The success of DNA and RNA in, respectively, translating and transcribing their genetic information has as much to do with their physical structure and shape as with the nucleotides they contain. The Symposium on DNA and RNA Biology at the 2017 ASCB|EMBO Meeting will focus on some of the latest techniques being used to characterize these molecules and on how anomalies in their structures can lead to disease.

Focus on Molecular Forms, continued on p. 10

ASCB Fights to Protect H1-B Visas

Since taking office, the Trump Administration has agitated for immigration reform, even launching the “Buy American, Hire American” Executive Order in April to encourage the U.S. government and private companies to favor American products and workers.

Many members of Congress, incentivized by this attitude, have introduced legislation aimed at reforming various aspects of the complex U.S. immigration code. The H-1B visa process, in particular, has gained special attention from legislators due to tales of it being exploited to undercut American workers, while professional societies, including the ASCB, worry that modifications in the program will adversely affect their members.

In light of potential changes to the H-1B visa program, ASCB’s public policy team has been meeting with various congressional offices, such as those of Senator Chuck Grassley (R-IA) and Representative Erik Paulsen (R-MN), to discuss proposed legislation.

H1-B Visas, continued on p. 31
small but powerful

the blue pco.panda with latest sCMOS technology

ultra compact design

resolution 2048 x 2048 pixels

16-bit dynamic range

USB 3.1 interface

pcotech.com
Understanding Nature through Description

By Pietro De Camilli

I had the good fortune to have an exceptionally good anatomy teacher during my first year of medical school. One of the exercises during labs was to identify structures. I recall how adamant he was in expecting us not to rush to a “guess,” even when the guess could be easy, but to first describe every morphological feature of the structure. Only then could we name the structure. His point was that description is a way to gain insight into the properties of an object and is a prerequisite to understanding it. Because the course was part of a medical school curriculum, he also emphasized how this approach was the foundation of medical practice: a detailed analysis of signs and symptoms of a patient, prior to rushing to a diagnosis. I did not pursue a career in medicine, but this lesson, the power of description, left a long-lasting and important impact on me when I decided to spend my professional career as a scientist.

Description as the Foundation of Science

Description is the foundation and the first step of any scientific endeavor in the natural sciences. Descriptive analyses have shaped biology. Cell biology was born from morphological descriptions sparked by technological developments. The introduction of the light microscope by Robert Hooke and its extensive use by Anton van Leeuwenhoek led to the first descriptions of cells and eventually to the cell theory. Electron microscopy revealed an entire new intracellular world and sparked a new wave of descriptions.

Yet, the word “descriptive” is often associated with something dull in science, and can be a death sentence when used by a reviewer to assess the merits of a grant proposal or of a manuscript. Description is the analysis of an object without acting on the object. The word “descriptive” is often used in contrast to “mechanistic,” a term that reflects an analysis geared toward understanding the object of our interest via its active manipulation. In cell biology, “mechanistic” typically refers to the elucidation of molecular mechanisms underlying an aspect of cell function or structure. Mechanistic science relies on the possibility of perturbing the system under study, to determine what is necessary and sufficient for a given phenomenon and thus to advance from correlation to the understanding of causation. It allows us to progress from description to prediction. Thus, ultimately our pursuit should be mechanistic.

But one should not dismiss the power of description. Description can be dull if it simply enumerates a list of observations that are neither systematic nor anchored to a question. However, description rises to a different level if it is used to extract principles from observations, to frame questions, and to formulate and validate hypotheses. Carl Linnaeus’s descriptions emphasized anatomical relationships between living species and laid the foundation for the elucidation of how they derive from each other. Alexander Von Humboldt built on his systematic descriptions of nature during his travel in Latin America to discover the interconnectedness of all living species with themselves and with the environment.

The observations and descriptions by Charles Darwin during his voyage to the Galapagos Islands offer a spectacular example of a continuous feedback between description, building a hypothesis, and then making new observations to refine the hypothesis. Darwin’s research was not mechanistic in the way we typically intend this term today, i.e., perturbation of a system to validate a hypothesis. However, far from representing a simple collection of observations, Darwin’s descriptive analysis of species was aimed at understanding how they were interrelated, leading to a landmark scientific advance.
The monumental and comprehensive descriptive work of Santiago Ramón y Cajal on the structure and connections of cells of the nervous system in various species and developmental stages gave birth to modern neuroscience. Likewise in the history of cell biology, the descriptive works that stand out are those that attempted to relate structure to function. This work paved the way to mechanistic understanding. The founders of cell biology are the scientists who built on a systematic description of the cell’s internal structures to gain a first insight into their anatomical and functional relationship. These scientists framed the questions that kept cell biologists busy for decades to come.

**Description Remains a Critical First Step**

The explosion of new information and of new methodology for the manipulation of cells has dramatically changed the landscape in cell biology research and given us endless opportunities to interrogate cell function through molecular perturbation. Genomes have been sequenced and can be mined via bioinformatics tools, and genes responsible for different functions have been identified through genetic studies. Genes can be easily edited, and cell function can be acutely modified through biophysical and pharmacological tools. Breakthroughs in light and electron microscopy have dramatically advanced the possibility of monitoring the impact of these manipulations on cell structure and function. Thus, modern science is heavily mechanistic.

Yet, careful and insightful description continues to be a critical first step toward understanding. As new technologies improve the level at which we can analyze and quantify biological structures and parameters, a wave of studies building on new methodology and heavily relying on description will continue to be the engine for the formulation of new hypotheses. Cell Atlas projects, whose goal is to map gene expression and protein localization in all tissues of the body, and connectomics studies aimed at mapping all brain circuits are examples of such endeavors. Once again, in these studies the work that will stand out is that of scientists who through a first descriptive analysis of these data will be able to extract fundamental principles and to frame the questions to be addressed with subsequent mechanistic studies.

The act of describing forces us to pause while observing an object, an image, or a set of data. It forces us to think about what is important to note and thus is a prerequisite to formulating a mechanistic question. A synergistic use of descriptive and mechanistic approaches is a recipe for good science. However, some scientists have an exceptional ability to extract principles from description, which in modern science can and should be supported by careful quantitative analyses. Often these investigators are “visual” scientists who make their most seminal findings by observing, for example, through a microscope. Other scientists are attracted by science that starts with experimental manipulation or in the abstract language of numbers. Progress in cell biology is made possible by our diverse abilities and by the convergence of all these different approaches. Our best and unique contributions will come from the type of work that best fits our talents and our passions. Darwin found greatness in his exceptional ability to observe and describe, but as he noted in his autobiography, he was bad in math. Descriptive science can be great if description is a tool toward understanding.

A synergistic use of descriptive and mechanistic approaches is a recipe for good science.
The latest in photonics for researchers, engineers, product developers, clinicians and others in medicine, biotechnology and other life sciences.

Subscribe at www.photonics.com/Subscribe

From the publisher of Photonics Spectra magazine.
On July 13, 2017, the ASCB Minorities Affairs Committee (MAC) kicked off its annual Faculty Research and Education Development (FRED) Program in Seattle, WA. The FRED Program is a year-long program to promote grant funding success of junior faculty at institutions with a strong commitment to recruiting students from backgrounds underrepresented in STEM. Attendees at the meeting consisted of junior faculty, the majority of whom were at primarily undergraduate institutions (PUIs); their mentors; members of the MAC (including the PIs for the FRED Program, Renato Aguilera and Latanya Hammonds-Odie); and FRED alumni like me.

I came to this workshop as an invited speaker and was asked to share my experience as a pre-tenure junior faculty member at a PUI and minority-serving institution. I was on a panel with fellow FRED alumni Jonathan A. Kelber, from California State University, Northridge, and Nathan Bowen, from Clark Atlanta University. Together we shared our “best practices” on everything from hiring new students to work in the lab, lab budgeting, establishing a research plan, publishing, and grant writing. As I shared my experience with my colleagues, senior faculty also chimed in, volunteering valuable information useful for all in the room. Together, the entire group contributed and created a learning experience.

From my vantage point all of the sessions were like this—engaging and supportive. Everyone volunteered advice and resources. This was especially true when the mentees presented their proposal ideas by way of short PowerPoint presentations. We heard proposals on areas of cancer research such as DNA double-strand break repair and pancreatic cancer, HIV/immunology, and science education. Each of the presenters was enthusiastic, poised, and extremely knowledgeable. They received valuable feedback on how to further focus their specific aims and were then given an opportunity to present a revised version. Here is where, through insightful questions and comments, the mentors all helped us think like grant reviewers!

The mentors, some of whom have over 30 years of experience, gave valuable comments and suggestions for all mentees, were supportive, and were determined to help the mentees think like a study section or panel. The most impressive part of the FRED workshop was the fact that there was probably over 150 years of combined grant-writing experience in the room. Many of the mentors were former or active National Institutes of Health and National Science Foundation (NSF) grant reviewers. Some had also served as directors. There is no doubt that this is the most valuable part of the FRED workshop—getting experts to give you new insights on your grant application. They not only offered advice on grants but also briefly presented their own research.

The FRED workshop also included topics such as the tenure process and career advancement. We also heard a presentation from a program director from the NSF Molecular and Cellular Biosciences Directorate about the importance of the broader impacts portion of NSF grant applications.

Since this was an intimate setting and a small group, everyone was candid about their own struggles as junior faculty, and many talked openly about issues concerning race, gender, and ethnicity. The FRED workshop was a valuable experience.

—Cecilia Zurita-Lopez, California State University, Los Angeles
PhDs Explore the Leap from Research Science to Commerce

As life science PhD students and postdocs scan the horizon for possible careers, many are turning to the one-week ASCB–Keck Graduate Institute (KGI) course Managing Science in the Biotech Industry to learn what a biosciences industry future looks like.

“What we’ve found is that the kind of industry knowledge they learn over the week, and some of the professional development skills,” give the students an edge in understanding the jobs to apply for and in job interviews, says KGI Dean of the School of Applied Life Sciences Steve Casper.

The course gives participants a basic understanding of the bioscience industry, including such topics as company strategies and business models, entrepreneurship, networking, and the crucial point that scientifically valuable discoveries won’t necessarily have a commercial market.

Attendees use academic lessons, including case studies, as a basis for engaging in interdisciplinary teamwork that mimics typical company experiences. Using their PhD research skills, the 50 participants tackle projects that challenge them to apply their course work to research and develop both a medical and a business case for commercializing a theoretical life sciences product. For the last two years, projects have involved 3D printing of prototype medical implants for which teams must justify a go/no-go decision whether to commercialize the product.

In addition, students gain professional development insights and skills, including through career lunch panels during which industry professionals discuss their work experience and answer students’ questions.

At the 2017 course, held from July 10–15 in Claremont, CA, ASCB Chief Executive Officer Erika C. Shugart met with the attendees, giving them a brief overview of her career evolution and inviting attendee involvement as ASCB pursues industry collaborations under ASCB’s new strategic plan. She noted the success of the course: “As of mid-2017, more than 50% of those who attended the ASCB-KGI course in the past four years have gotten jobs in industry.”

Participants were also enthusiastic. Benjamin Akhuetie-oni, from Yale University, says that it was most interesting to learn “the process of obtaining investment and capital in the early stages of forming a life science start-up.” Networking and communication skills, not only the science, are critical, and individuals play a key role in a start-up’s success, he adds. Interacting with peers about their shared passion for science and future career plans “has been incredibly fun,” he says. Anna Kobb, a graduate student at the University of Toronto, says that being exposed to business and marketing knowledge “has been useful and enlightening.” Working on the team projects provided the pleasure both of engaging with classmates and of solving a challenge together.
Quinn Li, from the University of Iowa, especially enjoyed interacting with her peers and learning about their career goals and strategies for reaching those aims. “This course will serve as an inspiration in helping us think about the business aspects of our science research,” and many will want to go beyond the course materials, she says. Misagh Naderi, at Louisiana State University, agrees, noting that the course “definitely has given me a sense of direction for my future career” and he now plans to take additional business courses. The extensive reading in areas outside his comfort zone was both challenging and rewarding, he says, as was the opportunity to interact with students of different nationalities from diverse universities.

ASCB and KGI also offer a one-day version of the course the day before the Annual Meeting. More information on this year’s course, which will be held at Drexel University in Philadelphia on December 1, is available at www.ascb.org/biotech-mini-course.

—David Clarke, Science Writer

Call for Committee Volunteers!

Are you curious about how your ASCB functions, and are you willing to work to guide its future? If so, consider volunteering for one of these ASCB committees:

- Education
- Finance & Audit
- International Affairs
- Minorities Affairs
- Membership
- Nominations
- Postdocs and Graduate Students ("COMPASS")
- Public Information
- Public Policy
- Women in Cell Biology

ASCB is also seeking volunteers to serve as ASCB Ambassadors.

