>1</sup> Cell Biology, Duke University, Durham, NC, <sup>2</sup> Pharmacology and Cancer Biology, Duke University, Durham, NC
6:20 pm	M39	A microtissue-building toolbox to study biophysical effects on cell dynamics. <b>W. Jung<sup>1</sup>, K. Elawad<sup>1</sup>, D. Maity<sup>1</sup>, J. Kim<sup>1</sup>, S. Park<sup>1</sup>, S.X. Sun<sup>1</sup>, S.H. Kang<sup>1</sup>, Y. Chen<sup>1</sup></b> ; <sup>1</sup> Mechanical Engineering, Johns Hopkins University, Baltimore, MD

- 6:35 pm M40 Cell shortening for epithelial folding via a polarity-coupled, homeostatic microtubule scaffold. **M. Takeda<sup>1</sup>, M.M. Sami<sup>1</sup>, Y. Wang<sup>1</sup>**; <sup>1</sup>Laboratory for Epithelial Morphogenesis, RIKEN Center for Developmental Biology, Kobe, Japan  
\*Karen Oegema is the WICB Mid-Career Awardee for Excellence in Research.

## ● Minisymposium 5: Organelles in Metabolism and Stress Responses

4:15-6:50 pm

Room 118B

Co-Chairs: **Mike Henne**, UT Southwestern Medical Center; and **Shawn M. Ferguson**, Yale University

