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The Meeting with Everything

by w. mark leader, editor

This issue of the Newsletter focuses on the 2019 ASCB|EMBO Meeting, to be held December 7–11 in Washington, DC. There is a lot to say about the meeting. The Doorstep Meeting (Cancer: From Genome Instability to Therapy); Special Interest Subgroups; Bruce Stillman's Keynote Lecture; eight Symposia with 19 speakers; Minisymposia and Microsymposia; exhibits; posters; award presentations; 50 sessions on education and professional development—there’s so much going on that it’s hard to list everything let alone describe it in detail. So here we touch on some highlights.

In his President’s Column, Andrew Murray reviews the diverse offerings at the meeting and emphasizes the different kinds of connections—intellectual, human, and professional—that make the ASCB|EMBO Meeting an essential event for members of the cell biology community.

Cell biologists work at the cutting edge of knowledge, but they also have a long scientific tradition. ASCB Science Writer Mary Spiro captures this well in her feature on the Symposium “D’Arcy Thompson at 100: Controlling cell shape and function.” Learn how Symposium speakers Ethan Garner and Jennifer Zallen continue to build on the intellectual foundations established more than 100 years ago by one of the first mathematical biologists.

We also hear from three of the other Symposium speakers, Emily Troemel, Alexander Schier, and Daniel Colón-Ramos, about why the topics of their Symposia are exciting not only for specialists but for all cell biologists. Mary Spiro writes about the Doorstep Meeting in the final feature article. And you can read about the recipients of the many awards ASCB offers to honor the achievements of cell biologists at all career stages.

So here you’ll find a lot of words about the meeting, and I’m sure some of them will intrigue and inspire you. But just reading about the meeting is like reading about food; it really doesn’t capture the experience. Please come and enjoy and enjoy the feast!
Omar Quintero, associate professor of Biology at the University of Richmond, received the 2019 Distinguished Educator Award from his institution. The award was presented during the school’s annual Colloquy event on August 21.
Scientific Horde Descends on DC

By Andrew Murray

If we sported tattoos that said things like “Cells Rule” and “I’m Dynamically Unstable” and we rolled into Washington on a vast phalanx of Harley-Davidsons, this might be the headline greeting this year’s ASCB|EMBO meeting in Washington, DC—Cell Biology for the 21st Century. Instead, we’ll quietly take trains, fly, and drive into town with nothing mightier than poster tubes and laptops. As a result, neither the national nor local press will deign to notice our descent on a convention center that is within a mile of the White House and the Capitol. But as stealthily as we arrive, we will matter because science matters and matters twice over: once to the store of human knowledge and once for the ability of that knowledge to improve the human condition.

But you smile and say, “Enough with the lame jokes and noble prose. I’ve already gone to a meeting this summer, there were only 150 attendees, they all worked in my field, there were no concurrent activities, and they gave talks and posters that I could effortlessly understand. Why should I go to this huge meeting, where I have to plan out which one of competing talks I’ll listen to and navigate a sea of posters that stretches as far as the eye can see?” The answer is that the ASCB meeting has everything: scientific diversity, professional development, the chance to see cool new methods and machines, a Doorstep Meeting, and the same sort of specialization you got in your small, manageable summer meeting. I’m going to go through these draws, one at a time, to convince you why you and your lab should head to DC this December.

Just as realtors have three words “Location, location, location,” scientists should have three “Connections, connections, connections.” As the phrase implies, the connections I’m talking about come in three forms. The first is the intellectual connections between different areas of science. Every time you see (in your own research) or hear (in that of others) something unusual you have a chance to make a unifying connection with some other piece of knowledge and that connection can produce new ideas and push science forward. But you can only make the connection if the other piece of knowledge, or something related to it, is already in your mental filing system. The more items and ideas there are in your relational database and the more diverse those objects are, the more likely you are to make exciting connections.

The ASCB|EMBO meeting offers scientific diversity at many different levels. One of them is a meeting within a meeting, Saturday’s Doorstep Meeting, which highlights a specific intersection between cell biology and another part of biology or medicine. The theme of this year’s Doorstep is Cancer: From Genomic Instability to Therapy; it will feature speakers and discussions that emphasize the links between the fundamental aspects of cell biology that explain the genetic instability of cancer cells and new approaches to cancer therapy.

The ASCB|EMBO meeting proper also starts on Saturday, beginning with the meetings of 20 Special Interest Subgroups. These are selected from proposals made by groups of scientists who want to focus talks and discussion on a particular subject. The focus of
the groups ranges from particular problems, such as Bacterial Cell Organization and The Mechanics of Large Cellular Machines, to newly emerging techniques, such as Tools and Devices for Cell Biology and Machine Intelligence and Statistics in Cell Biology. Others, such as Building the Cell and Bottom Up Cell Biology, cut across disciplines, facilitating connections between diverse groups of cell biologists.

Saturday afternoon ends with the formal introduction of the meeting and the presentation of our keynote speaker, Bruce Stillman, who has spent his career studying how cells replicate their DNA. Since any cell that you study appeared by the growth and division of other cells, including the replication of their DNA, you should be there. You’ll come away with two messages. The first is that cells use a remarkably complicated set of enzymatic processes to enact the process that was first hypothesized in the famous line, “It has not escaped our notice that the specific pairing we have postulated immediately suggests a possible copying mechanism for the genetic material.” The second is that persistence matters: It has taken almost 30 years for a community of dedicated scientists to get from the first protein that binds to a replication origin to a fully reconstituted system that depends on 42 proteins that interact to form 16 distinct replication factors.

This year’s meeting features eight Symposia—sessions with talks given by leaders in fields that Elly Tanaka and Sue Jaspersen, and the Program Committee they chaired, picked because they represent cell biology’s most exciting areas. While many talks will cover topics familiar to ASCB regulars such as the cytoskeleton and organelles, the Symposia were chosen to illustrate how cell biology is at the hub of fields as diverse as modeling and developmental biology, or biochemistry and genomics. Therefore, instead of giving them traditional titles, like “Cell biology of the cytoskeleton,” we’ve tried to find something that better conveys how cell biology acts as an integrating theme for many areas of science. Our symposia are titled, “Beyond Figure 7: Integrating modeling and experiment in cell biology,” “Attack of the Killer Bugs: The cell biology of infectious disease,” “Decisions, Decisions: How cells choose their fates,” “21st Century Machinery: The structure, function, and evolution of protein machines,” “What Blueprints Tell Us: How genomics informs cell biology,” “Getting from Here to There: Individual and collective cell migrations,” “Google Maps of the Cell: Controlling intracellular flow and direction,” and “D’Arcy Thompson at 100: Controlling cell shape and function.” If you want to know more, you’ll have to come to the meeting or at least look at its webpage (www.ascb.org/2019ascbembo).

Beyond the Keynote and Symposia lies the chance to present your own work. Every year, 40% of participants at the ASCB|EMBO Meeting who submit abstracts by the first deadline present their work in a Minisymposium, Microsymposium, or Special Interest Subgroup, and everyone who wishes can submit a poster. The opportunity to present your own work and listen to others in these smaller sessions allows me to emphasize the second kind of connection: the human connections that scientists make with each other. At previous ASCB meetings, my work has changed directions because people shared unpublished results with me (and I hope I’ve done the same for them), I’ve started collaborations, I’ve recruited postdocs, I’ve made new friends and I’ve chatted (and occasionally caroused) with old ones. On the science side of social media, presenting a poster will get you new Twitter followers, and meeting interesting scientists will give you new people to follow.

If you’re a student, postdoc, or young PI, figure out who you want to come and listen to your talk or visit your poster. Email them before the meeting to ask them to come hear about your work and critique it. If you’re a geezer like me, respond to these invitations
and take the time to wander the poster sessions, get the two-minute description from young scientists, and give them your feedback and advice. From either end, discuss your own ideas and unpublished work openly. Being honest and open with others encourages them to reciprocate: The more information you give, the more you’ll get back. On several occasions talking to people at meetings has revealed that my lab was working on the same topic as another lab and led to both collaborations and submitting complementary papers that were published together. They have also led to new ideas and approaches to a research question.

Besides posters, the Exhibit Hall also houses exhibitors, and these range from manufacturers of equipment and reagents to publishers, societies (including both ASCB and EMBO), and the National Institutes of Health. It is a great place to meet editors from your favorite journals, including *Molecular Biology of the Cell*. You can test drive the latest microscopes and learn about other machinery and techniques and figure out what your holiday wish list looks like for the moment when your personal scientific deity sends floods of your local currency into your office.

Finally, there is the third and last form of connection: making connections that influence what you’re going to do in the future. ASCB and EMBO are deeply committed to helping individual scientists and scientific communities develop and grow. At our joint meeting, we offer a wide variety of professional development activities designed to foster the growth of both individuals and groups. Career-focused workshops and hands-on sessions provide training and mentorship to people at all levels, with sessions on finding a graduate school, a postdoctoral lab, or a position in industry or academia; navigating through tenure; and how to write and review proposals and papers and produce more accurate and unbiased assessments of research and individuals competing for positions. Personal growth is accentuated by sessions on topics such as work–life balance and how to communicate with your boss. All attendees are invited to join in one or more ASCB communities, which host events throughout the meeting. This year brings a new topic, the Scholarship of Diversity, an effort to use evidence-based approaches to measure the impact of diversity in the sciences. ASCB embraces the importance of diversity and inclusion: We present awards and honor those who embrace our Society’s commitment to inclusion and diversity and we have initiated a Diversity Keynote at the ASCB|EMBO Meeting to engage the broader community in sharing a vision of an inclusive scientific society. The Public Policy Committee will host a Capitol Hill Day, a day of meetings with your elected members of Congress. Indicate your interest in participating in this first of its kind event on your meeting registration form. The Public Policy Committee also trains attendees in local advocacy skills, including how to give a two-minute “elevator speech.”

So now that you know that you have a chance to come to the 2019 ASCB|EMBO Meeting—Cell Biology for the 21st Century—and utter our magic three words, “connections, connections, connections,” it’s time to go to the Web and register for the meeting. Note that registration is more expensive after October 3 and October 8 is the final deadline to submit an abstract.

**About the Author**

Andrew Murray is 2019 ASCB President. He is Herchel Smith Professor of Molecular Genetics, Howard Hughes Medical Institute Professor, and Director of the NSF/Simons Center for the Mathematical and Statistical Analysis of Biology at Harvard University.
SYMPOSIUM

D’Arcy Thompson at 100: Controlling Cell Shape and Function

Why an Early Biological Mathematician’s Work Still Fascinates Cell Biologists Today

By Mary Spiro

Even though it was published more than a century ago, D’Arcy Thompson’s seminal work, *On Growth and Form*, continues to fascinate anyone studying living organisms today, especially cell biologists. Thompson’s application of mathematical concepts and formulas to how living things grow and the shapes that they assume has inspired not only biologists, but physicists, mathematicians, and artists to take a more systematic approach to figure out how the structure of living things comes about. The Symposium “D’Arcy Thompson at 100: Controlling cell shape and function,” to be held December 11 at the 2019 ASCB|EMBO Meeting, will explore the latest findings in our understanding of cell growth and developmental biology.

First, let’s learn a bit more about D’Arcy Thompson. Born in 1860, Thompson was a mathematical biologist who became the first chair of biology at what was then called the University of Dundee in Scotland. He amassed a huge collection of biological specimens from around the world, especially aquatic animals, as a scientific adviser to the Fisheries Board of Scotland. Thompson noticed patterns of growth emerging as he studied each animal. Rather than focus on Darwinism in his investigations, Thompson centered his work on physical laws and mechanics. This created the thesis from which Thompson crafted *On Growth and Form*, published in 1917.