More information about how to apply is available on the ASCB website at ascb.org/community-committee. Send your applications to ascbinfo@ascb.org by Oct. 16.
And the ASBMB annual meeting is where I make my research known.

Remarkable new pathways of discovery are emerging every day, and that’s a direct result of the pioneering work you do in the lab — work your colleagues need to know about. At the 2018 ASBMB Annual Meeting, you’re called to show the scientific community how you’re blazing a trail in your area of specialty. Wherever you are on your career trajectory, you’ll benefit from the critical feedback you receive when you present an abstract — not to mention the illuminating lectures, workshops and peer dialogue you’ll encounter at the conference.

Share your success. Inspire the success of others.

Submit your abstract today!

asbmb.org/meeting2018
Angelika Amon, the Kathleen and Curtis Marble Professor of Cancer Research and HHMI investigator in the Department of Biology at the Massachusetts Institute of Technology, studies multiple aspects of cell growth and division and what happens to cells in which the process of chromosome segregation fails, mis-segregates chromosomes, and results in a condition known as aneuploidy. Because aneuploidy is a hallmark of cancer, determining its effects on cellular physiology is an area of intense investigation. In her Symposium talk, Amon plans to discuss aneuploidy’s effects on cells and how it relates to cancer. Through research in yeast, cultured mammalian cells, and mouse models, she has found that aneuploidy not only impacts gene expression but also affects virtually all aspects of the physiology of a cell, causing proteotoxic and oxidative stress. In her work on the question of how aneuploidy contributes to tumorigenesis, Amon found that aneuploidy causes genomic instability, which, she hypothesizes, could promote tumor evolution. Given the tumorigenic and mutagenic potential of aneuploidy, Amon’s lab more recently began to focus on mechanisms that eliminate aneuploid cells in the organism. She will discuss recent findings that indicate that aneuploid cells are cleared by the immune system.

Other speakers for the Symposium include Job Dekker, Joseph J. Byrne Chair in Biomedical Research, HHMI investigator, and co-director of the program in Systems Biology at the University of Massachusetts Medical School, and Carlos Bustamante, the Raymond and Beverly Sackler Professor of Biophysics at the University of California, Berkeley.

Members of Dekker’s lab have developed powerful molecular and genomic tools to study the three-dimensional structure of the genome inside the nucleus. For example, they invented Chromosome Conformation Capture (3C), which is used to detect physical interactions between genomic elements. With 3C, Dekker and others discovered that gene regulation is mediated by the three-dimensional organization of chromosomes that brings genes and their regulatory elements close together. To allow analysis of the folding of complete genomes they developed Hi-C, which combines 3C with deep sequencing, and Dekker and others are using it to generate comprehensive and unbiased long-range interaction maps of genomes. These maps will help to unravel how genome organization plays roles in gene regulation, in chromosome condensation and transmission, and in maintaining genome stability. Previously the Dekker lab found that the folding of the genome undergoes dramatic changes during the cell cycle. While the genome is folded in specific localized loops and a series of nested domains of various types in interphase, during mitosis all these structures are absent. Instead, chromosomes form rod-shaped structures that represent compressed arrays of stochastically positioned chromatin loops. In his presentation, Dekker will describe new insights his group obtained into how cells perform this remarkable task of folding, unfolding, and refolding chromosomes during the cell cycle.

Bustamante’s lab has been developing new single-molecule manipulation and detection methods, such as optical tweezers, single-molecule fluorescence microscopy, and super-resolution microscopy to help investigate DNA packaging into a bacteriophage; transcription; translation and protein folding; protein degradation via the protease ClpXP; mitochondrial fission; and catalysis-enhanced enzyme diffusion. His talk will focus on the use of ultra–high resolution optical tweezers to characterize the mechanochemical cycle of the motor responsible for packaging the DNA of bacteriophage Phi29 inside its capsid during viral assembly. Among other surprising results, the motor displays a division of labor in which only four of the five identical subunits perform a mechanical task whereas the fifth subunit fulfills a regulatory function. Moreover, the motor not only exerts force during packaging but also exerts torque, rotating the DNA molecule on its axis.

—Mary Spiro

Symposium 5, DNA/RNA Biology, will be held Tuesday, December 5 at 8:00 am.
Like any successful factory, cells perform quality control. Explore this topic at the Quality Control Symposium led by Tom Rapoport, Harvard Medical School/HHMI, and Brenda Schulman, Max Planck Institute of Biochemistry. Both Rapoport and Schulman use multidisciplinary approaches to define intricate pathways, and ultimately use purified proteins to recapitulate how the ubiquitin-proteasome system marks molecules and shuttles them off for degradation and disposal.

“A good example of this process is how the cell rids itself of misfolded endoplasmic reticulum (ER) proteins,” Rapoport said. “These proteins are transported back into the cytosol, poly-ubiquitinated, extracted from the ER membrane, and degraded by the proteasome, a pathway termed ER-associated protein degradation (ERAD),” he explained.

Little is known about this quality control pathway when compared with translocation in the other direction, the pathway that moves proteins into the ER. Rapoport plans to discuss recent findings that reveal how ubiquitin-gated protein channels open up in the ER membrane to create a hole through which misfolded proteins can be pulled into the cytosol.

In addition to crucial roles in eliminating misfolded or damaged proteins, Schulman points out that “the ubiquitin-proteasome system also often regulates pathways requiring precise timing, through the rapid elimination of proteins once their job is complete.” One such process is cell division. For example, progression through mitosis, exit from mitosis, and the G1 phase are regulated by sequential ubiquitin tagging of a series of cell cycle regulators by the massive molecular machine Anaphase Promoting Complex, also known as APC/C. Schulman plans to discuss how the dynamic catalytic components are distinctly hijacked and dramatically reconfigured for stepwise progression through different stages of mitosis.

—Mary Spiro

Symposium 6, Quality Control, will be held Wednesday, December 6, at 11:20 am.
ASCB is sponsoring a few fellowships for current and future undergraduate biology instructors to work with faculty experienced in using course-based undergraduate research experiences (CUREs) in their classes.

Participants will work with a mentor to develop a multi-session CURE, consider best teaching practices for its implementation, and put the new skills into practice in their own classroom.

Recipients will be awarded up to $1,500 for an in situ observation trip and laboratory supplies, and an additional $500 following completion of mentorship and program assessment. This program also provides a $500 mentor stipend. After applying the new skills, recipients will report findings to the scientific community.

Malt is now accepting admissions on a rolling basis for 2017.
To apply or learn more, visit ascb.org/mentoring-active-learning-teaching-malt-2017-fellowships.

Transform Lab Research into an Engaging Classroom Experience
Brain development, function, and degeneration are the central themes for the ASCB|EMBO 2017 Doorstep Meeting, to be held on Saturday, December 2 in Philadelphia. The second annual Doorstep Meeting offers talks by experts from disciplines tackling the cell biology of the brain and gives ample time for speakers and attendees to engage. Frank Bradke, of the German Center for Neurodegenerative Diseases, and Kelsey C. Martin, of the University of California, Los Angeles, David Geffen School of Medicine, curated the meeting lineup.

Bradke and Martin have chosen researchers whose investigations of protein folding and intracellular trafficking have yielded insights into neurodegenerative diseases as well as researchers whose studies of brain development and brain disease have uncovered a central role for critical cell biological processes. Along with the talks, students and postdocs have the opportunity to present posters during one of two, hour-long poster sessions to be held during the morning and afternoon breaks of the Doorstep Meeting. (The deadline to submit an abstract for the Doorstep poster sessions is October 11. Acceptance is not guaranteed. Abstracts submitted for the 2017 ASCB|EMBO Meeting are not eligible to be considered for the Doorstep Meeting.)

The Doorstep Meeting talks include:

Development and Reprogramming of Neuronal Diversity in the Neocortex
Paola Arlotta, Harvard University
The Arlotta lab is elucidating the governing principles underlying developmental generation and postnatal maintenance of excitatory pyramidal neuron diversity in the cerebral cortex. Arlotta will describe how pyramidal neuron diversity impacts the behavior of other cell types during cortical development and discuss the critical effect on oligodendrocytes to guarantee generation of normal patterns of myelin distribution in different cortical layers.

Saving the Synapse: MHC Class I and Synapse Pruning during Development and in Alzheimer’s Disease
Carla Shatz, Stanford Bio-X, Stanford University
The Shatz lab has found that molecules previously thought to function only in immunity also act at neuronal synapses to regulate synapse pruning and plasticity in response to new experiences. Changes in the function of these molecules could contribute to developmental disorders such as schizophrenia and Alzheimer's disease.

Gene Silencing Therapy for Neurodegenerative Disease
Don Cleveland, Ludwig Institute, University of California, San Diego
Cleveland will discuss how the combination of efforts using gene silencing with designer DNA drugs, adenoviral associated gene vectors, and genome editing mediated by site-specific nucleases could raise the possibility of development of effective disease-modifying therapies.

Dysfunction of Protein Translation in Neurodegeneration
Susan Ackerman, University of California, San Diego/HHMI
Forward genetics is used to identify genes responsible for phenotypes. Using this approach, the Ackerman lab has identified new mechanisms of neurodegeneration and has demonstrated that dysfunction of protein translation greatly impacts neuronal homeostasis in the aging mammalian brain.
Dynamic RNA-Protein Assemblies in Neurological Disease
J. Paul Taylor, St. Jude Children’s Research Hospital/HHMI
Mutations in several RNA-binding proteins (RBP) are linked to degenerative diseases, such as amyotrophic lateral sclerosis, frontotemporal dementia, and inclusion body myopathy. The Taylor lab hypothesizes that a disturbance of phase transitions that alters the dynamic properties of membrane-less organelles could be the underlying reason for these diseases. Taylor will present evidence that mutations in RBPs alter the biophysical and material properties of these proteins in liquid assemblies and result in perturbed dynamics and functions of multiple membrane-less organelles.

Autophagy Dynamics in Neuronal Homeostasis and Neurodegeneration
Erika Holzbaur, University of Pennsylvania Perelman School of Medicine
Deficits in autophagic flux lead to the accumulation of protein aggregates and dysfunctional mitochondria and are characteristic of neurodegenerative diseases such as Parkinson's, Huntington's, and ALS. Holzbaur’s talk will feature live cell imaging of autophagy in neurons that reveals a dynamic pathway that is altered in both aging and disease.

Chaperone Functions in Protein Quality Control and Implications in Neurodegenerative Disease
F. Ulrich Hartl, Max Planck Institute of Biochemistry
Failure of the chaperone machinery to maintain proteostasis (the conformational integrity and balance of the cellular proteome) can result in protein misfolding–related diseases such as Parkinson's, Huntington's, and Alzheimer's. Hartl will discuss recent findings from model systems suggesting that toxic protein aggregation in neurodegenerative disease is both a symptom and a cause of proteostasis decline.

From Protein Folding to Cognition: The Serendipitous Path of Discovery
Peter Walter, University of California, San Francisco
Integrated Stress Response Inhibitor (ISRB) was discovered in the Walter lab during a screen for small molecule modulators of the unfolded protein response. Walter will discuss this drug-like compound that effectively renders cells insensitive to translational inhibition by phosphorylation of eIF2 and has proved to be a cognitive enhancer in rodents, significantly improving the long-term memory of wild-type animals in behavioral assays.

The Cell Biology of Protein Misfolding in Alzheimer’s and Parkinson’s Diseases
Dennis Selkoe, Harvard Medical School/Brigham & Women’s Hospital
For more than 30 years, the Selkoe lab has used human brain tissue, animal models, and living neurons to study in vitro characteristics and bioactivities of endogenous forms of amyloid β-protein, tau protein, and α-synuclein in human neurodegeneration. Selkoe will talk about recent work in his lab that has implications for the initiation of diseases such as Parkinson's and suggests potential disease prevention by compounds that stabilize physiological α-synuclein tetramers.

—Mary Spiro

Volunteer to Review CVs Online
Give back to your cell biology community by signing up to help younger ASCB members with online CV review. We are always looking for more volunteers, including ASCB members in academia and industry, to help review cover letters, CVs, and resumes of young ASCB scientists. We will match you, and will only ask you to review two or three times a year. If you can help, please contact Thea Clarke at tclarke@ascb.org.
Dec. 2-6, 2017 | Philadelphia, PA

**Science is an international endeavor...**

This meeting collaboration between the American Society for Cell Biology (ASCB) and the European Molecular Biology Organization (EMBO) is designed to speak to the global impact of science.

**Meeting Highlights**

- Network internationally at the first joint meeting between ASCB and EMBO.
- Attend a daylong doorstep symposium with leaders in the field on the Cell Biology of Degeneration and Repair in the Nervous System (separate registration required).
- Take advantage of professional development sessions for every career stage.
- Participate in workshops on 1) quantitative mass spectrometry techniques, such as SILAC, BioID, TMT; 2) microscopy imaging; and 3) CRISPR.
- Arrive Friday so you can attend both morning and afternoon Saturday Subgroups organized by ASCB members.