- 4:15 pm Introduction
- 4:20 pm M41 Lipid Droplet Biogenesis Is Spatially Coordinated at Yeast ER-Lysosome Contact Sites in Response to Nutritional Stress. **H. Hariri<sup>1</sup>, S. Rogers<sup>1</sup>, R. Ugrankar<sup>1</sup>, Y. Liu<sup>1</sup>, R. Feathers<sup>1</sup>, M. Henne<sup>1</sup>**; <sup>1</sup>Cell Biology, UT Southwestern Medical Center, Dallas, TX
- 4:35 pm M42 Measurement of caveolin-1 densities in the cell membrane for quantification of caveolar deformation after exposure to hypotonic membrane tension. **M. Tachikawa<sup>1</sup>, N. Morone<sup>2</sup>, S. Suetsugu<sup>3</sup>**; <sup>1</sup>Theoretical Biology Laboratory, RIKEN, Wako, Japan, <sup>2</sup>MRC Toxicology Unit, University of Leicester, Leicester, United Kingdom, <sup>3</sup>Graduate School of Biological Sciences, Nara Institute of Science and Technology, Ikoma, Japan
- \* 4:50 pm M43 Membrane dynamics during cellular wound repair. **N.R. Davenport<sup>1,2</sup>, K.J. Sonnemann<sup>3</sup>, K.W. Eliceiri<sup>3,4</sup>, W.M. Bement<sup>1,3,5</sup>**; <sup>1</sup>Program in Cellular and Molecular Biology, University of Wisconsin-Madison, Madison, WI, <sup>2</sup>Thermo Fisher Scientific, Eugene, OR, <sup>3</sup>Laboratory of Cell and Molecular Biology, University of Wisconsin-Madison, Madison, WI, <sup>4</sup>Laboratory for Optical and Computational Instrumentation, University of Wisconsin-Madison, Madison, WI, <sup>5</sup>Department of Zoology, University of Wisconsin-Madison, Madison, WI
- 5:05 pm M44 Deciphering the function of CLYBL, a missing human gene and a mitochondrial orphan metabolic enzyme. **H. Shen<sup>1</sup>, V. Mootha<sup>1</sup>**; <sup>1</sup>Department of Molecular Biology, Massachusetts General Hospital/Howard Hughes Medical Institute, Boston, MA
- 5:20 pm M45 The Unfolded Protein Response Maintains Lipid Homeostasis by Selective Autophagy during Lipid Perturbation-Induced ER Stress. **J. Koh<sup>1</sup>, L. Wang<sup>2</sup>, C. Beaudoin-Chabot<sup>1</sup>, G. Thibault<sup>1,2</sup>**; <sup>1</sup>School of Biological Sciences, Nanyang Technological University, Singapore, Singapore, <sup>2</sup>Lee Kong Chian School of Medicine, Nanyang Technological University, Singapore, Singapore
- 5:35 pm M46 TFEB regulates lysosomal positioning by modulating TMEM55B expression and JIP4 recruitment to lysosomes. **R.A. Willett<sup>1</sup>, J.A. Martina<sup>1</sup>, G. Hammond<sup>2</sup>, J.P. Zewe<sup>2</sup>, R. Puertollano<sup>1</sup>**; <sup>1</sup>NHLBI, National Institute of Health, Bethesda, MD, <sup>2</sup>Cell Biology, University of Pittsburgh School of Medicine, Pittsburgh, PA
- 5:50 pm M47 Mitochondrial subpopulations exhibit differential dynamic responses to support increased energy demand during exocytosis. **N. Porat-Shliom<sup>1</sup>, L.N. Malec<sup>1</sup>, O. Harding<sup>1</sup>, R. Weigert<sup>1</sup>**; <sup>1</sup>Laboratory of Cellular and Molecular Biology, National Institute of Health, NCI, Bethesda, MD
- 6:05 pm M48 Regulated recruitment of C9orf72 to lysosomes supports diverse signaling and degradative functions. **J. Amick<sup>1</sup>, A. Tharkeshwar<sup>1</sup>, C. Amaya<sup>1</sup>, S.M. Ferguson<sup>1</sup>**; <sup>1</sup>Cell Biology, Yale University, New Haven, CT
- 6:20 pm M49 3D ultrastructural analysis of the progressive restructuring of the endoplasmic reticulum by a coronavirus provides insight into its subversion of the ERAD tuning pathway. **E.M. Mihelc<sup>1</sup>, S.A. Tinney<sup>1</sup>, S.C. Baker<sup>2</sup>, J.K. Lanman<sup>1</sup>**; <sup>1</sup>Biological Sciences, Purdue University, West Lafayette, IN, <sup>2</sup>Microbiology and Immunology, Loyola University Chicago Stritch School of Medicine, Maywood, IL
- 6:35 pm M50 The peroxisomal AAA-ATPase Pex1/Pex6 unfolds substrates by processive threading. **B.M. Gardner<sup>1</sup>, D.T. Castanzo<sup>1</sup>, S. Chowdhury<sup>2</sup>, G. Stjepanovic<sup>1,3</sup>, M.S. Stefely<sup>1</sup>, J.H. Hurley<sup>1,3,4</sup>, G.C. Lander<sup>2</sup>, A. Martin<sup>1,4,5</sup>**; <sup>1</sup>Molecular and Cell Biology, University of California, Berkeley, Berkeley, CA, <sup>2</sup>Department of Integrative Structural and Computational Biology, The Scripps Research Institute, La Jolla, CA, <sup>3</sup>Molecular Biophysics and Integrated Bioimaging Division, Lawrence Berkeley National Laboratory, Berkeley, CA, <sup>4</sup>California Institute for Quantitative Biosciences, University of California, Berkeley, Berkeley, CA, <sup>5</sup>University of California, Berkeley, Howard Hughes Medical Institute, Berkeley, CA  
\*Nick Davenport is the recipient of the *Molecular Biology of the Cell* Paper of the Year Award.