Cell Shape and Self-Organizing Systems

Symposium organizer Ethan Garner, professor of Molecular and Cellular Biology at Harvard, studies the molecular mechanisms controlling the spatial and temporal coordination of bacterial growth and division. “Thompson’s work has influenced biologists to reframe their approaches to be more quantitative. Perhaps more importantly, it also attracted a large number of physicists and mathematicians to these problems, bringing in new perspectives,” Garner said. He plans to present the talk “How Cell Shape Arises—The Minimal, Self-Propagating Systems that Create Rod Shaped Cells and Determine Their Width.”

Garner hopes attendees gain an understanding that cell shape, just like all other spatial biological processes, arises from simple self-organizing systems. “These systems need not be complex. In bacteria spatial sensing and formation are accomplished using only a few interacting components, a simplicity that is often obscured when studying similar eukaryotic processes,” he said.

Cells Self-Organizing

Developmental biologist Jennifer Zallen, HHMI investigator and professor at Memorial Sloan Kettering Cancer Center and co-organizer of the Symposium, will present the talk “Signals, Forces, and Cells:
Decoding Tissue Morphogenesis.”

Zallen, who uses Drosophila embryos as her model organism, is studying how large populations of cells intercalate and arrange themselves into the complex structures found in a complete organism. “D’Arcy Thompson considered how beautiful shapes and patterns in biology are generated by forces acting at many levels, from the forces that position structures within cells, to the forces that generate cell shape and polarity, to the forces that dynamically organize cells in time and space,” said Zallen. “In my lab, we study how groups of cells self-organize to produce distinct structures during development.”

“Cells not only have different molecular signatures that allow them to recognize each other and assemble to build tissues,” Zallen continued, “they can also directly respond to forces generated by the cells around them—the push and pull of neighboring cells and tissues. This ability of cells to rapidly modulate their behavior in response to force provides a powerful mechanism that allows cells to correct variations during development and to detect and repair tissue damage in the adult.”

If D’Arcy Thompson Were with Us Now
The spirit of Thompson’s ideas has persisted in modern cell biology, whether it is acknowledged or not. What do researchers think Thompson would be studying if he were alive today?

“I’m sure D’Arcy Thompson would be doing what many groups are doing today,” said Garner, “running simulations using our vast computational power to see if mathematics could both describe and recapitulate different biological forms. My guess would be running simulations to see if he could recapitulate the different shapes of diatoms from different interacting rules.”

Garner added that Thompson’s contributions to the realm of cell mechanics help provide a different lens through which cell processes can be elucidated. “Recent and upcoming work is showing that mechanics play a role in smaller organisms. Both bacteria and archaea adjust their shape and gene expression in response to shear flow, tension, or pressure, and this causes changes in how they form into colonies or biofilms,” said Garner. “I’m most excited about how single cells, or groups of them, sense and respond to mechanical forces. I think this will not only be a key to understanding development in eukaryotes but also multicellularity in the other kingdoms.”

“This is an exciting time when we can now really begin to address these questions,” added Zallen, “not only by prodding cells in a dish, but also by using biophysical and live-imaging approaches to visualize and understand how forces affect cell behavior in real

Polarization microscopy images of Bacillus subtilis sacculi, with color indicating slow axis orientation. This shows that cell wall material is inserted around the rod width. Image: Ethan Garner
There is growing excitement among those studying immunity as we begin to understand the diversity of mechanisms that cells use for their defense. Epithelial cells are a particularly good system in which to study such mechanisms. Positioned between the inside of an animal and the outside world, epithelial cells require robust defenses against microbes that can cause disease.

While canonical innate immune pathways have a role in epithelial cell defense, there is increasing appreciation of the many ways that stress response pathways in these cells are important for defense against infection. For example, the endoplasmic reticulum unfolded protein response (ER-UPR) signaling pathway controls several aspects of immunity in mammalian intestinal epithelial cells, including regulating secretion of antimicrobials and IgA antibodies.

In addition to signaling pathways like the ER-UPR that have sequence conservation from yeast to
humans, an exciting possible new direction for the field of innate immunity is that there are stress/immune responses in intestinal epithelial cells that don’t have obvious sequence conservation across host organisms, yet still have a conserved function in immunity. The reasoning here is that intestinal epithelial cells are regularly interacting with microbes, and thus are in an evolutionary arms race with co-evolving microbial pathogens. Because virulence factors from pathogens will block host defense factors to enable infection, the sequence of defense factors will diversify over evolutionary time to evade attack from pathogens, and thus become species-specific. However, these species-specific factors in epithelial cells may still regulate conserved cell biological processes.

Epithelial defense is particularly important for animals like the nematode *Caenorhabditis elegans*, which lacks an adaptive immune system and has no known professional immune cells like macrophages. Furthermore, *C. elegans* intestinal cells are non-renewable and in direct contact with microbes, and thus require cell-intrinsic (non-apoptotic) defenses against pathogenic microbes. *C. elegans* defense pathways include proteostasis pathways like the conserved ER-UPR, the mitochondria-UPR, and the heat shock response. However, these pathways do not seem to be activated in response to infection with natural intracellular pathogens of *C. elegans*.

In our work we have described a novel immune/stress response that we have called the intracellular pathogen response (IPR), which is a shared transcriptional response to diverse natural pathogens such as fungal-like microsporidia and the three-gene RNA Orsay virus. The IPR appears to be distinct from other stress responses and involves genes in the *pals* gene family, which appear to be mostly specific to *C. elegans*, although they have a sequence signature that is distantly related to a single gene each in mouse and humans. The IPR provides defense against the earliest stages of microsporidia and viral infection in intestinal epithelial cells. Interestingly, there are several independent inputs that regulate IPR gene expression, including pathogen infection, as well as blockade of the proteasome and chronic heat stress (distinct from heat shock).

Recently, we found that IPR activation by the Orsay virus is mediated by sensing of viral replications products by the RIG-I homolog DRH-1. Given that RIG-I-like receptor sensing of viral infection is critical in mammalian immunity, this finding provides connections between the *C. elegans* IPR and defense in mammalian epithelial cells. Further exploration of the inputs and outputs of the IPR may provide novel insight into how stress responses provide ancient forms of immunity in epithelial cells.

**About the Author**

Emily R. Troemel is a professor in the Section of Cell and Developmental Biology at the University of California, San Diego. She and Sebastian Lourido will speak in the Symposium “Attack of the Killer Bugs: The cell biology of infectious disease” at the 2019 ASCB|EMBO Meeting.
SYMPOSIUM

Decisions, Decisions: How Cells Choose Their Fates

From Single Cells to Cell Biology

By Alexander F. Schier

Why should cell biologists care about single-cell genomics? scRNA-seq, scATAC-seq, SCI-seq, scGESTALT, scCRAZE—is it all a fad? Or is there something interesting to be discovered with these techniques? Here are five things you can do with single-cell genomics that show why it is becoming an essential tool for cell biologists:

First, you can discover the universe of cell types and cell states. Multicellular organisms often consist of hundreds of cell types, and, like single-cell organisms, those cells can be in many different physiological states. Single-cell genomics helps capture and define cell types and states in unprecedented molecular detail. For example, dozens of previously unrecognized cell types have been identified in vertebrate brains. This approach also creates new opportunities to define the diversity and similarities of cell types in different organisms and to reconstruct the evolutionary history of cell type diversification.

You can also determine the molecular trajectories of cell differentiation. During development and tissue homeostasis cells become specialized and acquire specific structures and functions. Single-cell genomics time courses reconstruct the molecular changes cells undergo during differentiation. For example, recent studies revealed the cascades of transcriptional changes that underlie vertebrate embryogenesis. Similar approaches are now being used to describe the molecular trajectories underlying regeneration and disease progression.

Third, you can deduce the lineage relationship between cells. Each cell has a mother, a grandmother, a grand-grandmother, and so on, and is thus related to other cells through lineage. Single-cell genomics combined with endogenous or introduced mutations can define the ancestral relationships between cells. For example, complex lineage trees have been reconstructed for cells in the zebrafish brain. These proof-of-principle studies lay the foundation for the future creation of full lineage trees of animal development.
With single-cell genomics you can detect the emergence of abnormal states. Mutations, toxins, aging, disease, and other disruptions change cellular states. Single-cell genomics is a sensitive tool to identify these changes and their heterogeneity. For example, abnormal cell states or compositions have been identified in several cancers and psychiatric disorders. Exciting current opportunities include the discovery of cellular vulnerabilities and their exploitation or correction.

Finally, you can use single-cell genomics to define entry points to mark and manipulate cells. The analysis of cellular processes relies on the specific accessibility of defined cells. Single-cell genomics is identifying combinations of markers that allow the manipulation of specific cell types and states. For example, highly specific marker genes enable the recording and inhibition of neural circuits. It is conceivable that these approaches will enable the specific targeting of any cell type or state.

Many technological, analytical and conceptual challenges remain in this field, but it is now quite clear that single-cell genomics is opening new horizons in cell biology.

About the Author
Alexander F. Schier is professor in the Department of Molecular and Cellular Biology at Harvard University, a Site Director of the Allen Discovery Center for Cell Lineage Tracing, and Director of the Biozentrum at the University of Basel, Switzerland. He and Andrea Brand will speak at the Symposium “Decisions, Decisions: How cells choose their fates” at the 2019 ASCB|EMBO Meeting.
As a prelude to my presentation in the Symposium “Google Maps of the Cell: Controlling Intracellular Traffic Flow and Direction” at the 2019 ASCB|EMBO Meeting, I’d like to discuss my aspirations for the field of cell biology. In the book *Consilience*, E.O. Wilson reminds us of one of the most important aspirations in the sciences—the integration of knowledge across fields and scales: “The ongoing fragmentation of knowledge and resulting chaos… are not reflections of the real world, but artifacts of scholarship.” When knowledge can be linked across different fields of scholarship and consilience is achieved, a scientist can see past the phenomenology to achieve a deeper understanding of the underlying rules. And all of a sudden events that might appear very different—like an apple falling, or a sunset—can be singularly explained by the same underlying force, gravity.

The field of cell biology started with the use of electron microscopy and descriptions of subcellular structures that stained well with these methods, most notably membrane-bound organelles. These early descriptions created the framework for modern cell biology, and also some of the field’s blind spots and assumptions. For example, absent from these early descriptions, but very much important for the cell, are the dynamics (through time) of the subcellular organization and the organization of membrane-less organelles. Recent progress, made through the convergence of new imaging methods, modeling, and quantification of the biophysical properties of cells, has created opportunities for consilience, bringing to bear principles of biochemistry and biophysics to cell biology. One of those discoveries is the realization that fundamental physical properties, like those involved when liquids phase separate, can be used to in part explain cytosolic organization.

The concept that the cell is composed of sol-like liquids—a cytosol—is as old as the field of biochemistry, and proposals that phase separation could contribute to intracellular organization were made by biochemists decades ago. But what was lacking was integration of this knowledge and
ideas into principles of cellular organization. The consilience of these ideas, facilitated by new tools and conceptual frameworks that bridged biochemistry, biophysics, and cell biology, enabled the emergence of concepts that reframed principles of cellular organization.