**Deadlines**

- **October 4**
- **October 11**
- **November 9**

**Discounted Early Meeting Registration**

**Final Abstract Submission** (poster only)

**Hotel Reservation/Roomshare**
Symposia

Structure of the Cell

- Wolfgang Baumeister
  Max Planck Institute of Biochemistry, Germany

- Jennifer Lippincott-Schwartz
  Janelia Research Campus, HHMI

- Gia Voeltz
  University of Colorado-Boulder

Metabolism

- Michael Hall
  Biozentrum, University of Basel, Switzerland

- Helen H. Hobbs
  University of Texas Southwestern Medical Center/HHMI

Cell Biology of Neurons

- Lukas Kapitein
  Utrecht University, The Netherlands

- Kang Shen
  Stanford University/HHMI

- Christopher Walsh
  Boston Children’s Hospital and Harvard Medical School/HHMI

Cell Interactions

- Valentina Greco
  Yale University School of Medicine

- Gillian Griffiths
  Cambridge Institute for Medical Research

DNA/RNA Biology

- Angelika Amon
  Massachusetts Institute of Technology

- Carlos Bustamante
  University of California, Berkeley

- Job Dekker
  University of Massachusetts Medical School/HHMI

Quality Control

- Tom Rapoport
  Harvard Medical School/HHMI

- Brenda Schulman
  St. Jude Children’s Research Hospital/HHMI

Looking for lodging?
Save time and book today in the pre-approved ASCB housing block.

For the best hotel rates and protection, book your hotel now with no deposit collected. Visit ascb-embo2017.ascb.org/hotels.
Special Interest Subgroups

Saturday Morning Subgroups, 8:30 am–12:30 pm:
Subgroup A: 4D Nucleome Organization: Unlocking the structure-function relationships of genome organization and nuclear morphology
Subgroup B: Advanced Imaging for Quantitative Cell Biology
Subgroup C: Cell Biology in Adaptive Immune Response
Subgroup D: Cilia: Traffic, Signals, Disease
Subgroup E: Microtubule Motors: Emergent Phenomena and New Paradigms
Subgroup F: Optogenetics: From Molecular Switches to (Multi-)Cellular Circuits
Subgroup G: Spatial and Temporal Control of Cell Signaling
Subgroup H: The Cell Biology of Glycoconjugates
Subgroup I: The Cell Biology of Organoids
Subgroup J: Building a Multiscale, Multidimensional Human Cell Atlas
Subgroup K: When Cytoskeletal Networks Collide

Saturday Afternoon Subgroups, 1:00 pm–5:00 pm
Subgroup L: Actin Functions across the Tree of Life
Subgroup M: Bottom-Up Cell Biology

Subgroup N: Building the Cell 2017
Subgroup O: Cell Cycle Regulation of Morphogenetic Behavior
Subgroup P: Cell-Cell Fusion
Subgroup Q: Emerging Model Systems
Subgroup R: From Motors to Cancer: Integrating Mechanical Forces across Scales
Subgroup S: Sharing and Reusing Cell Image Data
Subgroup T: The Intersection of Lipids and Proteins in the Secretory Pathway
Subgroup U: Translating Cell Biology Research into Effective Immunotherapies for Cancer
Subgroup V: Tunneling Nanotubes: Intercellular Highways, New Frontiers for Deciphering Intercellular Communication in Disease

Wednesday Morning Subgroups, 8:30 am–11:05 pm
Subgroup W: Neurite Formation: From Neurite Initiation to Outgrowth
Subgroup X: Neuronal Cytoskeleton: A Complex Interplay of Cytoarchitecture and Dynamics

Minisymposia

Minisymposia are presented on Sunday, Monday, and Tuesday afternoon and Wednesday morning.

Bacterial Infection and Symbiosis
Bacterial Infection and Symbiosis

Cell Biology of Neurons
Subcellular Organization of Neural Cells
Axonal and Synaptic Cell Biology

Cell Biology of the Nucleus
Inside the Nucleus: Genome Organization and Gene Expression
Border Dynamics: Nuclear Envelope Organization and Remodeling

Cell Division, Cell Cycle, and Cell Death
Regulation of Cell Size, Mitosis, and Meiosis
Ensuring Fidelity of Chromosome Segregation
Mechanics of Cell Division and Cytokinesis

Cell Signaling and Cancer
Cancer Cell Signaling, Adaptive Responses, and Metastasis
Molecular Mechanisms of Cell-Cell Signaling
Visualization of Compartmentalized Signaling in Cancer

Cellular Metabolism
Cellular Metabolism

Cytoskeletal Dynamics, Mechanics, and Cell Motility
Functions and Mechanisms of Cytoskeletal Motors
Actin Dynamics and Function
Mechanical Coupling from Nucleus to Extracellular Matrix
The Life of a Microtubule: Birth, Dynamics, and Function

Multicellular Interactions, Tissues and Organs
Multicellular Interactions: Tissue Assembly and Morphogenesis
Multicellular Interactions: Tissue Regeneration and Mechanisms of Disease

Organelles and Membrane Dynamics
Organelles in Metabolism and Stress Responses

Lipids in Signaling and Membrane Organization
Organelle Morphogenesis, Targeting, and Distribution
Membrane Shaping by Fusion and Fission

Proteostasis, Autophagy and Neurodegeneration
Autophagy
Protein Folding, Misfolding and Neurodegeneration

RNA Biology
RNA Biology

(information on co-chairs is available online)

#ascbembo17 | ascb-embo2017.ascb.org
Along with the myriad scientific speeches, talks, and Symposia offered at the 2017 ASCB|EMBO Meeting in Philadelphia this December, the meeting provides attendees with more than three dozen career enhancement and special interest learning sessions. These sessions cover a broad array of topics to interest the entire scientific community. Program themes range from success in graduate school, to landing that first faculty job, to running a lab, to diversity and gender concerns, to working across cultural and national boundaries.

“The Annual Meeting is known for its scientific excellence, but many attendees also take advantage of our career enhancement and special interest learning sessions that are offered in order to round out their experience,” said Erika Shugart, ASCB Chief Executive Officer. “It is a great chance for early career scientists to get a boost for their careers and for attendees at all career levels to learn and network around topics such as science policy, open science, and science outreach.”

Shugart pointed out that the programming ideas come from ASCB members themselves. “Our career enhancement and special interest sessions are a great chance for attendees to share their expertise in the profession, since these sessions were generated during an open call earlier this year. It is truly programming by attendees for attendees,” she added.

Below are titles of the sessions being offered, grouped by theme. Please note that the date, time, and location for each session will be provided in the ASCB|EMBO 2017 Meeting Program and app, available at a later date.

—Mary Spiro

Success in Graduate School
Getting into Graduate School: the Do’s and the Don’ts and the What If’s
Resources to Address Challenges for International Graduate Students and Postdocs
Hit the Ground Running: Early Success in Graduate School
Getting the Most out of Your Thesis Committee
Planning Your Exit from Graduate School
The Next Step: Transition from Graduate School to a Postdoctoral Position
MD-PhD, Is It Right for Me?
Career Success for PhDs
Career Coaching
Networking: the Most Effective Job Search Tool
Careers in Industry Panel
Careers in Entrepreneurship/Consulting
Careers in Science Policy
Careers in Science Writing, Editing, and Communication
An Advanced Cell Biology Course in Brazil, promoted by IAC-ASCB-EMBO-FAPESP

Success in Academia
Navigating the Faculty Job Search
How to Deliver an Effective Chalk Talk
Preparing Grant Budgets
NIH Grant Process Panel: Insights from the Early Career Reviewer Program
What's New in Peer Review (of Grant Applications)?
Starting Your Lab at an R1 Institute
Starting Your Lab at a Primarily Undergraduate Institution
Lab Leadership—Teamwork and Conflict in the Lab
Lab Leadership—Roles, Values, and Expectations
Lab Leadership—Communication and Feedback
Taking an Idea to a Company
Science Learning for All: Inclusive Teaching Strategies
Foundational Cell Biology Workshop: Assessment in Real-Time—It's Not All about the Final Exam
Navigating Your Mentoring Relationships with a MAP (Mentoring Action Plan) as a Mentee

Success in Research and Publishing
New Opportunities for Researchers—Open Access to Transnational Research Infrastructures in Imaging, Structural Biology, and Compound Screening
Cell Biology in France: Tips and Opportunities for Research Positions
Meeting NIH’s Rigor & Reproducibility Training Requirement for Key Biological Resources with Cell Authentication Training Researcher and Institutional Roles in Ensuring Reliable Research Navigating Publishing in Scientific Journals The Road toward Open Science

Successful Science Communication, Outreach, and Advocacy
Advocacy Toolbox: the Two-Minute Speech
COMPASS Presents: Science Communication Workshop Using Improvisation
Communicating Science through Visual Media
Broader Impacts: Engaging the Community in STEM
Politician’s Don’t Bite

Special Interest
Green Cards for Scientific Researchers: How to Win Your EB-1/NIW Case
LGBTQ+ Diversity Session
Resilience in Science: A Panel and Networking Reception
Fast-Growing Cell Biology Society in China
NIH Update (Workforce, Funding Trends, and Policy)
First Timer? Making the Most of the Annual Meeting

Special Events
Bruce Alberts Award for Excellence in Science Education
2017 ASCB MAC Mentoring Keynote
Judged Poster Session
WICB Awards and Mentoring Theater Career and Mentoring Roundtables
E.E. Just Award Lecture
Ask a Scientist Bar Night
2017 Celldance Video Premiere and Elevator Speech Awards
International Exchange and Training Fair
ANNUAL Meeting Preview

Honors and Awards

Hartl and Horwich Named 2017 E.B. Wilson Medalists

ASCB has selected F. Ulrich Hartl of the Max Planck Institute of Biochemistry and Arthur Horwich of the Yale School of Medicine/HHMI to receive its prestigious 2017 E.B. Wilson Medal. Hartl, a biochemist, and Horwich, a geneticist, are pioneers in the realm of cellular protein chemistry whose collaborations helped unravel the molecular machinery that assists with protein folding. In his nomination letter, Alexander Varshavsky of the California Institute of Technology remarked that prior to the work of Hartl and Horwich in the late 1980s, the complexity of protein folding was greatly underestimated.

Hartl and Horwich challenged the widely held notion put forth by Nobel Prize winner Christian Anfinsen that proteins fold spontaneously in cells, just as they do in test tubes.

The Centrality of Protein Folding

“The previously obscure process of protein-assisted protein folding … is now one of the most beautiful and most important chapters in molecular biology,” Varshavsky wrote. “It is difficult to overstate the centrality of protein folding and its perturbation in the etiology of major diseases, including neurodegenerative syndromes.”

The E.B. Wilson Awards will be presented Tuesday, December 5 at 3:15 pm, when Hartl and Horwich will give independent lectures at the 2017 ASCB|EMBO meeting in Philadelphia. Hartl has been a member of ASCB since 2004; Horwich has been with ASCB since 1991.

Hartl directs the Max Planck Institute of Biochemistry, where he has worked since 1997. Hartl’s research focuses on understanding the role of molecular chaperones in protein folding and in neurodegenerative disorders such as Huntington’s or Parkinson’s disease, which are associated with protein misfolding and cytotoxic aggregation. He investigates the chaperones and heat shock proteins (Hsp) found in yeast and mammalian cells (as well as their Escherichia coli homologs) using structural, biochemical, and cell biological methods.

“We have conducted a systematic analysis, by quantitative proteomics, to understand how the cellular proteome utilizes the chaperone network for folding and conformational maintenance,” he said. Via the molecular chaperones, Hartl explains, there is the potential for developing novel therapies.

“We have discovered that the Hsp70 system in particular, but also the TRiC chaperonin, can prevent the formation of cytotoxic aggregates, suggesting pharmacological chaperone activation as a possible strategy to combat age-dependent neurodegeneration,” he said. “We have provided evidence, in collaboration with Erich Wanker from Berlin, that such activation can be achieved, in principle, with an experimental small molecule drug [called] geldanamycin. We wish to understand why cellular chaperone capacity declines during aging and how the system can be reset to a more youthful state.”

Hartl grew up in the northern part of the Black Forest in Germany in a household that fostered free play and informal scientific exploration. Although he earned a degree in medicine from Heidelberg University he never practiced, choosing instead to devote himself fully to research. While at Heidelberg, he was inspired by the work of Wilhelm Just who was investigating the hotly debated biogenesis of peroxisomes. Hartl’s doctoral thesis, which described how the peroxisomal system can be induced to grow and take up additional proteins
from the cytosol, impressed Walter Neupert, a biochemist at Munich University, who offered him a postdoctoral position. In Munich, Hartl turned his attention to the biogenesis of mitochondria and began to work on solving problems related to protein folding.