## ● Minisymposium 6: Regulation of Cell Size, Mitosis and Meiosis

4:15-6:50 pm		Room 108A
Co-Chairs: <b>Eduardo Torres</b> , University Massachusetts Medical School; and <b>Silke Hauf</b> , Virginia Tech		
4:15 pm		Introduction
4:20 pm	M51	Prevalence and Regulation of Cell-Size-Independent Gene Expression. <b>D. Chandler-Brown<sup>1</sup>, K.M. Schmoller<sup>1</sup>, J.M. Skotheim<sup>1</sup></b> ; <sup>1</sup> Biology, Stanford University, Stanford, CA
4:35 pm	M52	Supergrowth: Effect of osmotic oscillations on the rate of cell growth and the regulation of the proteome. <b>B. Knapp<sup>1</sup>, E.R. Rojas<sup>2</sup>, K.C. Huang<sup>2</sup>, F. Chang<sup>1</sup></b> ; <sup>1</sup> Cell and Tissue Biology, UCSF, San Francisco, CA, <sup>2</sup> Bioengineering, Stanford, Stanford, CA
4:50 pm	M53	Mechanistic Basis of Spindle Size Control and Scaling. <b>R. Farhadifar<sup>1,2</sup>, G. Fabig<sup>3</sup>, M. Rockman<sup>4</sup>, M.J. Shelley<sup>1</sup>, D.J. Needleman<sup>2</sup></b> ; <sup>1</sup> Center for Computational Biology, Flatiron Institute, New York, NY, <sup>2</sup> Molecular and Cell Biology, Harvard University, Cambridge, MA, <sup>3</sup> Experimental Centre, Technische Universität Dresden, Dresden, Germany, <sup>4</sup> Biology, New York University, New York, NY
5:05 pm	M54	Integrated cytoplasmic reorganization during human iPS cell mitosis. <b>S.M. Rafelski<sup>1</sup></b> , Allen Inst. for Cell Science <sup>1</sup> ; <sup>1</sup> Allen Institute for Cell Science, Seattle, WA
5:20 pm	M55	Cycling clouds of actin filaments regulate mitochondria size and distribution in mitotic cells. <b>A.S. Moore<sup>1</sup>, J.J. Nirschl<sup>1</sup>, C.L. Simpson<sup>1,2</sup>, E.L. Holzbaur<sup>1</sup></b> ; <sup>1</sup> Department of Physiology, Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA, <sup>2</sup> Department of Dermatology, Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA
5:35 pm	M56	Exploring the dynamic regulation underlying synchronous sister chromatid separation at anaphase onset. <b>J. Kamenz<sup>1,2,3</sup>, T. Mihaljev<sup>4</sup>, T. Boluarte<sup>1,2</sup>, S. Legewie<sup>4</sup>, S. Hauf<sup>1,2,5</sup></b> ; <sup>1</sup> Department of Biological Sciences, Virginia Tech, Blacksburg, VA, <sup>2</sup> Biocomplexity Institute, Virginia Tech, Blacksburg, VA, <sup>3</sup> Department of Chemical and Systems Biology, Stanford University School of Medicine, Stanford, CA, <sup>4</sup> Institute of Molecular Biology (IMB), Mainz, Germany, <sup>5</sup> Center for Soft Matter and Biological Physics, Virginia Tech, Blacksburg, VA
5:50 pm	M57	Microtubule destabilizing activity of selfish centromeres drives non-Mendelian segregation. <b>T. Aker<sup>1</sup>, E. Trimm<sup>1</sup>, M.A. Lampson<sup>1</sup></b> ; <sup>1</sup> Department of Biology, University of Pennsylvania, Philadelphia, PA
6:05 pm	M58	A compartmentalized, self-extinguishing signaling network mediates crossover control and faithful chromosome segregation in meiosis. <b>L. Zhang<sup>1,2,3,4</sup>, S. Köhler<sup>1,2,3,4</sup>, R. Rillo-Bohn<sup>1,2,3,4</sup>, A.F. Dernburg<sup>1,2,3,4</sup></b> ; <sup>1</sup> Department of Molecular and Cell Biology, University of California, Berkeley, Berkeley, CA, <sup>2</sup> Howard Hughes Medical Institute, Chevy Chase, MD, <sup>3</sup> Biological Systems and Engineering Division, Lawrence Berkeley National Laboratory, Berkeley, CA, <sup>4</sup> California Institute for Quantitative Biosciences, Berkeley, CA
6:20 pm	M59	Asymmetric centrosomes clustering defines the evolution of newly formed tetraploid cell populations. <b>N.C. Baudoin<sup>1</sup>, J.M. Nicholson<sup>1</sup>, O. Sharakhova<sup>1</sup>, K. Soto<sup>1</sup>, M. Giam Xue Lin<sup>2</sup>, G.I. Rancati<sup>2</sup>, D. Cimini<sup>1</sup></b> ; <sup>1</sup> Department of Biological Sciences and Biocomplexity Institute, Virginia Tech, Blacksburg, VA, <sup>2</sup> Agency for Science, Technology, and Research (ASTAR), Institute of Medical Biology, Singapore, Singapore
6:35 pm	M60	Serine-dependent sphingolipid synthesis is a metabolic liability of aneuploid cells. <b>E.M. Torres<sup>1</sup>, S. Hwang<sup>1</sup>, T.H. Gustafsson<sup>1</sup>, C. O'Sullivan<sup>1</sup>, C. Klose<sup>2</sup>, P. Cavaliere<sup>3</sup>, A. Schevchenko<sup>2</sup>, R.C. Dickson<sup>4</sup>, N. Dephore<sup>3</sup></b> ; <sup>1</sup> Department of Molecular, Cell and Cancer Biology, University of Massachusetts Medical School, Worcester, MA, <sup>2</sup> Molecular Cell Biology and Genetics, Max Planck Institute, Dresden, Germany, <sup>3</sup> Department of Biochemistry, Weill Cornell Medical College, New York, NY, <sup>4</sup> Department of Molecular and Cellular Biochemistry, University of Kentucky College of Medicine, Lexington, KY