In my lab’s work, these new frameworks, and recent genetic and cell biological discoveries we made, led us to question assumptions about the organization of metabolism in neurons. Most of our understanding of metabolism comes from biochemical studies, and it is largely assumed that many of these processes, such as glycolysis, are distributed throughout the cell. Our examination of the localization of glycolytic proteins in Caenorhabditis elegans neurons revealed that glycolysis—a ten-step enzymatic process occurring in the cytosol—can dynamically compartmentalize through the formation of liquid-like condensates near synapses to sustain synaptic function. This raises a number of important questions, and an opportunity to integrate knowledge across scales: How are the biophysical properties of glycolytic proteins changing as they form condensates? How do these biophysical properties affect their biochemical activity? Is the compartmentalized biochemical activity affecting subcellular function, such as the function of the neuronal synapses where the condensates form? We know that synaptic function underpins the formation of memories: Are these condensates influencing neuronal function and emergent properties of the nervous system, like the formation of memories and behavior? If so, how are their biophysical and biochemical properties of glycolytic proteins in health and disease influencing memories and behavior?

In the biological sciences, the field of cell biology—the study of cellular organization—sits as a link between chemistry and physics (through molecular biology, biochemistry, and biophysics) and the organism (through development and physiology). The power of consilience and its potential impact for cell biology is perhaps best exemplified by looking at its history in a neighboring field, genetics. The linking of physics and chemistry to genetics resulted in the discovery of the DNA structure and its role in heredity, revealing underlying principles that govern disparate phenotypes and diversity in nature. As the cell biology field achieves its own consilience with biochemistry and biophysics, the new knowledge will likely illuminate underlying principles ruling emergent properties of tissues, organs, and organisms. Of particular interest to me, the cell biological principles of synaptic organization might illuminate emergent properties of the nervous system, such as memory and behavior. My lab’s aspiration and efforts are toward the facilitation of this consilience between cell biology and neuroscience. In that, and to close quoting E.O. Wilson: “The moral imperative of humanism is the endeavor alone, whether successful or not, provided the effort is honorable and failure memorable….Let us see how high we can fly before the sun melts the wax in our wings.”
Doorstep Meeting Explores Cancer from Genome Instability to Therapy

By Mary Spiro

ASCB’s 2019 Doorstep Meeting convenes Saturday, December 7, in Washington, DC. This full-day meeting is titled “Cancer: From Genome Instability to Therapy,” and is being organized by Karlene Cimprich from Stanford University and David Pellman from Harvard Medical School and the Dana Farber Cancer Institute.

Limited to just 200 attendees, ASCB’s Doorstep Meetings seek to provide an intimate experience with a narrower research focus than the ASCB|EMBO Meeting. Invited presenters are among the top experts on the research topic that is the theme of the meeting. The meeting also provides ample opportunities to network, including a poster session where researchers can get feedback from leaders in their discipline and roundtable discussions on select subtopics.

Cimprich hopes attendees will “gain a greater appreciation of the complexity of genome maintenance and how it is influenced by other cellular processes and properties. Hopefully this, in turn, will inspire new thinking about the cutting-edge questions in the field and new approaches to cancer treatment that build on this common vulnerability of cancer cells.”

In Cimprich’s lab, the focus is on understanding how cells maintain genomic stability, particularly during DNA replication, since many challenges threaten its accurate completion and can lead to DNA damage. This is a complex, multifaceted process, and the lab is investigating how cells sense DNA damage during replication, choose between possible responses to stalled replication forks, and coordinate transcription with DNA replication.

“The ability to take advantage of defects in genome maintenance pathways to specifically target cancer cells has led to a greater need to understand fundamental cellular processes that influence DNA repair and genome stability,” Cimprich added.

Pellman’s group studies normal cell division mechanisms and the cell division defects of cancer cells. He seeks to understand how cell division defects, particularly defects in mitosis, lead to the formation of complex cancer genomes. This work may lead to the development of new therapeutic strategies for cancer. He says the Doorstep Meeting theme is particularly relevant to cell biologists today.

“Recent work by cell biologists to understand the mechanism of cell division has led to new insight into the cell division errors arising during cancer development and how these errors shape the architecture of cancer genomes,” Pellman said. “This has opened up new avenues for cancer therapeutics. In turn, the recent focus on disease mechanisms has provided a new perspective on basic science questions, such as how chromosome segregation influences the organization and integrity of the nucleus.”
The meeting will also feature talks from the following:

- Andrea Ablasser from École Polytechnique Fédérale de Lausanne, Switzerland, who looks at the mechanisms of intracellular sensing of DNA—a fundamental strategy of innate immunity.
- Irene Chiolo from the University of Southern California, who studies the mechanisms of DNA repair in heterochromatin using genetic, biochemical, and high-resolution imaging approaches.
- Jan Lammerding of Cornell University, who investigates the intricate interplay between cellular structure, mechanics, and function through an interdisciplinary research approach combining engineering, microfabrication, and cell and molecular biology techniques.
- James Chen from the University of Texas Southwestern Medical Center, who has done pioneering work on how a cell detects foreign pathogens, particularly foreign DNA, and then mounts an appropriate response to restore homeostasis.
- Serena Nik-Zainal at the University of Cambridge, UK, who has traced the origin of cancer genetic alterations by identifying mutational signatures through computational approaches and through sophisticated cell-based modeling.
- Michael B. Yaffe of the Massachusetts Institute of Technology, who is an expert on signaling pathways and networks that control cell cycle progression and DNA damage responses in cancer and cancer therapy. He studies cross-talk between inflammation, cytokine signaling, and cancer.

In addition to these talks, Tim Mitchison from Harvard Medical School will lead a discussion on the implications of recent advances in genome stability for cancer therapeutics.

Registration for the 2019 Doorstep Meeting is separate from that for the 2019 ASCB|EMBO Meeting; however, full meeting attendees receive a discount to attend the Doorstep Meeting. To get the discount, participants must either register for both meetings at the same time or be previously registered for the ASCB|EMBO Meeting before registering for the Doorstep Meeting.

About the Author
Mary Spiro is ASCB’s Science Writer and Social Media Manager.

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Pride in Our Science

By Claire Thomas

June was LGBTQ+ Pride Month, and the 50th anniversary of the Stonewall riots that shaped the modern Pride movement. Despite much progress, LGBTQ+ lives are still not well known by members of the larger community, many of whom have given little thought as to how these lives intersect with the world of an experimental scientist. The ASCB LGBTQ+ Task Force (ascb.org/committee/lgbtq-task-force) marked Pride Month with a series of blog posts giving much-needed insight into the lives of LGBTQ+ scientists.

Lee Ligon and Ashley Lakoduk asked “Why should ASCB blog about Pride?” Well, LGBTQ+ scientists can and do experience harassment and social isolation in academia, and LGBTQ+ students leave STEM fields at disproportionate rates. ASCB is committed to removing such barriers to success in the field of cell biology.

Bruno da Rocha-Azevedo highlighted the importance of LGBTQ+ visibility in the coming out process and told us how this drew him to help create this Task Force, a space for openly LGBTQ+ scientists to share their science and to be role models. The Task Force now includes members from all career stages and across the LGBTQ+ spectrum.

Ori Avinoam shared his story and reminded us that coming out is an ongoing process. This is a reminder that when a colleague or lab member comes out your hearty congratulations are welcome, but that they will likely still appreciate your support in the coming years.

Erica Gorenberg also emphasized the importance of role models, not only in daily life but also in science, and told us how the Task Force networking events helped her develop as a scientist. She also gave us some insight into the complexity of the LGBTQ+ community, and noted that by being open and accepting to all, ASCB can have a huge impact.

Claire Thomas highlighted some of idiosyncrasies of the transgender experience that are unique to the scientific world and academic environment. She pointed out that transitioning is hard work and a huge distraction from the focus required for promotion and tenure, and suggested that universities and institutes should acknowledge and accommodate this in promotion and tenure decisions.

Derek Applewhite brought our attention to the concept of “intersectionality” and how there are added burdens that come from being part of multiple minorities. There is a whole tapestry of such intersections, and visible representation becomes even harder to find for these community members. By creating an openly accepting membership, ASCB provides crucial support to nurture everyone’s talent.

So where does the larger membership enter this process? Erik Welf reminded us that allies are important. Allies listen to, defend, and support the LGBTQ+ community, allowing us to bring our whole selves to our science. Many of us are or will be scientific mentors, and it does not take much to be aware, considerate, and engaged. You can easily make a difference, and even direct your ASCB donations to us!

Members of the Task Force not only have Pride in their LGBTQ+ community, but are also proud of the fact that ASCB cares about diversity and inclusion. Please join us in our sixth annual LGBTQ+ Diversity Session at the 2019 ASCB|EMBO Meeting in Washington, DC, in December!

About the Author
Claire Thomas is an associate professor of Biology and of Biochemistry & Molecular Biology at The Pennsylvania State University.
“Keep networking hard,” said Steven Casper, dean of the Keck Graduate Institute’s School of Applied Life Sciences, as participants attending the ASCB-KGI Biotech West program in Claremont, CA, prepared to present their final projects after a week of lectures, networking events, and engaging discussions.

With generous support from American multinational biotechnology company Biogen, ASCB and KGI brought together 36 participants from July 7–13 to gain insights that will be essential should they choose to pursue careers in bioscience industries. As the attendees learned after sitting through the week’s sessions, besides technical knowledge, it’s all about networking.

Specific successful networking strategies were presented by several speakers. During his workshop, Randy Ribaudo, CEO of training consultancy SciPhD, reviewed the keys to effective communication, leadership, team building, and networking. His workshop was followed by a luncheon talk with a former academician, Andrey Shaw, who is now staff scientist with biotechnology corporation Genentech. And after Shaw, a panel with six participants in diverse careers gave meeting attendees an opportunity to ask speakers exactly how they made their way into their professions.

“Without this course, I never would have met any of these people,” says Zerick Dunbar, entering his third year as a PhD student at Meharry Medical School in Nashville, TN. He was referring both to industry professionals and fellow participants with a shared interest in biotech industry careers. Besides enlarging his network, the course provided a great opportunity for learning about options other than academia, he adds.

Casper’s lecture, “Social Networks, Entrepreneurship, and Career Development,” drove home why social capital and networks matter. Social capital is the ability to appropriate social relationships for economic gain, he said, explaining the ethical nuances of that ability. Casper underscored his message with graphs showing dense network clusters of senior managers and others in major metropolises.

“I really liked the networking aspect” of the program, which provided opportunities to learn both from professionals already in industry and from peers seeking industry jobs, says Katherine Labbé, a postdoc at the University of California, Davis. She also appreciated that the program taught “really concrete” lessons about how to get a job as well as broad business...
issues “so that we could put ourselves into the context of industry.”

For Pooja Bhardwaj—a postdoc at University of California, San Francisco, who also collaborates with a startup company focused on enzymes to block HIV infections—the course will have immediate practical applications. Before coming to the course, “I didn’t understand the business side and what goes into the commercialization of products and product development.” But what she learned “will really help me talk to investors, business people, and entrepreneurs” in the Bay Area’s startup culture, she says. The networking connections she made during the program will be helpful throughout her career, Bhardwaj adds.

A Harvard Business Review study that was part of the course reading exactly captures a key lesson from the course: “Strong personal networks don’t just happen at the watercooler. They have to be carefully constructed.”

About the Author
David Clarke is a science journalist living in Bethesda, MD.
A new study from Lehigh University provides further support to the “specialized ribosome” hypothesis by showing for the first time that specialized ribosomal protein paralogues in *Drosophila* carry out different tasks during spermatogenesis.