A Research Dilemma
It was around this same time that Horwich was launching his academic career as a junior faculty member in genetics at Yale. Horwich grew up near Chicago, IL, and graduated from Brown University in a unique program that combined undergraduate liberal arts with a medical degree. Although Horwich completed a medical internship and residency at Yale and worked as an attending physician in genetics for 20 years, his major focus was always on basic research. While studying a mutant strain of yeast, Horwich said he found himself in a research dilemma that became a pivotal point in his career.

“Here we were asking a somewhat new question: whether ‘de novo’ protein folding, to the properly folded ‘native’ state could be assisted by a molecular ‘machine’— a pretty radical question for the time,” Horwich said. “When we found a mutant (mitochondrial import function 4 or mif4) that behaved exactly that way, that is, proteins imported into mitochondria OK but then failed to reach active form, we were shocked. [We were] basically challenging Anfinsen’s theory that a polypeptide can fold on its own… and so we had no idea how to proceed,” Horwich said.

Hartl and his mentor Neupert heard about Horwich’s yeast mutant, and because they had more experience with protein import into the mitochondria, they offered to help. Horwich went to visit Hartl in Munich.

“That was the start of a year’s collaboration with Ulrich that helped show that indeed, our mutant affected protein folding inside mitochondria. We worked together also to identify a branch of chaperonins that are present in the cytosol of both archaeabacteria and eukaryotes.”

Combining the power of genetics and biochemistry, Horwich, Hartl, his PhD student Joachim Ostermann, and Neupert discovered the steps by which Hsp60, fueled by ATP in the mitochondria of yeast and another fungus, Neurospora crassa, worked to fold proteins into their functional shapes.

“Ulrich also was interested in the idea of a ‘pathway’ of chaperone interactions, beginning with unfolded segments of chain at the ribosome, for example, that could be recognized by Hsp70 class chaperones, but then folding of a collapsed globular species could be completed inside a ring of the Hsp60 class of chaperonin ring assemblies. He carried out some really beautiful work on that and the generality of such a pathway. [I am] not sure we could ever have convinced anyone of the existence of a folding machine without the collaboration with Ulrich and Walter. Their phone call was a gift out of the blue.”

Confirm and Support
Following their collaboration, which resulted in two seminal papers in 1989, Horwich and Hartl returned to their own research endeavors. Hartl worked with Bill Wickner at the University of California, Los Angeles, and later became a tenured professor at Sloan Kettering Cancer Center before finally moving back to Germany and to the Max Planck Institutes. Today, Horwich is the Sterling Professor of Genetics and Pediatrics at Yale School of Medicine and an HHMI investigator. Over the years, however, they found that their work continued to confirm and support one another. “There were points where our findings came at similar times and agreed, such as the finding that polypeptides are folded inside the encapsulated chaperonin ring,” Horwich said.

For his talk in December, Horwich said he plans to discuss the structure and mechanisms related to the chaperonin ring machines. Using a mouse model, his work is beginning to elucidate a mechanistic understanding of a form of amyotrophic lateral sclerosis that is caused by protein misfolding.

Hartl’s talk will be complementary. “Much work still lies ahead, but we are optimistic that the basic research toward understanding the cellular machinery of protein folding and quality control will eventually contribute to solving some of the most pressing medical problems of our aging population,” Hartl said.

—Mary Spiro
ANNUAL Meeting Preview

Honors and Awards

2017 EMBO Gold Medal Winner
Maya Schuldiner Credits Work-Life Balance for Her Success

For her significant contributions to the understanding of protein synthesis, trafficking, and quality control, Maya Schuldiner of the Weizmann Institute of Science in Israel has been awarded the prestigious EMBO Gold Medal for 2017. At a December 4 ceremony at the ASCB|EMBO meeting in Philadelphia, Schuldiner will receive the medal and present her research at the EMBO Gold Medal Lecture.

Schuldiner earned her PhD in developmental biology at The Hebrew University in Jerusalem, Israel. For her postdoctoral research, she switched to the field of cell biology to train at the University of California, San Francisco. She returned to Israel in 2008 to establish her own laboratory at the Weizmann Institute of Science in Rehovot.

But it may be Schuldiner's own mother who deserves the most credit for this cell scientist's successful career trajectory. Schuldiner says a pivotal point in her career came not in the classroom or the lab, but one day when her mother found her crying on the living room floor after the birth of her first child.

"After Daniel was born I nearly left science. I felt that there was no way I could manage to be the type of mother I wanted and combine it with being the type of scientist that I wanted," Schuldiner said. But Schuldiner's mother told her that in her day, "all that was expected from a mother was to have her children well fed, clean, and healthy, and to have good manners. She could not understand why I felt I was not a great mother when I did all that and so much more. I suddenly realized that I was tripping myself up by setting my standards too high."

These days, Schuldiner's lab uses high-throughput technology, advanced robotics, and extremely sensitive imaging technology along with the talents of geneticists, biochemists, and cell biologists to help understand the host of proteins found in the organelles of Saccharomyces cerevisiae. Currently, the function of about one-third of these yeast proteins remains a mystery. Since most of these proteins are also conserved in humans, having a better understanding of their function could have implications for understanding human disease.

At her talk, Schuldiner says she plans to highlight just how little we actually know about how cells work. "I would then like to share our passion for discovering functions for unstudied proteins, why we think it is important, and how we go about doing it," she said. "I will give some examples from areas that we have focused on such as targeting of proteins to organelles and organelle contact sites."

Although the knowledge gap seems challenging, Schuldiner is not intimidated. "I think that science is about loving the way and not expecting the goal," she said. "I come to work every day excited to see my students again and happy to work in an environment that I connect to. I learn something new every day, and I can’t think of anything else I would rather do. How better to pass one’s life on this earth?"

EMBO’s Gold Medal recognizes outstanding contributions to the life sciences in Europe by young independent group leaders and carries a cash award of 10,000 euros (~$11,252 USD). Schuldiner, who has been a member of ASCB since 2003, says she is excited and honored to be selected to receive the EMBO Gold Medal and shares credit with both her students and her spouse. "I wish I could share it with my amazing students, who, over the years, have done the beautiful work that has enabled me to be its recipient," she said. "Also, I could not have done science in the way that I love without the partnership and friendship of my husband, Oren. By sharing every aspect of the love and care for our children, we have both been able to combine an involved family life with an extremely engaged career."

—Mary Spiro
Scott D. Emr will give the 2017 Keith Porter Lecture at the 2017 ASCB|EMBO Meeting this December in Philadelphia. Emr is the Frank H.T. Rhodes Class of 1956 Professor of Molecular Biology and Genetics and the first director of the Weill Institute for Cell and Molecular Biology at Cornell University. The Porter Lecture is named for Keith Porter, a pioneer in the use of electron microscopy in biology and a founder of ASCB.

Emr’s research centers on the complex mechanisms that move cargo into and out of eukaryotic cells. The highly regulated and specific ways that cells accomplish the “shipping and receiving” of proteins and lipids, as well as some of the genetic and biochemical tools used to study these processes, have held Emr’s interest since graduate school.

Emr earned his PhD in molecular genetics from Harvard Medical School in 1981 in the laboratories of Thomas Silhavy and Jonathan Beckwith. Emr says that Silhavy and Beckwith exposed him to the power of bacterial genetics, which enabled them to discover how membrane protein biogenesis occurs. The 1970s also was a time when new techniques in molecular biology were exploding.

In Love with Genetics and Membrane Trafficking

“I was captivated by this problem and by the growing list of molecular genetic tools that were newly available to probe this problem, including the application of the new Fred Sanger DNA sequencing technology,” Emr said. “We were able to isolate and characterize the first secretion-defective mutants in the signal sequence of a secreted protein (bacterial lambda phage receptor protein, LamB) that blocked its secretion and resulted in accumulation of the protein in the cytoplasm. In addition, using classical genetic selections, we isolated the first mutations in the translocon (PrlA/SecY) that recognizes and transfers secreted proteins across the bacterial plasma membrane.”

Emr said he was “transformed” by the experience of these discoveries and he “fell in love with genetics and membrane trafficking.” Next, Emr was fortunate to be able to secure a postdoctoral position with Randy Schekman at the University of California, Berkeley.

“With Randy, I worked on protein secretion in yeast. I wanted to learn every detail about the newly isolated yeast sec mutants and all the genetic and biochemical approaches one could use to analyze them,” Emr said. “Yeast cloning vectors and other molecular biology tools were becoming available at that time, and I took full advantage of these new tools. I merged my graduate student molecular genetics expertise with my newly acquired yeast cell biology and biochemistry knowledge to develop gene fusion approaches that would permit new genetic selections in yeast for membrane trafficking mutants.”

Emr landed a faculty position at the California Institute of Technology, where he advanced from assistant to associate professor from 1983 to 1991. George Palade recruited Emr away from Caltech in 1991 to the University of California, San Diego, School of Medicine. He was appointed Distinguished Professor of Cellular & Molecular Medicine and HHMI investigator until he departed in 2007 to assume his position as director of the newly created Weill Institute for Cell and Molecular Biology at Cornell.

Molecular Mechanisms of Organelle Biogenesis

Today, Emr says there still are many unsolved mysteries regarding membrane trafficking. As a cell biologist and biochemist, Emr said his work has focused on uncovering the molecular
mechanisms responsible for the biogenesis of specialized compartments (i.e., organelles), which are present inside all cells. These organelles perform key biochemical functions that keep cells alive. A better understanding of the role for membrane lipid asymmetries and membrane/organelle contact sites through basic scientific research will help reveal pathways and mechanisms that underlie human disease.

“One simple question that has occupied my thinking for many years is, how do cells maintain and regulate the size, shape, number, and activity (composition) of each organelle? My personal interest has focused on lysosomes and endosomes,” he said. “In my lifetime, I hope to understand the mechanisms that monitor and regulate the functional lifetime of specific membrane proteins as well as the organelles that contain them.”

“The Emr laboratory has used a single-celled yeast as a genetic model system to discover and isolate the complex machinery as well as a special class of signaling lipids, phosphoinositides, that sort and deliver proteins and enzymes to lysosomes, the organelles that degrade and recycle cellular proteins. This sorting machinery directs the packaging of proteins into small membrane-enclosed carriers called vesicles. One set of machines that Emr’s lab discovered, the ESCRT complexes, turn off signals received by specific growth factor receptors at the cell’s surface by sorting the activated receptors into vesicles.

“These vesicles are then delivered to the lysosome where the receptors are inactivated and degraded,” Emr said. “Defects in the ESCRT complexes result in prolonged signaling by the growth factor receptors, which ultimately can lead to uncontrolled cell growth and tumor formation. The ESCRT complexes also have been found to play an essential role in cytokinesis, plasma membrane repair, nuclear envelope reformation, and the budding and release of the HIV virus from infected cells.”

Emr has earned the Searle Scholars Award and an NSF Presidential Young Investigator Award. He was elected to the National Academy of Sciences (2007), the American Academy of Arts and Sciences (2004), and the American Academy of Microbiology (1998). He won the 2003 Hansen Foundation Gold Medal Prize for elucidating intracellular sorting and transport pathways. In 2007, he was awarded the Avanti Prize for his key contributions in understanding lipid signaling pathways. He was awarded the van Deenan Medal in 2014 in recognition of his outstanding career in biomembrane research. He also served as a member of the advisory boards for the Pew Scholars Program in Biomedical Sciences and the Searle Scholars Program. He has been a member of ASCB since 1988. ■

—I am Spiro

Scott D. Emr will give the Porter Lecture on Sunday, December 3, at 3:15 pm.
ASCB Learning Center 2017: More to See, More to Touch, and More to Do!

The ASCB Learning Center (Exhibit Hall) is the hub of the 2017 ASCB|EMBO Meeting, the place you can come for a personal tour of new technologies, products, and services that you’ve been considering. Here you can get your questions answered, face to face. Here you can try out lab equipment or materials before buying. You’ll find the newest technologies and products. You can look through the latest books and talk to journal editors, one on one. Maybe you’ll even win a prize or at least score some science swag.

At the heart of the Learning Center are ASCB’s famous “poster alleys”—where ideas, data, and careers are shaped—and the more than 200 companies presenting interactive and up-close demonstrations of their products and services. In today’s accelerating research world, the Learning Center is where you can find what you need now—or what you will need tomorrow—for your research.

We’ve made it easy to schedule time to visit the ASCB Learning Center. On Sunday, Monday, and Tuesday all the scientific activities outside the Learning Center take a break from 12:00 pm–3:00 pm. This special three-hour window gives you time to have lunch in the Learning Center, visit the exhibits, explore the posters, and attend Tech Talks without missing any scientific sessions. It’s a chance to recharge your batteries (both biological and mobile) for the afternoon science presentations.