SUNDAY

## ● Education Minisymposium: Evidence-Based Education

4:15-6:50 pm		Room 124
<b>Supported by CBE – Life Sciences Education</b>		
Co-Chairs: <b>Amy Prunuske</b> , Medical College of Wisconsin; and <b>Tracie Gibson</b> , University of Massachusetts-Amherst		

4:15 pm		Introduction
4:20 pm	M61	Developing Future Biologists: creating and assessing a portable short course to engage underrepresented students in developmental biology. <b>J.M. Pinsky<sup>1</sup>, E.A. Dulka<sup>2</sup>, S. Barolo<sup>1</sup></b> ; <sup>1</sup> Cell and Developmental Biology, University of Michigan, Ann Arbor, MI, <sup>2</sup> Molecular and Integrative Physiology, University of Michigan, Ann Arbor, MI

4:40 pm	M62	Steel City Blues: Leveraging a Legacy of Pollution for Research and Reflection in Introductory and Advanced Undergraduate Biology Courses. <b>K.M. Drace<sup>1</sup>, V.K. Gibbs<sup>1</sup>, M.L. Styers<sup>1</sup>, P.K. Hanson<sup>1</sup></b> ; <sup>1</sup> Biology, Birmingham-Southern College, Birmingham, AL
5:00 pm	M63	Assessment of <i>Mapping the Brain</i> , a research and neurotechnology based approach for the modern neuroscience classroom. <b>S.D. Robertson<sup>1</sup>, Z.A. Johnson<sup>1</sup>, N.R. Sciolino<sup>2</sup>, N.W. Plummer<sup>2</sup>, P. Jensen<sup>2</sup></b> ; <sup>1</sup> Biotechnology Program, Department of Molecular Biomedical Sciences, North Carolina State University, Raleigh, NC, <sup>2</sup> Neurobiology Laboratory, National Institute of Environmental Health Sciences, Research Triangle Park, NC
5:20 pm	M64	Interdisciplinary Collaborations: A Course-based Undergraduate Research Experience (CURE). <b>R. Roberts<sup>1</sup>, J. Koeppe<sup>2</sup>, S. Price<sup>1</sup>, P. Craig<sup>3</sup></b> ; <sup>1</sup> Biology, Ursinus College, Collegeville, PA, <sup>2</sup> Chemistry, SUNY Oswego, Oswego, NY, <sup>3</sup> Chemistry, Rochester Institute of Technology, Rochester, NY
5:40 pm	M65	Integrating Cell Biology Concepts: Comparing Learning Gains and Self-Efficacy in Live and Virtual Undergraduate Lab Experiences. <b>L. Goudsouzian<sup>1</sup>, P. Riola<sup>2</sup>, K. Ruggles<sup>2</sup>, P. Gupta<sup>2</sup>, M.A. Mondoux<sup>3</sup></b> ; <sup>1</sup> Natural Science, DeSales University, Center Valley, PA, <sup>2</sup> Mathematics and Computer Science, DeSales University, Center Valley, PA, <sup>3</sup> Biology, College of the Holy Cross, Worcester, MA
6:00 pm	M66	Engagement in the publication process improves scientific communication, critique and career skills among graduate students. <b>E.A. Johnson<sup>1</sup>, M.W. Springel<sup>2,3</sup>, S.C. Fankhauser<sup>3,4</sup></b> ; <sup>1</sup> Biology, Emory University, Atlanta, GA, <sup>2</sup> Harvard University, Boston, MA, <sup>3</sup> Journal of Emerging Investigators, Boston, MA, <sup>4</sup> Biology, Oxford College of Emory University, Oxford, GA