“Specialized eRpl22 paralogue-specific ribosomes regulate specific mRNA translation in spermatogenesis in *Drosophila melanogaster*,” was published in the August 1, 2019, issue of *Molecular Biology of the Cell*. Authors Vassie C. Ware, professor of molecular biology at Lehigh University, and Catherine M. Mageeney, her former graduate student, found evidence that contradicts the textbook assertion that ribosomes “indiscriminately synthesize proteins in all cells by translating genetic information encoded in messenger RNAs,” Ware said, “Maria Barna’s laboratory at Stanford University has shown changes in core ribosomal protein content of ribosomes can impact the types of proteins that the ribosome will actually make within stem cells derived from mouse embryos,” said Ware, whose study shows this happening in spermatogenesis in fruit flies.

“Our work is the first to show specialized ribosomes at work in a multicellular organism (the fruit fly) within a differentiation process (spermatogenesis),” said Ware. Previous studies showed that the ribosomal protein paralogues eRpl22 and eRpl22-like (found only in eukaryotic cells) impact lifespan and fertility of the animal, so Ware’s lab honed in on these components for its study.

“We used a technique that allowed us to purify each ribosome type from cells of the fly testis and then to determine what mRNAs were found in association with each ribosome type using RNA sequencing,” Ware said. “Experiments revealed distinct subpopulations of mRNAs are associated with eRpl22 or eRpl22-like ribosomes for over 50% of the RNAs captured from ribosomes. The mRNAs, known to be important for specific stages of spermatogenesis, were found in association with either eRpl22 or eRpl22-like ribosomes.”

Ware’s laboratory also conducted in vitro studies of model testis mRNAs in an engineered fly cell culture system. “Specific association with eRpl22-like ribosomes can occur outside of the testis environment,” they concluded, “thus enabling us to establish an experimental system for testing factors that allow specific mRNAs to be associated with specific ribosome types. Collectively, our results support the hypothesis that paralogue functions are distinguished in spermatogenesis by selective translation of mRNAs required for specific stages of sperm maturation. Indeed, all ribosomes are not alike!” Ware concluded.

It is still unknown how paralogue-specific ribosomes in the male germline target specific mRNAs, she added.
“Our preliminary experiments using an engineered fly cell culture system have proven useful in eliminating ‘germline-specific factors’ as necessary for targeting ‘model’ mRNAs to eRpL22-like ribosomes, since enrichment is recapitulated in the cell system,” said Ware. “We are using our engineered fly cell culture system to explore features of both mRNAs and paralogue-specific ribosomes themselves that govern targeted translation. Additionally, we will use this system to identify ribosome-associated proteins that may be required for the targeting mechanism.”

These findings contribute to understanding the role specialized ribosomes may play in several human disorders of ribosome function called ribosomopathies. “Malfunction of specialized ribosomes may account for how several of these disorders manifest in specific types of cells,” Ware said.

“More specifically our work on specialized ribosomes in fruit fly spermatogenesis has implications for understanding factors regulating human sperm development and fertility.”

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**Volunteer to Review CVs**

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.
Highlights from

MOLEcular BIOLOGY OF THE CELL
www.molbiolcell.org

Here are some important recent papers that the MBoC Editorial Board has selected for highlighting:

**Spindle–F-actin interactions in mitotic spindles in an intact vertebrate epithelium**
Angela M. Kita, Zachary T. Swider, Ivan Erofeev, Mary C. Halloran, Andrew B. Goryachev, and William M. Bement (July 1, 2019)
The participation of actin filaments in mitotic spindle assembly has long been controversial. We present improved methods for preserving actin filaments in fixed tissues and use both fixed and live imaging to reveal multiple pools of spindle-associated actin filaments with different dynamic properties.

**The Drosophila Afadin and ZO-1 homologues Canoe and Polychaetoid act in parallel to maintain epithelial integrity when challenged by adherens junction remodeling**
During morphogenesis, cells must change shape and move without disrupting tissue integrity. This requires cell–cell junctions to allow dynamic remodeling while resisting force generated by the actomyosin cytoskeleton. Canoe and Polychaetoid, the Drosophila Afadin and ZO-1 homologues, act in parallel during this process.

**Actin assembly produces sufficient forces for endocytosis in yeast**
Masoud Nickaeen, Julien Berro, Thomas D. Pollard, and Boris M. Slepchenko (July 22, 2019)
Actin kinetics in yeast and rheology of filament networks are combined in a model to estimate forces exerted on an endocytic invagination by an assembling actin patch. The model shows that high local filament density, entanglement due to network dendritic structure, and cross-linking by fimbrin result in forces sufficient to work against turgor pressure.

**Reciprocal regulation of actomyosin organization and contractility in nonmuscle cells by tropomyosins and alpha-actinin**
In fibroblasts, myosin II in parallel stress fibers can align to form 2D lattices. Alpha-actinin is essential for this process. We show that tropomyosin negatively regulates myosin II stack formation through competition with alpha-actinin and that the degree of order in the actomyosin network negatively correlates with contractile force magnitude.

**Expansion and contraction of the umbrella cell apical junctional ring in response to bladder filling and voiding**
Amity F. Eaton, Dennis R. Clayton, Wily G. Ruiz, Shawn E. Griffiths, Maria Eulalia Rubio, and Gerard Apodaca (July 22, 2019)
The bladder umbrella cell apical junctional ring expands and contracts with filling and voiding, but how this is accomplished is unknown. We observed that filling-stimulated expansion required RAB13-dependent trafficking and formin-dependent actin assembly, but was independent of NMIIA. In contrast, voiding-induced contraction depended on NMIIA and actin dynamics, RHOA, and dynamin-dependent endocytosis.
About the Image
The incredible complexity of a mammalian eye (in this case, from a mouse) is captured here. Each color represents a different type of cell. In total, there are nearly 70 different cell types, including the retina’s many rings and the peach-colored muscle cells clustered on the left. Image by Bryan William Jones and Robert E. Marc, University of Utah

How to Submit
Do you have an image you would like to see published here? Please contact Mark Leader at mleader@ascb.org.
The 2019 ASCB|EMBO Meeting will focus on cell biology as the fundamental basis of biology, with workshops and symposia on upcoming topics such as nontraditional model organisms, and the use of computational modeling and biophysics to “Build the Cell from the Ground Up.”

**KEYNOTE LECTURE**

**Bruce Stillman**
President and Chief Executive Officer, Cold Spring Harbor Laboratory

**SYMPOSIA**

**SUNDAY, DECEMBER 8**

**Beyond Figure 7: Integrating modeling and experiment in cell biology**
Margaret Gardel, University of Chicago; Iva Tolic, Ruder Bošković Institute, Croatia; Petra Schwille, Max-Plank Institute of Biochemistry, Germany

**Attack of the Killer Bugs: The cell biology of infectious disease**
Sebastian Lourido, Whitehead Institute and MIT; Emily R. Troemel, University of California, San Diego

**Decisions, Decisions: How cells choose their fates**
Alex Schier, Harvard University; Andrea Brand, The Gurdon Institute, UK

**MONDAY, DECEMBER 9**

**21st Century Machinery: The Structure, function, and evolution of protein machines**
Andrea Musacchio, Max-Plank Institute of Molecular Physiology, Germany; Pierre Gönczy, Swiss Federal Institute of Technology Lausanne (EPFL), Switzerland; Tatsuya Hirano, Chromosome Dynamics Laboratory, RIKEN, Japan

**What Blueprints Tell Us: How genomics informs cell biology**
Harmit S. Malik, Fred Hutchinson Cancer Research Center/HHMI; Brenda Andrews, University of Toronto, Canada

**TUESDAY, DECEMBER 10**

**Getting from Here to There: Individual and collective cell migrations**
Ana-Maria Lennon-Duménil, Institut Curie, France; Rodrigo Fernandez-Gonzalez, University of Toronto, Canada; Carl-Philipp Heisenberg, Institute of Science and Technology, Austria

**Google Maps of the Cell: Controlling intracellular traffic flow and direction**
Daniel Colón-Ramos, Yale University; Elina Ikonen, Sloan Kettering Institute/HHMI

**WEDNESDAY, DECEMBER 11**

**D’Arcy Thompson at 100: Controlling cell shape and function**
Ethan Garner, Harvard University; Jennifer Zallen, Sloan-Kettering Institute/HHMI

**MINISYMPOSIUM/MICROS Fou MPM SYMPOSIUM TOPICS**

**Controlling the Cell: The Nucleus, Chromosomes and Cell Division**
(includes Regulation of Cell Division, Mitosis & Meiosis, Chromosome Structure, the Nucleus, and From DNA to RNA)

**Cytoskeleton, Motility & Cell Mechanics**
(includes Microtubules & Motors, Cilia/Flagella, Actin and Myosin, Cell Shape and Polarity, and Cell Biology of the Neuron)

**Education Minisymposium**
Evidence-Based Education: Biology Competency for the Classroom and Beyond

**Intracellular Organization & Quality Control**
(includes Trafficking, Organelles and Their Interactions, Lipid Trafficking and Membrane Recycling, Phase Transitions, Autophagy, Protein Turnover & Quality Control)

**Multicellular Cell Biology: From Tissues to Organisms**
(includes Cell Migration, Morphogenesis and Developmental Dynamics, Stem Cell & Organoid Biology, Metabolism, Immunity and Cell Death)

**New Perspectives on Cell Biology: Evolution to Super-Resolution**
(includes Biophysics and Quantitative Approaches to Cell Biology and Emerging Model Systems)

**IMPORTANT DATES AND DEADLINES**

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<td>Deadline to apply to lead a roundtable discussion</td>
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**JOIN THE CONVERSATION #ASCBEMBO19**

www.ascbembomeeting.org
2019 ASCB MEMBER-ORGANIZED SPECIAL INTEREST SUBGROUPS

Saturday, December 7, 8:30 am to 11:30 am
Biological Timing: Molecular Clocks and Timers, from Systems to Synthetic Biology
Building the Cell
Cell Biology Meets the Hippo Pathway
Cellular Symmetry Breaking
Kinesin Motors - What Is Conventional?
Machine Intelligence and Statistics in Cell Biology
New Frontiers in Multifactor Regulation of Cytoskeleton
Nucleoporin Roles in Tissue Architecture, Development and Genetic Disease
Organelle Membrane Contact Sites and Cell Plasticity Control
Visualizing Immune Cell Activation

Saturday, December 7, 12:30 pm to 3:30 pm
Bacterial Cell Organization
Bottom-Up Cell Biology
Building Complexity to Understand the Microtubule Cytoskeleton: From Regulation of Microtubule Dynamics to Coordination of Motor Ensembles

Epithelia and Their Stem Cells
Lipids and Proteins in the Secretory Pathway - Homeostasis and Stress
Mechanics of Large Cellular Machines
Signaling at the Primary Cilium
Tools and Devices for Cell Biology
Tunneling Nanotubes and Other Cell Protrusions: Structure, Composition and Role in Inter-cellular Communication and Disease
Using Advanced Imaging to Redefine the Cell and Tissue Biology

Sunday, December 8, 4:15 pm to 7:15 pm
The Cellular and Molecular Basis of Invasive Metastatic Cancer
Monday, December 9, 4:15 pm to 7:15 pm
Redrawing the Cellular Map: Cytoskeletal Forces, Organelles and the Crossroads
Tuesday, December 10, 4:15 pm to 7:15 pm
Maintenance of Genome Integrity in Health and Disease
Wednesday, December 11, 8:15 am to 11:15 am
Cell Dynamics and Matrix Interactions in Three-Dimensional Environments

PRESENTING A POSTER?