Seasoned meeting attendees know that there’s no better way to learn about new technologies than talking to the experts at the exhibit booths. Let an exhibitor swipe your badge and more information will come to you after the meeting. Swiping your badge is a painless way for you to support the ASCB|EMBO Meeting because our exhibitors highly prize the contacts they make with researchers. You’ll be helping ASCB build better meetings in the future.

Tech Talks, Publishers’ Row, and the Mobile App

Choose from more than 30 Tech Talks presented by exhibitors Sunday–Tuesday from 8:15 am–7:45 pm. These presentations will be in two dedicated venues right inside the ASCB Learning Center as well as in exhibitor booths. Check out these special opportunities to learn more about products and technologies from the experts.

Browse Publishers’ Row to see a display of new books, media, and journals. The ASCB journals, *Molecular Biology of the Cell (MBoC)* and *CBE—Life Sciences Education*, will have their own booth. Visit Booth 1031 for opportunities to meet editorial board members from *MBoC*.

Looking for a particular product? You can check the Meeting Program and the Meeting Mobile App (with multimedia links) for a full description of every exhibitor’s product line.
In addition, exciting new product launches are hyperlinked from the meeting website. The Meeting Program and the Meeting Mobile App (iPhone and Android) will be available online approximately one month before the meeting at www.ascb.org/meetings.

Fed Central
Want to discuss the status of current grants, the potential for future funding, and other types of collaborations with federal agencies? You’ll find the connections you want waiting in the dedicated Fed Central area.

Startup Central
Startup Central is the place to find innovative startup companies. Come meet with Ananda Devices, Aurox Ltd, Infinitesimal LLC, LipoType GmbH, MiniPCR, Nanolive SA, and NanoSurface Biomedical.

Career Insights and Inspiration
The Learning Center is also the home of the ASCB Career Center and of Roundtable Central, where the always popular Career Discussion and Mentoring Roundtables and Science Discussion Tables take place. Come learn about and discuss both science and life as a scientist.

Refreshments and Commentary
The exhibits will be open Sunday–Tuesday from 9:30 am–4:00 pm. Come to the ASCB Learning Center each morning after the first Symposium of the day to enjoy refreshments from 9:30 am–10:30 am. In the afternoon, a refreshing cold drink and snack will be available from 12:00 pm–3:00 pm.

On Tuesday, stop by the Career Center at 1:00 pm for the premiere of three Celldance videos and the Elevator Speech Awards. Grab a snack and a good seat for the first showing of three “Tell Your Cell Story” videos from leading ASCB member labs. The video makers will be on hand for commentary and questions. Then it’s time to award winners of the Elevator Speech Contest.

Make the ASCB Learning Center your meet-up point or daily rest stop. Prepare to be wowed by the science in the poster alleys and the exciting new science technologies and insights offered in the exhibitor booths!

To view a list of 2017 exhibitors and their products, go to www.ascb.org/2017meeting/exhibitors-list.

—Louise Campbell-Blair, Director, Business Development

Companies Giving Tech Talks*

ACEA Biosciences, Inc.  
Allen Institute for Cell Science  
Andor Technology  
BD Biosciences  
Berkeley Lights  
Bio-Rad  
BioLegend  
Bruker Corporation  
Carl Zeiss Microscopy, LLC  
Cellecta, Inc.  
GE Healthcare  
GORYO Chemical, Inc.  
Horizon Discovery  
Hybrigenics Corp.  
John Wiley & Sons, Ltd.  
Leica Microsystems Inc.  
MilliporeSigma (formerly EMD Millipore and Sigma-Aldrich)  
Nanolive SA  
NemaMetrix, Inc.  
Nikon Instruments, Inc.  
Photometrics  
Semrock (a Division of Idex Health & Science)  
Startups: LipoType GmbH, MiniPCR, Infinitesimal LLC, Nanosurface Biomedical  
SVI Huygens Software  
TESCAN USA, INC.  
Thermo Fisher Scientific, Inc.

*As of August 8, 2017

Visit Artists’ Row
A showcase of cell biology-themed arts and crafts for your last-minute holiday gifts! Meet the artists who create them.
The ASCB thanks the following organizations for supporting the 2017 ASCB|EMBO Meeting*

**Gold**
- Allen Institute for Cell Science
- Genentech
- Getson & Schatz, P.C.
- Nikon Instruments
- The Kavli Foundation

**Silver**
- Bio-techne
- Biogen
- Chroma Technology Corporation
- Sciencell Research Laboratories

**Bronze**
- Genentech
- Janssen Neuroscience
- Okolab SRL
- Tokai Hit Co., Ltd
- Thermo Fisher Scientific, Inc.

*As of August 28, 2017

The ASCB is grateful to its Corporate Members for 2017

**Gold**
- Allen Institute for Cell Science
- Genentech
- Getson & Schatz, P.C.
- Nikon Instruments
- The Kavli Foundation

**Silver**
- Bio-techne
- Biogen
- Chroma Technology Corporation
- Sciencell Research Laboratories

**Bronze**
- Genentech
- Janssen Neuroscience
- Okolab SRL
- Tokai Hit Co., Ltd
- Thermo Fisher Scientific, Inc.

The ASCB thanks the following organizations for supporting the Cell Biology of Degeneration and Repair in the Nervous System 2017 Doorstep Meeting

- Biogen
- Genentech
- Janssen Neuroscience
- The Kavli Foundation

*As of August 28, 2017
Women in Cell Biology Committee Awards

Each year, the Women in Cell Biology Committee (WICB) honors three investigators at distinct career stages through recognition awards. The unique and innovative WICB Junior and Senior Career Recognition Awards were established in 1986. The Junior Award for Excellence in Research (formerly the Junior Career Recognition Award), which is given to a woman, was the first ASCB award aimed at identifying newly independent, early-career scientists who exhibit significant potential for making scientific contributions. (ASCB has more recently established gender-neutral awards similarly targeting early-career scientists.) The award has been predictive of continued success, as evidenced by academic tenure and promotion as well as subsequent receipt of prestigious awards and honors, such as the National Institutes of Health (NIH) Pioneer Award, Howard Hughes Medical Institute funding, and ASCB’s E.B. Wilson Award.

The WICB Senior Leadership Award (formerly Senior Career Recognition Award) was also unique in that it combined recognition of scientific achievement and a strong commitment to the fostering of women in science. In 2015, the WICB Senior Leadership Award was renamed for Sandra K. Masur for her leadership as chair of WICB from 2000–2016 and for her long service as a member of this highly collaborative committee.

As an increasing number of ASCB awards for junior and senior scientists were created, WICB realized that the critical career period between junior and senior stages was being overlooked. Accordingly, in 2013 WICB established the Mid-Career Award for Excellence in Research. This award recognizes a woman who has held an independent position for 7–15 years, who has demonstrated a track record of exceptional scientific contributions to cell biology or has effectively translated cell biology across disciplines, and who exemplifies a high level of scientific endeavor and leadership.

In this historical context, we are pleased to announce our 2017 award recipients: Julie Canman, Columbia University; Karen Oegema, University of California, San Diego; and Harvey Lodish, Massachusetts Institute of Technology (MIT). The list of previous winners can be found at www.ascb.org/wicb-awards. We encourage you to join us in honoring the 2017 awardees during the ASCB|EMBO Meeting in Philadelphia at our WICB Awards and Mentoring Theater session on Tuesday, December 5, from 10:45 am–12:00 pm in the Pennsylvania Convention Center Room 122B.

Julie C. Canman: Junior Award for Excellence in Research

Julie Canman is assistant professor in the Department of Pathology and Cell Biology at Columbia University where her nominator Gregg Gundersen noted that she is a rising star in her field. Julie Canman’s nominator Gregg Gundersen noted that she is a rising star in her field.
Karen Oegema: Mid-Career Award for Excellence in Research

Karen Oegema is professor in the Department of Cellular and Molecular Medicine and a member of the Ludwig Institute for Cancer Research, University of California, San Diego (UCSD). Her independent research program since joining the UCSD faculty in 2002 addresses questions on centriole assembly and cytokinesis by integrating approaches in biochemistry, genetics, in vivo imaging, and structural biology. Her lab’s work is built on her postdoctoral research with Tim Mitchison and Yixian Zheng at Harvard University in which she identified properties of γ-tubulin complexes, and then with Tony Hyman at the Max Planck in Dresden where she revealed mechanisms of centriole assembly by using genetic approaches in C. elegans. Additionally, her vision and creativity are guiding her group as they generate a functional map of the essential genes required for embryo production and development in C. elegans, the majority of which are conserved in humans.

As noted by Don Cleveland, her nominator for the WICB award, Oegema has distinguished herself not only in research significance and productivity but also in mentoring and teaching excellence. Highlighting her mentoring strength, Oegema was a postdoctoral mentor for Julie Canman, this year’s WICB Junior Award recipient (see above).

As an independent investigator Canman is revealing the molecular mechanisms that contribute to cytokinetic diversity and ensure robust cell division, by combining conditional worm genetics with single-cell live-cell imaging and developing new microscopy-based technologies to spatially and temporally inhibit protein function with precise resolution. In addition to her research excellence, Canman has already developed a strong training record in mentoring undergraduate and graduate students as well as postdoctoral fellows.
end, I made it to the meeting with my slides, the talk went well, and I had a great time at the meeting."

**Harvey Lodish: Sandra K. Masur Senior Leadership Award**

Harvey Lodish is professor in the Department of Biological Engineering at MIT. He earned his PhD in genetics with Norton Zinder at the Rockefeller University and after postdoctoral work with Sydney Brenner and Francis Crick at the MRC Laboratory of Molecular Biology he moved from UK Cambridge to U.S. Cambridge in 1968 and joined the faculty at MIT, where he has remained throughout his career.

Lodish’s outstanding scientific achievements and the breadth of his investigative impact are evident in his seminal contributions on plasma membrane proteins, including membrane glycoproteins, receptors, and glucose, fatty acid, and ion transporters, as well as more recently adipogenesis and erythropoiesis through over 600 peer-reviewed articles. His scientific impact has been recognized with numerous honors, including being a member of the National Academy of Sciences; a fellow of the American Association for the Advancement of Science, the American Academy of Arts and Sciences, and the American Academy of Microbiology; and an associate (foreign) member of the European Molecular Biology Organization.

Another major reason that Lodish is this year’s Sandra K. Masur Senior Leadership Award winner is his outstanding record in training and mentoring over 175 PhD students and postdoctoral fellows, with two of his students receiving the Nobel Prize and the Lasker Award and seven being elected to the U.S. National Academy of Sciences or the National Academy of Medicine. And of the many women alumni of the Lodish lab, a substantial number have tenured university positions or leadership positions at the National Institutes of Health or National Research Council, in biotechnology, and in nonprofit scientific foundations. Jean Schaffer and others supporting his nomination noted that Lodish’s scientific open-mindedness enables trainees to have intellectual freedom to pursue a range of important problems and apply creative thinking in challenging existing paradigms. This approach is also conveyed in his lead authorship of the textbook *Molecular Cell Biology*.

Lodish claims that many years ago he learned—in large measure from his wife and two daughters who have each had independent careers—that attracting and retaining top scientists to one’s research group requires a very family-friendly culture, both at the individual lab level and more broadly across institutions. Lodish embraces recruiting researchers with families, opens his home to gatherings for lab families, and even officiated at the marriage in Taipei of one of his postdocs. Lodish received the Mentor Award in Basic Science from the American Society of Hematology.

Within ASCB, Lodish was ASCB president in 2004 and a WICB member. On a very personal level he is an advisor to Parent-Powered Innovation, a not-for-profit organization that works with parents interested in developing treatments for their children’s rare diseases. His grandson has Gaucher disease, a lysosomal storage disorder, and is being treated with a drug that Lodish helped develop shortly after helping to found Genzyme, a company devising enzyme replacement therapy.

—Diane L. Barber, Chair, Women in Cell Biology Committee and Sandra K. Masur, Icahn School of Medicine at Mount Sinai
PUBLIC POLICY Briefing

H1-B Visas, continued from p. 1

These offices have received ASCB’s white paper on immigration,1 which advocates easing foreign travel by H-1B visa holders and matching visa durations with training times, among other recommendations.

Most bills, including those introduced by both of these members of Congress, seek to provide an easier route to the United States for nonimmigrants who have obtained a PhD from a U.S. institution of higher education. Nonimmigrants who received their degree in any of the STEM fields would be especially favored.

Of concern to the ASCB is the possibility that legislation may reduce the approved period of stay for H-1B visa holders.

---

Presently nonimmigrants are permitted to stay for six years with the possibility of extension. Some bills, like Sen. Grassley’s, would reduce that period to three years with maximum extensions totaling six years.

The ASCB is working to ensure that the concerns of our members and the biomedical community are heard during debates about damaging provisions such as these.

If you or other members of your lab have had any relevant experiences navigating H-1B visa program, please contact Kevin Wilson at kwilson@ascb.org.