6:20 pm	M67	Learning in Large Introductory Biology Courses Is Effectively Facilitated by Trained Undergraduate Learning Assistants. <b>R.P. Donaldson<sup>1</sup></b> ; <sup>1</sup> Biological Sciences, George Washington University, Washington, DC
6:40 pm	M68	Evaluation of an intervention designed to support multicultural collaboration. <b>A.J. Prunuske<sup>1</sup>, J.B. Welch<sup>2</sup>, K.M. Nemeth<sup>2</sup></b> ; <sup>1</sup> Microbiology and Immunology, Medical College of Wisconsin, Wausau, WI, <sup>2</sup> Biology, University of Minnesota, Duluth, MN

## ● Exhibitor Tech Talk

5:30-6:30 pm

Theater 2, Learning Center

**PerkinElmer, Inc.**

**Simple cell-based TR-FRET assays for protein phosphorylation, cell signaling, and biomarker detection**

Presenter: Roger Bosse, PhD

Level: Introductory

Protein phosphorylation is a critical process involved in cell signal transduction. Studies of protein phosphorylation in cells enable the elucidation of complex signaling pathways involved in the progression of many diseases such as cancer, inflammatory diseases, immune diseases, and metabolic diseases. LANCE® Ultra TR-FRET cellular phosphoprotein detection kits provide physiologically relevant, homogeneous mix-and-read cell signaling and cellular phosphorylation assays that can be measured on the vast majority of plate readers without the need for specially engineered cell lines. LANCE TR-FRET assays are simple, fast, and easy to optimize in cellular or biochemical formats.

## ● Satellite Event: Breakthrough Prize Live Streaming

9:15 pm: Drinks & Dessert

Loews Philadelphia Hotel, Millenium Ballroom, 2nd Floor

10:00 pm: Breakthrough Prize Ceremony Live Broadcast

**Organized by the Breakthrough Prize in Life Sciences Board**

Please join us for a special live broadcast of this year's Breakthrough Prizes, which honor important and primarily recent achievements in the categories of Fundamental Physics, Life Sciences, and Mathematics.

The prizes were founded by Sergey Brin and Anne Wojcicki, Mark Zuckerberg and Priscilla Chan, Yuri and Julia Milner, and Jack Ma and Cathy Zhang. Committees of previous laureates choose the winners from candidates nominated in a process that's online and open to the public. Laureates receive \$3 million each in prize money.

The significance of scientific advances resonates in both the present and the future. They are among the highest achievements of human culture and the foundation on which new knowledge will be built.

Breakthrough Prize laureates are honored at an annual awards ceremony which is televised globally and features short films about the scientists and their work, presentations by celebrities and live music from world-renowned artists. The evening draws together the stars of science with leading figures from technology, business and entertainment.