Thousands of posters are presented throughout the ASCB|EMBO 2019 Meeting. Find a home for your research in one of our poster topics: https://www.ascb.org/2019ascbembo/submissiontopics. Main topics include:

- Actin Cytoskeleton
- Microtubule Cytoskeleton
- Cilia & Flagella
- Molecular Motors
- Cell Structure, Mechanics, and Motility
- Cell-Matrix and Cell-Cell Interactions
- Membrane Trafficking
- Organelles and Membrane Biology
- Nuclear Structure and Function
- Regulation and Organization of the Genome
- Cell Division: Mitosis & Meiosis
- Signal Transduction and Signaling Networks
- Proteostasis, Cell Stress, and Aging
- Cell Polarity
- Development and Morphogenesis
- Cancer Cell Biology
- Normal and Diseased Organs and Therapeutics
- Cell Biology of the Neuron
- Cell Biology of Microbes and Parasites
- Physical, Chemical & Systems Cell Biology
- New Technologies and Frontiers
- Science Education
- NEW THIS YEAR!—Scholarship of Diversity

NEW THIS YEAR! MEMBER-LED ROUNDTABLE DISCUSSIONS

Want to lead a discussion on an important issues, trend, or topic?

Apply to lead a conversation among your peers on an emerging topic in the cell biology community. Facilitators will pose a topic or question and provide a brief description of the conversation to be published in the mobile app and in an on-site handout. Applications close on October 8. ascb.org/2019ascbembo/roundtablediscussions.
DOORSTEP MEETING
Cancer: From Genome Instability to Therapy
Date: Saturday, December 7
Location: East Salon, Walter E. Washington Convention Center, Washington, DC
Registration and abstract submission are now open.
Abstract deadline is Tuesday, October 8.
You must be registered to attend to present an abstract.
Registration is limited to 250 attendees. Register now!
*Discounted registration will be available to those who also register for the 2019 ASCB|EMBO Meeting.

TAKE A BREAK FROM THE MEETING
AN EVENING WITH THE Membrane Band
Well-known rock songs with a scientific lyrical twist!
Sunday, Dec. 8, 8-11 pm
Hill Country Barbeque Market
410 7th St. NW
FREE and open to the public!
SPONSORED BY
The French Society for Cell Biology, Hybrigenics Services, Club Exocytose Endocytose, and Shadow Woods Productions, LLC.
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ASCB is grateful to its Corporate Partners for their generous support.

**Leadership Circle ($50,000+)**
- Biogen
- Nikon Instruments Inc.

**Cornerstone Circle**
($25,000 to $49,999)
- Allen Institute for Cell Science

**Ambassadors Circle**
($12,500 to $24,999)
- 3i Intelligent Imaging Innovations
- Agilent Technologies, Inc.
- Andor Technology & Bitplane, Inc.
- BioTek Instruments
- Bruker Corporation
- Carl Zeiss Microscopy, LLC
- Chroma Technology
- Hamamatsu Corporation
- Illumina, Inc.
- Leica Microsystems Inc.
- MilliporeSigma
- Olympus America Inc.
- Springer Nature
- Thermo Fisher Scientific
- Thorlabs

**Advocates Circle**
($6,500 to $12,499)
- Abberior Instruments America
- ALVEOLE
- Applied Biological Materials Inc.
- Baker Ruskinn
- BioLegend, Inc.
- Bio-Technne
- Cell Press
- Cellecta, Inc.
- Cold Spring Harbor Laboratory Press
- DeNovix Inc.
- Electron Microscopy Sciences
- Ibidi USA, Inc.
- Lipotype GmbH
- Mad City Labs
- Miltenyi Biotec
- Nanolive SA
- PCO-TECH Inc.
- Peprotech, Inc.
- Rockefeller University Press
- Sartorius
- Sutter Instrument Company
- The Company of Biologists
- TOKAI HIT Co., Ltd.
- Worthington Biochemical Corporation
- Yokogawa Electric Corporation

**Supporters Circle**
($3,750 to $6,499)
- Anatomical Record/American Association of Anatomists
- Cytoskeleton, Inc.
- Double Helix Optics
- Getson & Schatz, P.C.
- Lumencor, Inc.
- MIMETAS B.V.
- Mizar Imaging
- Molecular Devices
- OviGenex
- Science/AAAS
- ScienCell Research Laboratories
- Sino Biological, Inc.
- W.W. Norton

*As of August 23, 2019*
EDUCATION AND PROFESSIONAL DEVELOPMENT
SESSIONS PLANNED FOR ASCB|EMBO 2019

CAREERS

First Timer? Making the Most of the Annual Meeting
Bench-Based Research Careers in Industry
Careers in Non-Profits, Science Advocacy, and Science Outreach
Career Coaching
MD-PhD, Is It Right For Me?
Careers in Science Policy
Careers in Industry: Beyond the Bench in Biotech
Searching for a Faculty Position and Starting a Lab at a Primarily Undergraduate Institution (PUI)
Finding and Starting a Lab at an R1 Institution
Preparing your Academic Application Materials

Careers Beyond the Bench Outside Biotech—Science Infrastructure, Management, and Development
How to Give a Chalk Talk
Judged Poster Session
Transitions Academy Undergraduate Session: Preparing a Successful Application for Graduate School—the Do’s, the Don’ts, and the What If’s
Transitions Academy Early Graduate Student Session: Hit the Ground Running as an Incoming Graduate Student to a PhD Program
Transitions Academy Senior Graduate Student Session: Planning Your Next Step—Finding the Right Postdoctoral Position for Your Career
Transitions Academy Postdoc Session: Developing a Plan for Your Scientific Independence—Easing the Transition from Postdoc to an Independent Investigator
Transitions Academy Junior Faculty Session: Preparing a Tenure Package—What to Include and What to Leave Out

EDUCATION
Educators’ Resource Sharing Session
Foundational Cell Biology Workshop: Addressing Socially Challenging Topics in the Biology Classroom
You Can Publish This Too! Developing, Publishing, and Highlighting Innovative Classroom Activities
Mechanisms for Effective Mentoring of Undergraduates in Research Projects
Writing Better Exam Questions for Undergraduate Cell Biology

WORKPLACE
EMBO Lab Leadership – Communication and Feedback
EMBO Lab Leadership – Roles, Values, and Expectations
EMBO Lab Leadership – Teamwork and Conflict in the Lab
COMPASS Open Forum: Self-Empowerment for Trainees
Mental Health & Managing Stress in Academia
Empowering People of Color in STEM
The Art of Self-Advocacy: A Panel and Networking Reception
Diversity and Inclusion in Science: LGBTQ+ Session

FUNDING
For Faculty Members: National Institute of General Medical Sciences Undergraduate and Predoctoral Grant Programs
Meet the Funders

PUBLISHING
A Transition to Open Access or Open Science
Reimagining Peer Review in a World of Preprints

OUTREACH
Advocacy Toolbox: The Two-Minute Speech
Effectively Organizing Science Outreach Events
Ask a Scientist Bar Night
Elevator Speech Contest Awards
Writing Your Science Story: How to Get Everyone Else Excited About Your Work

INTERNATIONAL
International Research and Training Exchange Fair
Green Cards for Scientific Researchers: How to Win Your EB-1/NIW Case
Brazil, China, EMBO Global initiatives: Joint Session for International Scientific Exchange
How to Boost Your Research Project with the Support of International Research Infrastructures

SCIENCE/POLICY
Technical and Policy Gaps in Assuring Tissue Culture Cell Genetic Integrity
Translational Research: From Bench to Bedside
Industry as a Partner for Advancing Science
Barriers to Expanding the Ranks of Staff Scientists in Biomedical Research
How to Improve Research Assessment During the Triage Phase of Application Review
GFP25: Lighting up Cell Biology
Can’t-Miss Programming at the 2019 ASCB|EMBO Meeting

By Mary Spiro

Andrew Murray’s President’s Column for this issue (p. 5) does a great job of highlighting the main features of the 2019 ASCB|EMBO Meeting. Here are some highlights of other programs and events you may have overlooked while browsing the upcoming meeting program online.

Meet Your Matches
When attendees and exhibitors arrive to pick up their badges, they will be randomly given a pin with a number on it that approximately 100 other attendees and/or exhibitors will also have. Beginning with the opening night reception on Saturday, December 7, and anytime you are in the Exhibit Hall, ASCB encourages participants in this Meet Your Match challenge to find another participant with the matching number button. Each time you meet a match, get your badge scanned by an ASCB Staff member at one of the five stations in the opening night reception or at the ASCB Booth throughout the week for a chance to win one of three $100 Visa gift cards. Those who meet at least five of their 100 matches will be entered to win! If you or your match can’t make it to the scan station or booth at the same time, snap a photo and bring it to the booth so that at least one of you can be scanned to enter the drawing.

ASCB Booth
Make sure to stop by the ASCB Booth (#612) to pick up a reasonably priced short- or long-sleeve t-shirt (or one of each) available in various colors with an exciting new design. ASCB will also be selling themed socks, mugs, and wireless phone chargers. In addition to new merchandise, the booth will feature a colorful backdrop where you can take a selfie, a chance to learn about and sign up for our new online community platform, an opportunity to share your thoughts on ASCB membership on video, the ability to chat with ASCB leadership and staff, and of course, a place to relax in one of our popular bean bag chairs. Visit the Membership Help Desk at the ASCB Booth to learn about professional development resources, volunteer opportunities, and how to make the most of your member benefits. There will also be chance to win a FREE 2020 meeting registration—stop by to find out how.

Educational and Professional Development Sessions
Sessions this year will focus on careers, education, the workplace, funding, publishing, outreach, international researcher issues, and science policy. There are nearly 50 different sessions from which to choose. Check out some of these relevant and innovative offerings: Careers in Science Policy, A Transition to Open Access or Open Science, The Art of Self-Advocacy: A Panel and Networking Reception, Writing Your Science Story: How to Get Everyone Else Excited About Your Work, GFP25: Lighting up Cell Biology (Martin Chalfie and Jennifer Lippincott-Schwartz discussing green fluorescent protein and where it has led, and the winners of ASCB’s image and video contest), and Advocacy Toolbox: The Two-Minute Speech. See the complete list of events on p. 29. Seating is limited, so make sure to check the program for times and
locations and arrive early so that you won’t be left out in the cold.

One-Day Biotech Mini-Course
Considering a career in biotech? Register to attend this one-day course offered by ASCB and the Keck Graduate Institute. Applications are open on the 2019 ASCB|EMBO Meeting Registration site. (There is a separate fee of $125. You need not register for the ASCB|EMBO Meeting to register to attend the one-day biotech mini-course.) In the morning, attendees will learn about processes by which scientific discoveries are translated into bioscience ventures and common business strategies through a case study/lecture/small group learning format. During lunch, a career panel Q&A will allow participants to network with representatives from local biotech companies. At the professional development workshop in the afternoon, registrants will get advice on how to combine scientific, business, and social skills to become business-ready and competitive for a professional career as well as get help building a resume, dissecting job postings, and landing job interviews.

4D Nucleome Meeting
The 4D Nucleome Conference, jointly organized by the 4D Nucleome Network and ASCB, will be held December 5–6 at the Capital Hilton. This conference will feature recent technological and conceptual advances in research on higher-order chromatin organization in eukaryotic cells. Registration is $300 and is due by October 15 at https://4dn-annual-meetings.smapply.io.