Footnote
1www.ascb.org/immigrationwhitepaper.

Science Funding Faring Better in Congress than in the Trump Budget

With media and public attention turned to the battle over ObamaCare taking place on the Senate side of Capitol Hill, appropriations subcommittees in the House quietly started their work on the FY18 federal budget during July. The work by the House is the first step of a long congressional budget process, but the news for the U.S. National Institutes of Health (NIH) and the U.S. National Science Foundation (NSF) so far is that funding levels could be significantly better than those requested by the Trump Administration.

Under the House bill, the NIH’s FY18 budget, which was slated for an $8.6 billion cut in the Trump budget proposal, is set to receive a $1.1 billion increase from its FY17 budget. This is short of the $2 billion increases the NIH has been receiving for each of the last two years. However, Rep. Tom Cole (R-OK), a strong supporter of the NIH and chair of the House subcommittee that funds the agency, said he hoped the $1.1 billion would serve as a floor for future negotiations with the Senate that could result in a larger final budget.

The NSF budget, which the Trump Administration wanted to reduce by 10%, is reduced to $7.3 billion, only $133 million below the FY17 actual budget.

Other areas of federal science are also doing better than originally feared. Within the Department of Energy, the Office of Science, which was targeted for a 17% cut in the Trump budget proposal, is seeing slight increases from FY17 in both the House and Senate versions of its FY18 budget. Medical & Prosthetic Research at the Department of Veterans Affairs, slated to be cut by 5% by the administration, will see respectable increases in both the House and the Senate.

Some federal programs, particularly those that are being tied to climate change research, are still in the budget crosshairs. At the National Oceanic and Atmospheric Administration (NOAA), the Office of Oceanic and Atmospheric Research, with a proposed 32% cut, is cut by 7.7% by the House. The NOAA program responsible for weather satellites, with a 17% proposed cut by the administration, is inexplicably cut by over 22% by the House.

—Kevin M. Wilson
The ASCB Committee for Postdocs and Students (COMPASS) is a group of trainees dedicated to promoting the voice and visibility of early career scientists, including through science outreach. Such outreach not only allows us to showcase to the public how government funds are spent toward scientific progress, but also enables us to inspire the next generation of scientists. To this end, COMPASS holds a grant competition to fund ASCB members engaged in outreach activities within their local communities. Preference is given to projects in underserved communities.

Below I highlight some of the projects we funded in 2017. Do you have an idea for an outreach activity within your local community? The next grant deadline is February 15, 2018. Look for details soon on www.ascb.org and in the Newsletter.

**The Young Scientist Program**
This program was founded by a University of California, Davis, graduate student and aims to enhance science education for K–12 students in California’s San Joaquin Valley. Volunteer graduate students work with local teachers to bring interactive hands-on labs to the classroom, thereby empowering young students to pursue STEM fields while also enhancing graduate student teaching and communication skills.

**Sharon STEM Talks**
Based in Sharon, MA, this program uses a Science Café–style approach to bring members of the public together with scientists to facilitate science discussion. The monthly seminars, presented by a diverse set of local scientists, are held at a public library. This type of outreach gives scientists a chance to practice communicating in lay terms while allowing the public, specifically younger generations, to engage with the local science community.

**Cell Biology Day at Anschutz**
Graduate student organizers invite middle-school students to visit the Colorado Anschutz Medical Campus for a day of cell biology exploration. Students participate in hands-on lab activities, tour active labs on campus, and eat lunch with graduate students to learn more about their research and careers. These visits introduce young people to what a research lab looks like and show them the diverse types of people who work in academic science.

**Community Partnership in Lyme Disease Prevention**
Amy Prunuske organizes outreach events with middle- and high-school science students to collect field data on tick species and pathogens. Students learn about zoonotic diseases and participate in the data collection by using in-the-field genotyping assay technology. This citizen-driven science project promotes Lyme disease prevention and gets the public involved.

**GO:MCB & CaresBio**
The University of Connecticut GO:MCB graduate student program has teamed up with a local biotechnology company, CaresBio, to engage 4th- to 12th-grade students in a science fair. For an afternoon, younger students and...
their families participate in a variety of events that cover basic science concepts. Meanwhile, over the course of a month, older students work one-on-one with graduate student mentors to develop and execute science projects. This partnership not only invests in a new generation of scientists, it also gives graduate students a chance to work on their mentoring skills.

**Starkville Science Club**
Here the COMPASS outreach grant is funding the implementation of a “Cell Biology For Life” teaching module for middle- and high-school students in the Starkville Science Club. Students have access to microscopes and fixed slides displaying a diverse set of cell types. In addition, members of the club tour the cutting-edge resources at The Institute for Imaging and Analytical Technologies at Mississippi State University. Using this hands-on experience as a gateway, this module aims to spark interest in science through the powerful tool of imaging and observation.

**Developing Future Biologists**
Graduate students at the University of Michigan developed a short course on developmental biology for local undergraduate students whose curricula currently lack this training. This course travels from university to university, making it available to students without their needing to travel. This program aims to promote biomedical and developmental biology research as career pathways for undergraduate students from underrepresented groups.

---

**Are you getting ASCB Pathways?**
You should be regularly receiving our monthly email update, ASCB Pathways—alerting you to the latest ASCB happenings and Annual Meeting updates. If you aren’t seeing the e-newsletter in your inbox, please check your spam filter, and/or contact your system administrator to whitelist *ascb.org.*
OFFICE HOURS with EdComm

Regardless of our current role in academe, education—for us and for our students—is central to our identity as scientists. With that in mind, the ASCB Education Committee (EdComm) is pleased to offer Office Hours with EdComm, a column addressing broad issues in education, ranging from career choice to curriculum development to incorporating technology into your lectures. EdComm Members and Associates look forward to answering your questions; please direct them to DearEdComm@ascb.org.

Taking the Terror out of Random Call

Dear Office Hours with EdComm,

I try to use evidence-based teaching strategies as much as possible in my classroom but one that I have not yet tried is random call. I remember when I was a student and being called on at random was terrifying for me! I also know that some of my students are really anxious about speaking in front of the class so I fear that I might alienate these students and some might even stop coming to class altogether. I want to make my classroom an equitable environment and I know that random call is supposed to help that but do I really have to do it? Is there another strategy I can use?

—Reservations about Random Call

Dear Reservations about Random Call,

Random call, or “cold calling,” is certainly a method that evokes strong feelings, so this is a great question to consider. Some instructors may think of random call as an incentive to pay attention to what the instructor is saying or to participate in group activities. Although this certainly may be one benefit, random call is also an important equity strategy. We all have experienced classrooms in which a single individual or small group of students are the only ones who raise their hands to answer a question. Using random call ensures that every student has the chance to participate and practice answering or asking questions. Let’s take a look at the evidence supporting random call as an effective strategy to use in the classroom.

A recent study in CBE—Life Sciences Education by Knight, et al. showed that the use of random call after small group discussions improved the quality of those small group discussions. Analysis of small group conversations showed that the small group discussions in random call class sessions included more reasoning and questions than the conversations in volunteer class sessions. In another study, Eddy et al. found that there were differences in both the achievement and participation of male and female students but that random call was a useful strategy in mitigating that participation gap. Dallimore et al. demonstrated that when random call is used more frequently, there is actually an increase in students’ voluntary participation in classroom discussions. This may occur because students are increasingly comfortable with talking in front of the class after having been required to do so or because they rely less on individuals who are always willing to answer questions in front of the class.

The evidence presented above makes a compelling argument for random call, but your question indicates that it’s a bit more complicated, and it is. What about the fear potentially induced in students by random call? Many studies of random call have noted student fear and anxiety in response to random call, and importantly, this may be a distraction from the learning process. I agree that acknowledging student fear and anxiety is important. However, avoiding the use of random call is not the only way to mitigate this fear.

Below are some strategy suggestions from the literature and personal experience for implementing random call in a way that might help to mitigate student fear and anxiety:

■ Discuss the use of random call early in the semester and give students who are very anxious the opportunity to opt out by emailing the professor. The last thing we want is our students focusing on the fear of random call rather than the course content! In my experience, very few will take this option, but it can build trust and help students with specific public speaking anxieties to feel comfortable in the classroom.

■ Build community in class so that getting the wrong answer or making mistakes is accepted and even welcomed. The wrong answer is really just a learning opportunity and any student who bravely gives the wrong answer is really just saying what many other students are likely thinking. Further, getting the wrong answer and figuring out how to get the right answer in this process is profoundly brain-changing. If being wrong is normalized in the learning environment, individual students who are called on and get the wrong answer will likely be less embarrassed and distracted by it. You might even thank those students for bringing up an important opportunity for clarification.

■ “Warm call,” instead of cold call, provides opportunities for students to try their answers out in a small
group or pair discussion before being called on randomly. Letting students know when the question is initially asked (before discussing in groups) that they will be called on lowers the participation barrier even further. This approach also gives students incentive to make the most out of their small group discussions.\textsuperscript{1,2}

\begin{itemize}
  \item Allow students to “phone a friend” or “pass” their turn to another random name. This is a fun option that may build community in the classroom by allowing students to ask a colleague for help. We all ask colleagues for help from time to time, so why not allow students to try it in the classroom?
  \item Ask questions to which there are multiple correct answers. Framing questions around what students’ ideas are rather than using random call on questions where there is only one correct answer may allow for multiple ideas to be shared. For example, instead of “What is the molecule produced during transcription?” you might ask, “What can you tell me about the process of transcription?” and then allow several students to share ideas that might build a better understanding of this process.
\end{itemize}

To conclude, random call may be a useful strategy for creating an equitable and inclusive classroom, and there are certainly many approaches to making this a more realistic option for you and your students. I hope one or more of these suggestions will be helpful if you do try random call, but only you can decide if it is right for your classroom.

---EdComm

References

\textsuperscript{1}Knight JK, Wise SB, Sieke S (2016). Group random call can positively affect student in-class clicker discussions. \textit{CBE—Life Sciences Education} 15, ar56.


Recent Early Career Meeting

Bay Area Meeting on Organelle Biology
Berkeley, CA. June 6, 2017

Nearly 140 participants convened at Stanley Hall at the University of California, Berkeley, for the 2017 Bay Area Meeting on Organelle Biology (BAMOB). Opening the day was keynote speaker Jodi Nunnari from the University of California, Davis, who impressed the audience with striking live-cell imaging of the intimate physical and functional relationship that exists among the endoplasmic reticulum, mitochondria, and mitochondrial DNA. Presentations and posters by local early-career researchers covered a broad range of topics relating to organelle biogenesis, structure, and function in eukaryotic and prokaryotic cells. Highlights included using *Legionella* infection to uncover basic mechanisms of organelle function, in vitro reconstitution of ESCRT membrane budding events, and the characterization of the suction-cup-like actin-based organelle of *Giardia*. A dynamic social hour capped off this second successful edition of BAMOB.

Upcoming Early Career Meetings

Northeast Nuclear Envelope Meeting 2017
New Haven, CT
September 15, 2017

Triangle Cytoskeleton Meeting
Saxapahaw, NC
September 18, 2017

Ethical and Inspiring Mentorship in Biomedical Science
College Park, MD
September 21, 2017

Translational Cell Biology Symposium
Gainesville, FL
September 22, 2017

Alternative Muscle Club, 5th Annual Meeting, 2017
San Diego, CA
September 22, 2017

CelluART Toledo
Toledo, OH
September 29, 2017

UCLA Mitochondria Symposium
Los Angeles, CA
November 2, 2017

Biological Soft Matter
Cambridge, MA
November 17, 2017

ASCB is pleased to provide Early Career Meeting Grants to graduate students and postdocs to organize one-day meetings. Such meetings usually involve two or more institutions (within the United States or international), and topics can range from basic science to career development as long as there is clear relevance to the broadly defined field of cell biology.

The next deadline to apply for funds is **January 17, 2018**. Applicants must be or become members of the ASCB. For more information visit www.ascb.org and click on “Meetings.”
Seen in THE CELL IMAGE LIBRARY

Multiphoton image of microglia (GFP, green) and cerebral blood vessels (Texas-red dextran, red) in a living, anesthetized transgenic mouse. This image (www.cellimagelibrary.org/images/42603) is by Harris A. Gelbard and received an Honorable Mention in the 2009 Olympus BioScapes Digital Imaging Competition. It is published under a Creative Commons Attribution, Non-Commercial, No Derivatives License.

The Cell Image Library (www.cellimagelibrary.org) is a freely accessible, easy-to-search, public repository of reviewed and annotated images, videos, and animations of cells. Portions of the Cell Image Library were developed by ASCB under a Grand Opportunities grant from the National Institute of General Medical Sciences and are now managed by the National Center for Microscopy and Imaging Research under a perpetual license from ASCB.

Did you know?

You Can Still Submit an Abstract for the 2017 ASCB|EMBO Meeting

You still have time to submit an abstract for poster consideration for the 2017 ASCB|EMBO Meeting, to be held December 2–6, 2017, in Philadelphia. October 11 is the final deadline. We welcome the latest, hottest science!

Are there nonmembers in your lab who want to submit abstracts? Now is the time to encourage them to join ASCB. Our “one-stop-shop” will allow submitters to apply for membership and submit their abstract with one payment without leaving the abstract submission site. They will also be eligible for the discounted member-only registration rate for the meeting.

Nonmembers will pay a higher abstract submission fee if they choose not to join the ASCB, so why miss out on the savings? Members can save up to 33% on registration/abstract fees.

For more information go to ascb-embo2017.ascb.org/abstractinformation.
HIGHLIGHTS from MBoC

The Editorial Board of Molecular Biology of the Cell has highlighted the following articles from the July and August 2017 issues. From among the many fine articles in the journal, the Board selects for these Highlights articles that are of broad interest and significantly advance knowledge or provide new concepts or approaches that extend our understanding.

**Binding of ZO-1 to α5β1 integrins regulates the mechanical properties of α5β1–fibronectin links**

**Víctor González-Tarragó, Alberto Elosegui-Artola, Elsa Bazellières, Roger Oria, Carlos Pérez-González, and Pere Roca-Cusachs**

Interaction between tight junction protein ZO-1 and integrin α5β1 reduces the resistance to force of α5β1–fibronectin bonds while simultaneously increasing their affinity. This effect is specific to subconfluent cells in which ZO-1 is displaced from its normal localization in cell–cell junctions.

*Mol. Biol. Cell* 28 (14), 1847–1852

**A cytoskeletal clutch mediates cellular force transmission in a soft, three-dimensional extracellular matrix**

**Leanna M. Owen, Arjun S. Adhikari, Mohak Patel, Peter Grimmer, Natascha Leijnse, Min Cheol Kim, Jacob Notbohm, Christian Franck, and Alexander R. Dunn**

Quantitative analysis of the pairwise dynamics of the actin cytoskeleton, focal adhesions, and ECM fibrils reveals how cytoskeletal dynamics drive matrix deformation and cell motility for primary human fibroblasts embedded in a 3D fibrin matrix.


**Transmembrane helix hydrophobicity is an energetic barrier during the retrotranslocation of integral membrane ERAD substrates**

**Christopher J. Guerriero, Karl-Richard Reutter, Andrew A. Augustine, G. Michael Preston, Kurt F. Weiberth, Timothy D. Mackie, Cleveland-Rubeor, Neville P. Bethel, Keith M. Callenberg, Kunio Nakatsukasa, Michael Grabe, and Jeffrey L. Brodsky**

Cdc48/p97 provides the energy to retrotranslocate integral membrane ERAD substrates. A series of ERAD substrates with increasingly hydrophobic transmembrane helices is used to show that retrotranslocation efficiency inversely correlates with hydrophobicity.

*Mol. Biol. Cell* 28 (15), 2076–2090
Single-molecule imaging of the BAR-domain protein Pil1p reveals filament-end dynamics
Michael M. Lacy, David Baddeley, and Julien Berro
A new strategy is used to reveal nanometer-scale single-molecule dynamics within protein assemblies to study the eisosome: a stable, linear cluster of proteins on the yeast plasma membrane. The BAR-domain protein Pil1p binds and unbinds at eisosome ends, supporting a new model of eisosomes as dynamic oligomeric filaments.
Mol. Biol. Cell 28 (17), 2251–2259

Electrostatic interaction between polyglutamylated tubulin and the nexin–dynein regulatory complex regulates flagellar motility
Tomohiro Kubo and Toshiyuki Oda
The 3D localization of polyglutamylated tubulin in eukaryotic flagella is identified. Polyglutamylated tubulins are located on the interface between the microtubule and its cross-bridging structure, the N-DRC. Flagellar motility is regulated by electrostatic interaction between negatively charged tubulins and positively charged N-DRC.
Mol. Biol. Cell 28 (17), 2260–2266

Generic membrane-spanning features endow IRE1α with responsiveness to membrane aberrancy
Nozomu Kono, Niko Amin-Wetzel, and David Ron
Previous studies indicated that IRE1α responds to membrane aberrancy via its transmembrane domain (TMD); however, little is known about the TMD features involved. Use of CRISPR/Cas9-mediated gene editing shows that generic membrane-spanning features of the TMD are sufficient for IRE1α’s responsiveness to membrane aberrancy.
Mol. Biol. Cell 28 (17), 2318–2332
## Table of Contents

### EDITORIAL

Sustaining CBE—Life Sciences Education  
Erin L. Dolan

### CURRENT INSIGHTS

Insights from Small-N Studies  
Julia Goavea

### WWW.LIFE SCIENCES EDUCATION

More Than Metaphor: Online Resources for Teaching Cancer Biology  
Amy J. Hawkins and Louisa A. Stark

### ARTICLES

Sarah E. Andrews, Christopher R. Runyon, and Melissa L. Aikens

Gender, Math Confidence, and Grit: Relationships with Quantitative Skills and Performance in an Undergraduate Biology Course  
K. M. Flanagan and J. Einarson

Do Biology Students Really Hate Math? Empirical Insights into Undergraduate Life Science Majors’ Emotions about Mathematics  
Lucas P. Wachsmuth, Christopher R. Runyon, John M. Drake, and Erin L. Dolan

Reflecting on Graphs: Attributes of Graph Choice and Construction Practices in Biology  
Aakanksha Angra and Stephanie M. Gardner

Investigating Undergraduate Students’ Use of Intuitive Reasoning and Evolutionary Knowledge in Explanations of Antibiotic Resistance  
Melissa Richard, John D. Coley, and Kimberly D. Tanner

Investigating Novice and Expert Conceptions of Genetically Modified Organisms  
Lisa M. Potter, Sarah A. Bissonnette, Jonathan D. Knight, and Kimberly D. Tanner

The DNA Triangle and Its Application to Learning Meiosis  
L. Kate Wright, Christina M. Catavero, and Dona L. Newman

Do Biology Majors Really Differ from Non–STEM Majors?  
Sehoya Cotner, Seth Thompson, and Robin Wright

Introductory Biology Students’ Use of Enhanced Answer Keys and Reflection Questions to Engage in Metacognition and Enhance Understanding  
Jaime L. Sabel, Joseph T. Dauer, and Cory T. Forbes

Improving Exam Performance in Introductory Biology through the Use of Preclass Reading Guides  
Rebekah Liu, Ashley Wong, Anahita Asifrad, and Justin F. Shaffer

Values Affirmation Intervention Reduces Achievement Gap between Underrepresented Minority and White Students in Introductory Biology Classes  
Hannah Jordt, Sarah L. Eddy, Riley Brasil, Ignatius Lau, Chelsea Mann, Sara E. Brownell, Katherine King, and Scott Freeman

Effectiveness of a Low-Cost, Graduate Student–Led Intervention on Study Habits and Performance in Introductory Biology  
Tyler D. Hoskins, J. D. Gantz, Blake R. Chaffee, Kel Aritinghaus, James Wiebler, Michael Hughes, and Joyce J. Fernandes

Increasing Research Productivity in Undergraduate Research Experiences: Exploring Predictors of Collaborative Faculty–Student Publications  
Danielle X. Morales, Sara E. Grineski, and Timothy W. Collins

Mentoring Interventions for Underrepresented Scholars in Biomedical and Behavioral Sciences: Effects on Quality of Mentoring Interactions and Discussions  

Providing Experiential Business and Management Training for Biomedical Research Trainees  

What Motivates Biology Instructors to Engage and Persist in Teaching Professional Development?  
Jill S. McCourt, Tessa C. Andrews, Jennifer K. Knight, John E. Merrill, Ross H. Nehm, Karen N. Pelletreau, Luanna B. Prevost, Michelle K. Smith, Mark Urban-Lurain, and Paula P. Lemons

### CORRECTION

A Call to Develop Course-Based Undergraduate Research Experiences (CUREs) for Nonmajors Courses  
Cissy J. Ballen, Jessamina E. Blum, Sara Brownell, Sadie Hebert, James Hewlett, Joanna R. Klein, Erik A. McDonald, Denise L. Monti, Stephen C. Nold, Krista E. Slemmons, Paula A. G. Soneral, and Cissy J. Ballen

---

### On the Cover

Biological Context and Probe: *Herpetosiphon aurantiacus* is a filamentous nonphototrophic bacterium that exhibits gliding motility and is capable of predation on other bacteria. The picture brightness is linearly proportional to the dry mass distribution. Photo Credit: Michael Shribak and Irina Arkhipova.
MEMBERS in the News

Kathleen Green, the Joseph L. Mayberry, Sr., Professor of Pathology and Toxicology and professor of Dermatology at the Northwestern University Feinberg School of Medicine, was recently elected to the German National Academy of Sciences. Green is a leader in epithelial cell biology and has been a faculty member at Northwestern since 1987. She has been a member of ASCB since 1980 and is presently serving as Secretary of the Society.

Member Benefit: Publicize Your Book

Are you publishing a book? If so, let ASCB know! Send the title, publisher, ISBN information, and a thumbnail (300 dpi) of the cover. We'll include it in the ASCB Newsletter. This publicity is available only to ASCB members. Please send submissions to Thea Clarke at tclarke@ascb.org.

Video Feature in MBoC

You can now view videos from within the HTML version of an article in Molecular Biology of the Cell (MBoC). Previously, videos stored as supplemental data were several clicks away. Now thanks to a feature called video injection, they appear within the article where they are first mentioned in the text, just like other figures. (See examples in the article at http://bit.ly/1MVm4GD.)

ASCB has partnered with Glencoe Software to offer this feature, which has been installed retroactively for most articles since 2005 that have videos as data supplements.
ASCB Members

Books by Members

- **Introduction to Quantitative Cell Biology** (2017), Wallace F. Marshall, Morgan & Claypool


Managing Your Membership

- **Keep Your Profile up to Date.**
  Update your profile online to get information that is relevant to you. Or, if you move, update your email or phone number. Visit ascb.org/myprofile.

- **Need to recover login info? Visit ascb.org/recover**

- **Add ASCB to Your Safe Sender List**
  Receive the ASCB resources, news, and information important to you. Ask your systems administrator to whitelist our domain “@ASCB.org”

- **Let us Know About Your Achievements**
  Did you get a postdoc? Win an award? Did you publish? Were you promoted? Are you now at another organization? Your colleagues at ASCB want to know...
  send news on your achievements to ascbinfo@ascb.org

We welcome your comments and suggestions at ascbinfo@ascb.org

Other ways to stay in touch:
- ASCBiology
- @ASCBIology
In Memoriam: Catherine D. Lewis, 68, NIGMS Cell Biology and Biophysics Division Director

Catherine D. Lewis, director of the National Institute of General Medical Sciences (NIGMS) Division of Cell Biology and Biophysics (CBB) until her retirement in January, died on July 12, 2017, at the age of 68. Lewis had been a member of ASCB from 1999 through 2015 and was well known to Society members.

Lewis began her career at the National Institutes of Health (NIH) in 1983 after earning her PhD in biochemistry from Princeton University. She led cutting-edge research in the fields of nanoscience and single molecule methods. At NIGMS, she managed grants in genetics and developmental biology, as well as grants in structural biology that led to the first crystal structures of the ribosome. She oversaw initiatives aimed at advancing structural genomics, improving methods for cellular imaging, creating a library of cell images, and, most recently, supporting resources for cryo-EM and cryo-EM tomography. NIH honored Lewis twice with Director’s Awards for her work on trans-NIH initiatives and her leadership on science education in elementary schools.

Writing on the NIGMS blog, Peter Preusch, acting director of the CBB, said Lewis was “known for her work ethic and her ability to make people feel at ease. She managed a division responsible for more than 1,300 grants, and did so with grace, patience and a sunny smile.” He said, “Working in the CBB division was fun because she helped make it so. She will be missed.”

—Mary Spiro

Letter to the Editor

I would like to offer a warning to everyone who applies for a National Institutes of Health grant that they need to check every detail of their application. The bureaucrats in the Division of Receipt and Referral summarily reject grant applications if they are missing any essential piece. I recently submitted a competitive renewal application and inadvertently omitted the Biosketch. The Division refused to accept a corrected application, and suggested that I submit in the next cycle, creating a four-month gap in funding. I think we really need an aggressive campaign to try to change this inflexible and wasteful policy.

—Harold Erickson, Duke University

ASCB Member Comments

We welcome your comments and suggestions at ascbinfo@ascb.org
Your Donation to ASCB Goes a Long Way

In 2016 your generous, tax-deductible donations helped provide the following awards:

- Postdoctoral Travel Awards
- Graduate Student Travel Awards
- Junior Faculty Travel Awards
- Minority Travel Awards
- International Travel Awards

In addition, your contributions provided support to the Early Career Scientist Award, the Merton Bernfield Memorial Award, the WICB Awards presentation, the Keith Porter Lecture, international outreach, ASCB’s public policy and public information efforts, and the LSE Fund.