Membrane Band Concert; Ask A Scientist Bar Night; EdComm Networking
Jam out to well-known rock songs revised with a scientific lyrical twist performed by Membrane Band, a musical group comprising cell scientists and ASCB members. Open to everyone, including the public, the show is from 8:00–11:00 pm on Sunday, December 8, at Hill Country Barbeque Market, 410 7th St. NW, just a few blocks south of the Walter E. Washington Convention Center. Food and drink will be available for purchase. The concert is free thanks to sponsorships from the French Society for Cell Biology (SBCF), Hybrigenics Services, Club Exocytose Endocytose, and Shadow Woods Productions, LLC.

Tour DC watering holes with your ASCB colleagues and practice your science communication skills as you strike up conversations with local patrons. The Committee for Students and Postdocs (COMPASS) will host Ask a Scientist bar night on Sunday, December 8, beginning at 8:15 pm. It’s open to all ASCB members, whether you are a student, established scientist, or anything in between. Meet at the registration area to split up into groups. Free t-shirts that say “I’m a Scientist: Ask Me about My Research” will be available to the first 100 people for pick up before heading out into the night.

The Education Committee’s Networking Happy Hour will happen Sunday, December 8, from 7:00 to 9:00 pm at the Right Proper Brewing Company Shaw Brewpub, located at 624 T St. NW. There will be food and drink available for purchase.
2019 E. B. Wilson Medalist
Peter Devreotes Tells the Story of Chemotaxis

By Mary Spiro

Peter Devreotes, the 2019 winner of ASCB’s E.B Wilson Medal, studies chemotaxis—how cells move in response to extracellular cues and attractants. In a way, chemotaxis mirrors Devreotes’ personal journey toward cell biology.

“In early grade school, my father, who was a mechanical engineer, would teach me math at home. So initially I was inspired by him. I still have his slide rules and drafting equipment,” Devreotes said. “Through high school and college, I was amazed at the discoveries of great physicists—early and modern. I am still impressed by the work of early electrophysiologists who brought rigorous theory to biological processes like membrane potential. I am also impressed by transformative breakthroughs such as green fluorescent protein (GFP) or single-molecule imaging in cell biology.”

Devreotes earned his BS in physics in 1971 at the University of Wisconsin, Madison, and then earned his PhD in biophysics in 1977 from Johns Hopkins University. After a Damon Runyon Fellowship at the University of Chicago, Devreotes returned to Johns Hopkins to join the faculty in 1980. He’s been the director of the Department of Cell Biology since 2000.

“When I look back it seems like I was on a predetermined course from physics through biophysics and biochemistry to cell biology,” said Devreotes, the Isaac Morris and Lucille Elizabeth Hay Professor of Cell Biology at the Johns Hopkins School of Medicine. “Really, at each point, I just switched to what seemed like the most exciting area. Right now, I think there is a great deal to learn about the behavior of molecular networks in cells. Discoveries in this area of cell biology will transform medicine.”

The Story of Chemotaxis

Nominated by several of his peers and colleagues, Devreotes’ scientific legacy thus far is telling the story of chemotaxis. Douglas Robinson, also a professor of cell biology at Johns Hopkins, wrote in his nomination letter, “Peter is incredibly deserving of this award as he has made several seminal discoveries in directed cell migration, has been a leader in bringing systems-level analysis to cell biology, and has been an active member of ASCB for many years.”

Robinson explained how Devreotes’ “attention to the dynamic interplay between the variety of cellular systems using clever experimental design and computational approaches sets chemotaxis on a higher plane of elegant understanding that researchers of other cellular processes aspire to.”

First, Devreotes identified how G-protein coupled receptors (GPCR) are involved in chemotaxis. Although these chemoattractant receptors, as well as their associated heterotrimeric G-proteins, are distributed uniformly around the cell surface,
Devreotes was able to elucidate how the activation of GPCR produces phosphoinositides and causes asymmetric signaling. These signals are interpreted into the wavelike motion of the cell membrane, created by the alternating assembly and disassembly of the actin cytoskeleton. Lastly, Devreotes developed mathematical models for these systems.

**Devoted to Dictyostelium**

Throughout his career, Devreotes has used the amoeba *Dictyostelium discoideum* as his model organism. “Dictyostelium is like an experimentally tractable immune cell. You can move quickly to learn fundamental mechanisms of chemotaxis, motility, cytokinesis, macropinocytosis, phagocytosis, and host–pathogen interactions,” he said. “These mechanisms are also shared with epithelial cells and fibroblasts. It is amazing how much this small community of researchers has contributed to knowledge of these processes. Other models such as *Drosophila*, zebrafish, etc., are better for understanding the complexity of development.”

Sticking with *Dictyostelium* for studies of motility and chemotaxis has sometimes proved to be challenging. “Despite its advantages, there is pressure from journals and funding agencies favoring studies in ‘relevant’ organisms. About half of the projects in the lab now are focused on human cells. But I must say that most of the new insights are still coming from *Dictyostelium*,” he said.

Basic questions in science still retain importance and value, despite a research landscape that seems to favor translational or clinical endeavors, he noted. “One just has to look over a longer time period,” Devreotes said. “Most of the major technology and medical advances of today derive from curiosity-driven basic research. It is just short-sighted for funding agencies to be focused so strictly on translational research. Imagine if they made that decision in 1945 and stuck with it. We would have none of the miraculous diagnostics and treatments we have today.”

**Cell Biology for the 21st Century**

Devreotes said a good day in the lab is a day that uncovers new data that challenges old. “I think I am most excited about rigorous data that contradicts our current working model. I know we are about to move forward,” he said.

Devreotes said he thinks the behavior of molecular networks will be among the most important questions for future cell biologists because they could reveal potential therapies. “Cellular networks have internal feedback loops that confer excitable properties. I have had a fantastic time working with my friend control engineer Pablo Iglesias (also at Johns Hopkins), whose group brings computational simulation as a tool for understanding network behavior. I think that excitability controls many of the spontaneous behaviors that cells display,” he said. “Gene profiles and external cues influence behavior by altering these excitable properties. Currently, therapies target specific molecules, but in reality these are altering network behavior. With a better understanding of
networks, better interventions or combinations of interventions will be available."

He said being a member of ASCB “has tremendously broadened my perspective. Serving on ASCB Council makes you proud to be part of the community and you feel that your contribution will help younger scientists.”

And as for younger scientists, his advice is simple. “Choose a big problem that you are passionate about, use imagination, and work hard to learn new truths about it. Try to tune out the peer pressure to publish in ‘elite’ journals and focus on results. Work together collaboratively with your colleagues,” he said.

What does the future hold for Peter Devreotes?

“After 20 years, I am stepping down as Director of Cell Biology and I will devote more time to research. We still want to understand how cells sense and move toward directional cues.”

This will also give him more time to devote to outside passions. “I like biking, boating, fishing, being outdoors. My wife and I share hiking and birding. I am also interested in design. We recently designed and built an awesome house.”

Devreotes will present the 2019 E.B Wilson lecture on Tuesday, December 10, at 3:15 pm during the 2019 ASCB|EMBO Meeting in Washington, DC.

M. Madan Babu and Paola Picotti Honored with 2019 EMBO Gold Awards

By Mary Spiro

Earlier this year, the 2019 EMBO Gold Medals were awarded to two systems biologists, M. Madan Babu and Paola Picotti. Babu, who is based at the MRC Laboratory of Molecular Biology, Cambridge, UK, received the award for his fundamental contributions to the field of computational molecular biology, specifically for his discoveries in the areas of G protein–coupled receptor signaling and intrinsically disordered proteins. Picotti, from ETH Zurich in Switzerland, was recognized for conceptual and technological breakthroughs in the mass spectrometric analysis of proteins and proteomes, specifically for enabling the analysis of protein conformational changes in situ and on a proteome-wide scale. EMBO awards the Gold Medal annually to exceptional life scientists under the age of 40 in Europe. Babu and Picotti will each receive a gold medal and a cash prize of €10,000 and give a presentation at the ASCB|EMBO Meeting.
Julie Theriot to Give 2019 Keith Porter Lecture

By Mary Spiro

Julie Theriot, a professor in the Department of Biology at the University of Washington, has been selected to present the 2019 Keith R. Porter lecture at the ASCB|EMBO Meeting in Washington, DC, on Sunday, December 8. The award is given to an eminent cell biologist in memory of one of ASCB’s founding members, Keith R. Porter. Of Julie Theriot, ASCB President Andrew Murray said, “Julie was selected because she embodies the two things that defined Keith Porter: a passion for understanding how cell structure determines cell function and a remarkable commitment to the community of cell biologists. Julie’s observations and modeling of the dynamics of the cytoskeleton in migrating cells have vastly improved our knowledge of how cells move.”

Cato Laurencin Is 2019 E.E. Just Lecturer

By Mary Spiro

ASCB’s Minorities Affairs Committee presents the E.E. Just Award to memorialize the early 20th-century biologist and to recognize the outstanding scientific achievement by an underrepresented minority scientist. The 2019 E.E. Just Award recipient is Cato T. Laurencin of the University of Connecticut (UCONN). Laurencin holds the title of University Professor, which is the highest academic honor bestowed at UCONN. Laurencin is also the Albert and Wilda Van Dusen Distinguished Professor of Orthopedic Surgery at the school.

Sandra Murray, cell biology professor at the University of Pittsburgh, describes Laurencin as “an outstanding speaker, a spectacular scientist who is well funded, recognized nationally and internationally, has trained [a] number of individuals, and is recognized by the National Academy of Medicine and the National Academy of Engineering.” She added that “[Laurencin] has started programs to increase the diversity of the future workforce and, based on his many quotes, has given time to ponder where science is and should be going.”
Jorge Torres has been named the 2019 recipient of the ASCB Prize for Excellence in Inclusivity. Torres is an associate professor in the Department of Chemistry and Biochemistry at the University of California, Los Angeles (UCLA). He will receive $5,000, will be recognized at the 2019 ASCB|EMBO Meeting in Washington, DC, in December, and will contribute an essay to the Society’s basic science journal, *Molecular Biology of the Cell*.

ASCB’s Prize for Excellence in Inclusivity is an annual award recognizing one scientist with a strong track record in research who serves a critical role in fostering cell biology research and has demonstrated the importance of inclusion and diversity in science through mentoring, cultural change, outreach, or community service. The award is made possible by a grant from the Howard Hughes Medical Institute.

Torres’ academic record demonstrates obvious excellence. He earned his undergraduate degree at the University of California, Santa Barbara, and his PhD at Princeton University. His postdoctoral research was done at Stanford University, as well as at Genentech, Inc. But Torres’ humble roots and challenging upbringing could have been roadblocks to reaching these significant milestones.

**Overcoming Roadblocks**

“I was born in McAllen, TX, to Mexican immigrants. In my early years I was a migrant farm worker and traveled the United States living in the back of a truck and working in the fields harvesting vegetables and fruits,” he said. Despite having to work hard, his curiosity did not wane.

“Science is all around us, and yet we seldom stop to think about the science behind inanimate objects like cars and buildings and sentient beings like animals and humans,” Torres said. “I have had a life-long curiosity for how things work, especially in regards to the basic principles of life. Although it was not clear to me then, I became interested in science at an early age through my penchant for exploring nature and being fascinated by things that I did not quite understand.”

Torres credits his parents as the driving force behind his success. “My parents were my earliest role models, and I learned many valuable lessons that I have carried throughout my life. Most importantly that life is not easy, and sometimes you have to work extra hard to get ahead. Also, you must always be grateful for what you have,” Torres said.