On behalf of the many beneficiaries of your 2016 donation, thank you. Your 2017 donation will directly support the advancement of cell biology in many ways.

To donate visit www.ascb.org/donate

SPECIAL ISSUE

FORCES On and Within CELLS

Now Online!

@MBoCJournal | molbiolcell.org/content/28/14
The ASCB is grateful to the following donors whose contributions between August 1, 2016, and July 31, 2017, helped support Society activities.

**Gold ($1,000 and up)**

Bruce Alberts  
William Bement  
Robert Coffey  
David Drubin  
Joseph Gall  
Susan Gerbi  
Gary Gorbsky  
Kathleen Green and Rex Chisholm  
Barbara Hamkal  
Brigid Hogan  
Jodi Nunnari  
Thoru Pederson  
Sandra Schmid  
Mary Ann Stepp  
Zena Werb  
Kenneth Yamada

**Silver ($500 to $999)**

Diane Barber  
Suzanne Barbour  
Celeste Berg  
Henry Brown  
Jay Dunlap  
Christine Field  
Robert Goldman  
Renato Iozzo  
Morris Iozzo  
Tomas Kirchhausen  
Daniel Lew  
Thomas Pollard  
John Pringle  
Tim Schedl  
Beverly Wendland  
Mark Winey  
Elaine Yeh  
Michael Berns  
Richard Blanton  
Eric Brown  
Keith Burridge  
Nirupa Chaudhari  
Dorothy Croall  
Ronald Field  
K. Schmedl-Sapiro

**Bronze ($250 to $499)**

Dong Fu  
Gregg Gundersen  
Richard Hynes  
Geri Kreitzer  
Laura Lowery  
Sandra Masur  
Lou Novick  
Jenifer Monks  
Avani Mody  
Yuko Mimori-Kiyosue  
Sonni-Ali Miller  
John Merriam  
Barbara Mellone  
Wilfredo Mellado  
Esther Michelle  
Virginia Papaioannou  
Robert Pezza  
Jessica Polka  
Margot Quinlan  
Evelyn Ralston  
Lucy Robinson  
Jonathan Rothblatt  
Tom Rutkowski  
Edward Salmon  
Wendy Salmon  
Jean Sanger  
Joseph Sanger  
Uma Sankar  
Rebecca Schmidt  
Ahna Skop  
Alyson Smith  
Scott Stagg  
Clifford Steer  
Donna Stolz  
Brian Storrie  
Alexandra Surcel  
Sowyma Swaminathan  
Elizabeth Szul  
K. Schmedl-Sapiro

**Sustainer (up to $249)**

Khador Abdi  
Dany Adams  
Josephine Adams  
Robert Adelstein  
Alexandra Ainsztein  
Veenu Ashwarya  
Elizabeth Allison  
David Allred  
Franklin Ampe  
Simon Atkinson  
Sadie Aznavoorian-Cheshire  
Robert Bacallao  
Debra Baluch  
Lance Barton  
Christopher Bazinet  
Nicolas Bias  
Sue Biggins  
Rebecca Boston  
David Burgess  
Betsaida Cabrera Garcia  
Andrew Campbell  
Merri Casem  
J. David Castle  
Katayoum Chamaney  
Chandrime Chatterjee  
William Chirico  
Seemay Chou  
Chen Chun-Ti  
Laura Cisar  
Benjamin Clarke  
Mary Clutter  
Stanley Cohn  
Charles Cole  
Nathan Collie  
Lynn Cooley  
Gladyss Cortes  
Dianne Cox  
Alison Crowe  
Lissette Cruz  
Gauden Danuser  
Siddhartha Das  
Dean Dawson  
Margaret De Cuevas  
Savita Dhanvantari  
Roberto Diaz  
Dennis Discher  
Michael Dores  
Scott Dougan  
Robert Douglas  
Mara Ducan  
Noel Dwyer  
Mark Eckley  
Mikala Egeblad  
Elizabeth Eldon  
Jeanne Elia  
Elizabeth Esquerre  
Miles Esquerre  
Qiang Feng  
Rebecca Fenn  
Donna Fernandez  
Kathy Folz  
Tina Franklin  
J. Peter Gergen  
Penney Gilbert  
Amy Gladfelter  
Michael Gleason  
Michael Glotzer  
Kavitha Godugu  
Sarah Goetz  
Leslie Gold  
Mary Goldring  
Eric Goley  
Todd Green  
Ekaterina Grishchuk  
Guido Guidotti  
Suna Gulay French  
Karmella Haynes  
Rebecca Heald  
Ellen Heber-Katz  
David Hedrick  
Jessica Henty-Ridilla  
Henry Higgi  
Lula Hilenski  
Sarah Hitchcock-DeGregori  
Walter Hittelmann  
Jennifer Hood-Degreene  
Jeffrey Hord  
Mary Horne  
Audrey Howell  
Nasreen Jacobson  
Siddhartha Jana  
Jacquelene Jordan  
Don Kaiser  
Robert Kao  
Susan Kasper  
Kaoru Kato  
Karen Katula  
Irina Kaverina  
Yasunobu Kuboata  
Megan Kenry  
Andrew Kennard  
Mark Kittisopikul  
Jonathan Knight  
James Konopka  
Dana-Lynn Koomo-Lange  
Sanjay Kumar  
Laura Lackner  
Maria Fe Lanfranco  
Gallore  
Rosalyn Lang  
Gordon Laurie  
Joshua Lawrmore  
William Leach  
Connie Lee  
James Lee  
Sophie Librerie  
Sandra Lemmon  
Wayne Lencer  
Noelle L’Etoile  
Jani Lewis  
Can Li  
Lee Ligon  
Robert Lindner  
Michelle Lu  
Victor Luria  
Harvard Lyman  
Margaret Magnedantz  
Bhawwati Manish  
Pallavi Manral  
Michael Marks  
Frederick Maxfield  
Pierre McCrea  
Patrick McNeely  
Philip McQueen  
Wilfredo Mellado  
Barbara Meline  
John Merriam  
Sonni-Al Miller  
Ishara Mills-Henry  
Yuko Mimori-Kiyosue  
Hamed Mirzai  
Avani Mody  
Jennifer Monks  
Veronica Morandi Da Silva  
Paola Moreno-Roman  
Michelle Moritz  
Anthony Moss  
Mary Munson  
Elena Nadezhidina  
Amrinder Nain  
Asuki Nara  
Mohandas Narla  
Diane Nathaniell  
Heber Nielsen  
Barb Oakley  
Lucy O’Brien  
Francis Osadzusia  
Rudolf Oldenbourg  
Virginia Papaioannou  
Roberto Pezza  
Jessica Polka  
Margot Quinlan  
Elizabeth Raff  
Evelyn Ralston  
Barbara Reaves  
Lucy Robinson  
Jonathan Rothblatt  
Tom Rutkowski  
Edward Salmon  
Wendy Salmon  
Jean Sanger  
Joseph Sanger  
Uma Sankar  
Rebecca Schmidt  
Ahna Skop  
Alyson Smith  
Scott Stagg  
Clifford Steer  
Donna Stolz  
Brian Storrie  
Alexandra Surcel  
Sowyma Swaminathan  
Elizabeth Szul  
K. Schmedl-Sapiro  
Helen Tatchell  
Whitney Tevebaugh  
Chandra Theesfeld  
Miranda Thomas  
Holly Thompson  
Lisa Thottumkuri  
Robert Tombes  
Meng-Fu Tsou  
Julie Turner  
Madison Tyler  
Henriette Uiuwipumwe  
Olusye Vanderpuye  
Lydia Villa-Komaroff  
Jim Wahl  
Claire Walczak  
Ora Weisz  
Craig Wilkinson  
Katherine Wilson  
Jean Wilson  
Robin Wright  
Lillianne Wright  
Pinfen Yang  
Amber Yount  
Cecilia Zurita-Lopez
DEAR Labby

Upholding Standards of Authorship

Dear Labby,

I’m involved in a situation that’s turned into a bit of an international incident. I have a research collaboration with a colleague who is an assistant professor at a university in the Middle East, whom I met at the ASCB meeting a couple of years back. Our collaboration has flourished, so much so that we were able to get funding from the government in her country to allow one of her PhD students to spend a couple of years working in my lab in the United States. The work has gone well, the student is wonderful, and it has been great to work more closely with my colleague. The student wrote up the first results from this project and we submitted a nice paper that got favorable reviews, and we recently got the proofs of the paper that was about to be published. This is when the problems started. The student went back to her university for a visit and met with her dissertation committee there and showed them the paper. One of the committee members threw a fit and insisted that his name be added to the paper. This professor had no role in the project, other than being on the student’s committee, but he claims that he taught the student everything she knows (he was her professor in one graduate class!) and, besides, it is “customary and respectful” for committee members to be acknowledged with authorship on student papers. He has been sending emails to everyone under the sun, including my dean and department chair, and now I got an email from the editor-in-chief of the journal after the professor emailed him too. I know I should be sensitive to cultural differences, but I am also pretty clear that authors should have made real contributions to the work reported in the paper. I’m worried about my reputation, but I’m also worried about how this will affect the student.

—Besieged

Dear Besieged,

Labby is sorry that you’ve found yourself in this situation. Labby has had many wonderful collaborations with scientists around the world, and has always found these experiences to be enriching. You are absolutely right to uphold the accepted standards for authorship of scientific publications. Only those who materially contributed to the content of the publication can vouch for the content of the manuscript. As you know, a number of journals now require the contributions of each author to be specified in the manuscript, and the days of “courtesy authorship” have rightly been consigned to the history book. Labby expects that after a few inquiries, the journal editor will agree with you, and that will be the end to any threat to your publication. As for the consequences for the student, Labby recommends that you discuss this situation with your collaborator, and perhaps with other committee members or faculty in the department. It’s very likely that the complaining professor is also out of step with the contemporary culture of his university and that this kind of attitude is no longer acceptable. Most aspects of the way we do science are common currency around the world, and attitudes tend to be very similar. Labby is confident that your determination to maintain professional standards will win through.

—Labby

Got Questions?

Labby has answers. ASCB’s popular columnist will select career-related questions for publication and thoughtful response in the ASCB Newsletter. Confidentiality guaranteed if requested. Write us at labby@ascb.org.
Stay relevant with ScienCell’s 3D cell culturing kits.

- Kits recapitulating tubule formation in vitro
- Multicellular structures and interaction of multiple cell types
- Active ECM remodeling
- Lumen-containing structures
- Inclusive kits ready for use with clear protocols

Visit us at Booth #726 during ASCB
Dec 3-6 | Philadelphia, PA

For more information visit sciencellonline.com/3D
6076 Corte Del Cedro, Carlsbad, CA 92011 Toll-free (877) 602-8549
For research use only

The Mechanisms of Mitotic Chromosome Segregation

Ideal for research and teaching

Free for downloads from:

Edited by
J. Richard McIntosh


J. Richard McIntosh and Thomas Hays
A Brief History of Research on Mitotic Mechanisms

Tarun M. Kapoor
Metaphase Spindle Assembly

Andrea Musacchio and Arshad Desai
A Molecular View of Kinetochore Assembly and Function

Helder Maiato, Ana Margarida Gomes, Filipe Sousa and Marin Barisic
Mechanisms of Chromosome Congression during Mitosis

Ajit P. Joglekar
A Cell Biological Perspective on Past, Present and Future Investigations of the Spindle Assembly Checkpoint

Michael A. Lampson and Ekaterina L. Grishchuk
Mechanisms to Avoid and Correct Erroneous Kinetochore-Microtubule Attachments

Moë Yamada and Gohta Goshima
Mitotic Spindle Assembly in Land Plants: Molecules and Mechanisms

Charles L. Asbury
Anaphase A: Disassembling Microtubules Move Chromosomes toward Spindle Poles

Jonathan M. Scholey, Gul Civelekoglu-Scholey and Ingrid Brust-Mascher
Anaphase B

Tamara Potapova and Gary J. Gorbsky
The Consequences of Chromosome Segregation Errors in Mitosis and Meiosis

All chapters written by experts and peer reviewed
Suitable for scholarly reading by professionals as well as for graduate and advanced undergraduate courses
Join Us...

ASCB | EMBO 2017 meeting
Philadelphia, USA • December 2-6

Following the arc of scientific discovery

Program Co-Chairs: Laura Machesky, Beatson Institute for Cancer Research, Glasgow, Scotland, and Tobias Walther, Harvard Medical School/HHMI, Cambridge, MA

Pennsylvania Convention Center | ascb-embo2017.ascb.org

See pg. 17 for a list of scientific topics