**The Importance of Mentors**

Throughout various stages of his academic and professional career, Torres said he was fortunate to have mentors who exhibited the spirit of inclusivity that has since become part of his life’s philosophy. “John Rice, my high school wrestling coach, biology teacher, and a former sergeant in the Marine Corps, was a great role model who taught me that discipline, dedication, and determination were critical to becoming the best that you can be,” Torres said. "My undergraduate research advisor, Eduardo
Orias, was instrumental in my education of the scientific process and for fostering a welcoming, supportive, and fun environment in which I could grow as a budding scientist.”

He remarked that both his graduate advisor, Virginia Zakian (Princeton), and postdoctoral advisor, Peter Jackson (Stanford), proved to be crucial to his development as a critical thinker. “They always showed a passion for science that was contagious and inspiring. I learned so much about science and how to maneuver the scientific landscape from them,” Torres said.

In his own classrooms and laboratory, Torres strives to create an enriching environment. Small gestures, such as learning each student’s name and greeting them by name as they enter the classroom have a huge impact. He also connects coursework to research studies happening in his own laboratory, where he investigates the mechanisms and proteins involved in forming the mitotic spindle. In this way, he said, students can see the immediate importance of their education.

“I share my enthusiasm for our lab’s research and highlight the importance of the course for their development and advancement as scientists, why the course topics are exciting areas of interest to the scientific community, and how they relate to their everyday lives,” Torres said.

Torres also uses class time to build networks. “I allow students to introduce themselves and share their interests in science and career goals with their classmates. This helps to build a sense of community learning in the classroom where students feel safe to explore ideas and learn from each other,” Torres said. From the language on the syllabus to the course design, Torres said, he hopes his courses create an atmosphere where students with different backgrounds and life experience can find commonality and amplify one another’s strengths.

Providing Opportunities for Underrepresented Groups

In one of his nomination letters, Catherine Clarke, professor and chair of the UCLA Department of Chemistry and Biochemistry, noted Torres’ broad involvement in initiatives designed to provide opportunity and mentoring to underrepresented groups in science. To name a few, at UCLA Torres works with the Undergraduate Research Center, which has a dozen programs to identify the students with a potential interest in science and teach them skills for survival in college. Torres also volunteers his time at the local Society for the Advancement of Chicano and Native Americans in Sciences chapter and has worked with underrepresented students in the university’s Maximizing Student Diversity Scholars program to help them perfect their research proposals. Torres also offers his time and talents to the California Alliance for Minority Participation, a program from which he benefitted while earning this bachelor’s degree at the University of California, Santa Barbara.

Science is all around us, and yet we seldom stop to think about the science behind inanimate objects like cars and buildings and sentient beings like animals and humans.”

Small gestures, such as learning each student’s name and greeting them by name as they enter the classroom have a huge impact.
Torres finds these experiences rewarding because, he remarks, simply listening to or talking with students can have an enormous impact on their future. “As an underrepresented minority in the sciences that came from low socioeconomic status and a rough upbringing, hearing about the accomplishments and success stories of students that come from historically marginalized groups really warms my heart,” Torres said. “I am proud and humbled to be able to mentor students that may be going through experiences similar to the ones that I went through early in my career and to assist them in accomplishing their educational and career goals.”

These efforts, he hopes, will affect some of the greatest challenges he sees to promoting inclusivity in STEM such as “institutional policies and decades-old mindsets.”

“These are controversial topics that need to be addressed,” Torres said. “In the academic world, institutions and their faculty and staff need to examine how their policies and mindsets negatively impact their ability to extend educational, training, and career development opportunities to students from all walks of life. Once these institutional barriers to inclusion are understood, the hard work of addressing them must be undertaken.”

At the end of the day, Torres hopes he can uplift the curious kids like himself whose life circumstances may be harshly judged by society or overlooked by an academic establishment that fails to recognize this viable pipeline of scientific genius and innovation. He said he plans to use the prize money for outreach activities aimed at increasing inclusion in science and to create paid research opportunities for underrepresented students.

A short video showcasing more of the reasons why Torres was chosen for the 2019 ASCB Prize for Excellence in Inclusivity will premiere at the opening ceremonies of the ASCB|EMBO Meeting.

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Rong Li Chosen as 2019 Sandra K. Masur Senior Leadership Awardee

By Thea Clarke

Rong Li, Bloomberg Distinguished Professor of Cell Biology and Chemical & Biomolecular Engineering and the Director of the Center for Cell Dynamics at The Johns Hopkins University, was chosen by the ASCB Women in Cell Biology Committee for the 2019 Sandra K. Masur Senior Leadership Award for her research achievements, leadership, and mentorship.

Li is a leading expert in cellular dynamics in space, time, and adaptation. She has produced key discoveries on mitotic cell division, aneuploidy and cellular evolution, actin cytoskeleton and cell motility, cell polarity, and cellular quality control and aging.

Her leadership skills were enumerated by Susan Michaelis, Johns Hopkins School of Medicine, in a letter of support. Michaelis said that under Li’s leadership, the Center for Cell Dynamics has become completely re-energized, through new hires, exciting seminar programs, and many new collaborative initiatives.

Li has trained over 20 PhD students and postdocs, many of whom are now in independent positions in academia and industry. One of those postdocs was Roland Wedlich-Söldner, now the head of the Institute of Cell Dynamics and Imaging, University of Münster, Germany. He noted in his letter of support: “For me, she created the perfect scientific environment—on the one hand absolute scientific freedom to pursue any experiment I wanted, but at the same time providing efficient advice whenever I required it.”

Coleen Murphy Receives WICB Mid-Career Award for Excellence in Research

By Thea Clarke

The WICB Mid-Career Award recipient for 2019 is Coleen Murphy, professor, Department of Molecular Biology and Lewis-Sigler Institute for Integrative Genomics, Princeton University. Her research group studies aging and the quantitation of “quality of life with age,” including the decline of cognitive and reproductive capacities with age. They develop behavioral, genomic, genetic, biochemical, robotic, and computational approaches, using Caenorhabditis elegans as a model system.
According to her nomination letter, teaching is central to the core mission at Princeton, and “Coleen has gone above and beyond in teaching and mentoring the next generation of scientists. Besides teaching many courses in molecular biology and quantitative and computational biology to undergraduate and graduate students, she has developed a new course, the Cell Biology and Genomics of Aging. She is also the faculty director for the Summer Undergraduate Research Program, which gives students from underrepresented groups an opportunity to carry out summer research. She has also served as Director of Undergraduate Studies and serves the greater scientific community through a variety of other activities.

The WICB Mid-Career Award recognizes exceptional scientific and leadership contributions to cell biology in the critical career period between the junior and senior stages.

Sabine Petry Honored with WICB Junior Award for Excellence in Research

By Thea Clarke

Sabine Petry, assistant professor, Department of Molecular Biology, Princeton University, and associated faculty member of both the Departments of Chemical & Biological Engineering and Chemistry, has been honored with the 2019 WICB Junior Award. The award recognizes newly independent, early-career scientists within seven years of their first appointment who show significant potential for making scientific contributions.

As her nominator Jean Schwarzbauer, Princeton University, noted, Petry was highly productive in two fields during her graduate school years and in her postdoctoral work. As a grad student with Venki Ramakrishnan, MRC Laboratory of Molecular Biology, she solved bacterial ribosome structures in different translation states, providing new information about how protein synthesis works. And during her postdoc with Ron Vale, University of California, San Francisco/HHMI, she made the unexpected discovery that microtubules can branch.

Ron Vale, who wrote one of the letters of support, said: “Sabine has a stellar record as a graduate student, a postdoctoral fellow, and is now thriving as a faculty member at Princeton. She has a great blend of characteristics: a willingness to take on important but challenging problems, a determination to succeed and patience to sustain a long-term effort, a good personality and ability to orchestrate collaborative efforts, and the intelligence to think deeply about her results. I also think that she is terrific role model for young scientists as well.”
2019 Early Career Life Scientist Award Goes to Cigall Kadoch

By Mary Spiro

Cigall Kadoch, assistant professor of pediatric oncology at the Dana Farber Cancer Institute and Harvard Medical School, will give the 2019 Early Career Life Scientist Lecture at the ASCB|EMBO Meeting this year. Kadoch is being recognized for opening new frontiers in cancer research through her discoveries of how mutations in chromatin remodeling complexes rewire cells and drive cancer. “Cigall is a force of nature,” wrote Eric Lander, professor of Systems Biology at Harvard Medical School and president and founding director of the Broad Institute. “She is ambitious and extraordinary: She established her independent lab at the age of 27, becoming one of Harvard Medical School’s youngest-ever faculty appointments. Her elegant work combining biochemistry and cell biology to reveal the mechanisms of gene regulation driving human disease holds immense promise for designing new cancer therapeutics.”

Eric T. Hall to Receive MBoC Paper of the Year Award

By W. Mark Leader

Eric T. Hall was named by the Molecular Biology of the Cell (MBoC) Editorial Board as recipient of the 28th annual MBoC Paper of the Year Award. As a graduate student in Esther M. Verheyen’s laboratory at Simon Fraser University in British Columbia, Hall was first author of the article “Actomyosin contractility modulates Wnt signaling through adherens junction stability” (Mol. Biol. Cell 30, 411–426). Hall is now a postdoc in Stacey Ogden’s lab in the Department of Cell & Molecular Biology, St. Jude Children’s Research Hospital, Memphis, TN. “Previous work on Wnt signaling had shown that pathway output is influenced by actomyosin contractility that drives tissue and cell shape changes in developing tissues but had not fully explained the underlying mechanisms,”
notes Richard Fehon, who served as Monitoring Editor of the paper. “Using a combination of genetic and cell biological approaches Hall et al. showed that myosin-generated cellular tension represses Wnt signaling by stabilizing E-cadherin–based adherens junctions, which in turn recruit and sequester β-catenin to the cell cortex. These findings add significantly to our understanding of the dual roles of β-catenin as an adherens junction component and a Wnt pathway transcriptional coactivator, as well as to how Wnt signaling is coupled to tissue morphogenesis in development.”

Hall will present his latest research in a Minisymposium at the ASCB|EMBO Meeting in Washington, DC.

The MBoC Paper of the Year is selected by the Editorial Board from among papers published in the journal each year between June and May that have a postdoc or student as the first author.

2019 Porter Prizes for Research Excellence

By Mary Spiro

ASCB’s Award Selection Committee has chosen Meng-meng Fu, a postdoctoral fellow at Stanford University, and David Thaller, a PhD candidate from Yale University, as the 2019 winners of the Porter Prizes for Research Excellence. Fu will receive $4,000, and Thaller will receive $2,000. Each will give a talk in a Minisymposium relevant to her or his research. Also recognized as Honorable Mentions are Andrea Stavoe, a postdoc at the University of Pennsylvania; Evanna Mills, a postdoc at the Dana Farber Cancer Institute/Harvard Medical School; and Veena Padmanaban, a former Johns Hopkins graduate student and current postdoc at Rockefeller University, who will receive the Merton Bernfield Memorial Award (see p. 44).

Fu is a postdoctoral fellow in the neurobiology laboratory of the late Ben Barres. She earned her PhD with Erika Holzbaur, the William Maul Measey Professor of Physiology at the University of Pennsylvania. Holzbaur remarked that Fu “is one of the brightest, most motivated, and most creative students who has trained in my lab, putting her at the top of a very strong list. Meng-meng went up from my lab to a stellar postdoc in Ben Barres’ lab. Some of her groundbreaking work there was just accepted for publication…. This may be Ben’s last paper, and I think he would be particularly proud of how hard Meng-meng worked to complete this important study on her own, in the midst of the shutdown of the Barres lab.”

Thaller is earning his PhD in cell biology at Yale with associate professor Patrick Lusk. “Dave has been a major driver of the research in my laboratory
Veena Padmanaban, a postdoctoral fellow at Rockefeller University, will receive the 2019 Merton Bernfield Memorial Award. Until recently, Padmanaban was a PhD student in the Department of Biochemistry, Cell and Molecular Biology at Johns Hopkins University with advisor Andrew Ewald. Ewald remarked that “Veena has demonstrated outstanding achievement in the classroom and in the research laboratory. Based on her current accomplishments and potential for future leadership in science, I rank her in the top less than 1% of PhD students nationwide.” With regard to her research contributions, Phuoc T. Tran, an associate professor with the Sydney Kimmel Cancer Research Center at Johns Hopkins stated, “Veena has also shown great initiative in pioneering the development of key techniques and assays to study metastasis. Several of these assays have now been adapted within [Ewald’s] laboratory and also by several groups across the country.” Padmanaban will give a talk in a Minisymposium at the ASCB|EMBO Meeting.

Veena Padmanaban Earns 2019 Merton Bernfield Memorial Award

By Mary Spiro

over the last five years,” Lusk said. “He has played a singular role in catalyzing new research directions and establishing new techniques/technologies in my lab under the auspices of answering fundamental cell biological problems of subcellular compartmentalization. There is no question that Dave is outstanding and one of the top students in his class—he will be a scientific leader in the future.”
Emerging Voices

Improving Sustainability in the Research Lab

By Jami Conley Calderon

Last fall, the Intergovernmental Panel on Climate Change issued a special report describing the devastating impacts of increasing global temperatures, including wildfires, food shortages, and the complete loss of coral reefs by as early as 2040. As a member of the scientific community, but also simply as a human, I find the human contributions to climate change terrifying. We must make deliberate efforts to live more sustainable personal and professional lives to mitigate the climate crisis. I easily incorporated a bamboo toothbrush, reusable shopping bags, and a stainless-steel straw into my daily routine. But my daily routine also consists of using multiple pairs of nitrile gloves and single-use plastic conical tubes, and storing countless samples at –80°C. I cringe at the thought of using a plastic fork when it’s Food Truck Thursday on campus, but often don’t think twice about the number of plastic tubes I use in a single experiment. I think it’s time for us as scientists to do what we can to reduce our contributions to plastic waste and nonrenewable energy consumption, not only in our personal lives, but also by finding ways to improve sustainability in the research lab. And I know many other scientists agree.

As graduate students and postdocs, we may not have a say in the efficiency of the equipment purchased or installed in our labs. However, we are capable of optimizing how we use that equipment to create more sustainable labs. With guidance from the nonprofit organization My Green Lab and sustainability resources from universities around the country, we can all improve our lab practices to drastically reduce energy consumption and waste generation. Here are some simple ways you can adjust your lab practices to make sustainability a part of your professional life.

Close the Fume Hood Sash

The fume hood, essential to many labs, can consume as much energy as 3.5 households each day, according to My Green Lab. You can help to substantially reduce energy consumption by shutting the sash on the fume hood any time you are not actively using it. Raising the sash increases the amount of air moving through the hood and therefore boosts the exhaust fan speed, using considerably more energy than when the sash is closed. By simply shutting the sash immediately following experiments, you can make your lab more sustainable. To enhance sustainability in its labs, Brown University has incorporated “Shut the Sash” fume hood stickers and alarms that alert lab members if the fume hood sash is left slightly open. You can post stickers or signage on the fume hood in your lab to remind yourself and your lab mates to close the fume hood sash any time it’s not in use. Studies show fume hood stickers effectively lead to energy savings.

Maintain Your Freezer

Another major energy consumer is the ultra-low freezer, dubbed the “minus 80” in most labs. Preventative maintenance of your freezer maximizes...
I cringe at the thought of using a plastic fork…but often don’t think twice about the number of plastic tubes I use in a single experiment.

Reduction of energy consumption in labs is pivotal to minimizing the environmental impact of scientific research. According to Harvard Lab Sustainability Guide, good maintenance practices include checking and cleaning door seals, changing filters, cleaning exposed coils, and defrosting the unit at least once per year. Inventories and maps of freezer storage further reduce energy consumption by allowing you to find your samples quickly with minimal temperature fluctuation within the unit. You can also talk to your PI about temperature tuning. Ultra-low freezers set at −70°C instead of −80°C consume up to 40% less energy. Considering freezers set to −80°C use about as much energy as a single-family home every day, the energy savings resulting from increasing the temperature by only 10°C is massive. The International Laboratory Freezer Challenge provides a list of samples successfully stored at −70°C as well as publications to address appropriate storage temperatures of different sample types, so you can make sure temperature tuning is feasible for your samples (and have better evidence to convince your PI to give temperature tuning a try).

Use Glassware Instead of Single-Use Plastic
Consider which of your protocols require the use of sterile plastic tubes, flasks, or plates and which protocols allow for the use of glassware instead. I recently realized my lab used plastic conical tubes to store certain buffers for no reason other than a habit passed down from one lab member to the next. These buffers are just as effectively stored in sealable glass bottles. Plus, glass is nonreactive, making it an even better choice for long-term storage of buffers. By making a simple switch to glassware instead of plastic for certain protocols, we can reduce the amount of plastic waste contributed by labs.

Reduce Glove Changes When Possible
Gloves are a staple in the lab, and we tend to go through several pairs a day. Sometimes we must change our gloves to avoid contamination of our samples or because the gloves have been exposed to biohazardous waste. Other times, we take a break during an incubation or PCR and dispose of gloves that do not present a hazard to ourselves or our samples. In these cases, I’ve found removing my gloves and placing them next to my experimental setup allows me to pick up right where I left off after a break without wasting a pair of gloves. I also keep a spray bottle of ethanol near my lab bench, so I can clean my gloves periodically during experiments rather than needlessly changing them. Reducing unnecessary glove changes is an easy way to decrease excess waste production in the lab. Terracycle even offers glove recycling for those unavoidable glove changes.

Efficiently Use Autoclaves
When you use the autoclave, My Green Lab recommends consolidating your loads to maximize water and energy efficiency. Just as you wouldn’t set the dishwasher at home to run if you only loaded two bowls, don’t run an autoclave to sterilize only two flasks. Consider setting up an online schedule with neighboring labs to sign up to autoclave similar items together. Autoclaves are unavoidable energy consumers in the lab, but
Emerging Voices

Just as you wouldn’t set the dishwasher at home to run if you only loaded two bowls, don’t run an autoclave to sterilize only two flasks.

we can maximize the amount of materials sterilized with each use and minimize the overall number of cycles run, ultimately reducing energy consumption.

Reduce Office Waste
Lab waste isn’t limited to conical tubes and pipette tips. Office supplies like paper and pens further add to the waste generated in research labs. Instead of printing every journal article you want to read, try reading them on electronic devices. When you do need to print a paper, print double sided or with two pages per sheet to reduce the paper usage. You can also create a common folder in your lab for all printed papers to be deposited for lab members to read. This limits the number of times the same article gets printed in your lab. Other office supplies, including pens, markers, and staples, can be recycled through Terracycle, limiting the amount of waste entering landfills.

Although the current levels of energy consumption and waste production in the lab may seem inevitable, we can make positive changes in our daily professional lives to drastically lower energy use and minimize waste. Take a look at your existing protocols. Are there practical changes that can be made to improve sustainability without compromising the experimental design? Take a look at your cold storage. Are there items that could be stored at −20°C instead of −80°C? Talk to your administrators about implementing “Shut the Sash” and glove recycling initiatives throughout your whole department or institution. These simple changes won’t singlehandedly solve the climate crisis, but together we can reduce the detrimental effects of lab waste and nonrenewable energy consumption on our planet.

Footnotes
1www.ipcc.ch/sr15.
2www.mygreenlab.org.
3www.brown.edu/sustainability/initiatives/green-labs.

About the Author
Jami Conley Calderon is a PhD student in Biomedical Sciences at the University of Central Florida.
The ASCB Minorities Affairs Committee’s (MAC’s) Faculty Research Education Development (FRED) program helped me to secure National Science Foundation Research Experiences for Undergraduates funding and to cultivate institutional partnerships to promote inclusion and equity for Native American, Latinx, and nontraditional undergraduates in biology and biomedical research experiences at Heritage University. Heritage University is a private, nonprofit, four-year liberal arts university serving undergraduates on the homeland of the Yakama Nation in Washington State. Over 90% of undergraduates at Heritage University are eligible for Pell Grants.

At Heritage University, I integrated Karen Gross’ novel concept of lasticity with culturally responsive teaching approaches to promote inclusion and equity for all undergraduates in the general biology classroom and lab settings. Gross defines lasticity as a combination of conditions that fall under an “umbrella concept” that illuminates a process by which at-risk learners are able to succeed in post-secondary education. The term at-risk learner (or breakaway learner) refers to individuals “who have experienced toxic stress or trauma or other impediments in their lives to flourish in childhood and thereafter in education and in life.” Lasticity contains the following key building blocks: elasticity, reciprocity, pivoting right, plasticity, and belief in self.

Here, I describe a practical example of how the concept of lasticity is rooted within culturally responsive teaching and mentoring in undergraduate biology courses. I applied the concept of lasticity to implement flexible times (or flex times) for team experiments in course-based undergraduate research settings (CUREs) over the course of the semester. Flex times enables students who have two jobs or...
family members to attend to, the opportunity to succeed during the semester in their research team project.

In applying lasticity, I first think about reciprocity—shared discussion alongside our student scholars—and being mindful of students’ family obligations, their role as caretaker for their loved ones, and student services on campus. I then begin thinking of pivoting right—when I ask the student scholars what time(s) work best with them and their team, and then think creatively about how I can arrange lab accommodation in an effective way. (In her book on lasticity, Gross defines pivoting right as the “importance of all children [all people] making wise choices and exhibiting quality decision making.”) During this time, I acknowledge that as an instructor this is a moment of vulnerability and opportunity—I instill belief in self not only for me, but also for each student scholar to navigate through this experience. As I begin to finalize the additional flex time for CUREs, I encourage the research team to collect data at multiple time points so they can analyze patterns over time—for example looking at the long-term effects of tinta china (India ink) on the rate of phagocytosis in Tetrahymena thermophila. Elasticity and plasticity were woven together for the community of learners and scholars. Over time, I now see myself not only as an instructor, but also as an advocate and mentor of the research time during flex times. Through flex time within a lasticity framework, research teams are able to explore in-depth the biological patterns that change over time and space through their CUREs—each student has the opportunity to think like a scientist.

I applied the concept of lasticity to implement flexible times (or flex times) for team experiments.

References and Footnotes


About the Author

Bob Kao is an assistant professor in Biology in the College of Arts and Sciences at Heritage University in Toppenish, WA. He is a former ASCB FRED mentee who worked with Julian Simon at Fred Hutchinson Cancer Research Center as his mentor.
For several months, the Trump administration has been focused on claims of espionage by foreign nations in research laboratories in the United States. U.S. intelligence agencies have verified these charges, and now members of Congress are becoming involved. These serious espionage incidents are shining a light on important issues to which researchers funded by U.S. science agencies, including the U.S. National Institutes of Health (NIH) and the National Science Foundation (NSF), need to pay attention.

Both the NIH and NSF have distributed notices on these issues. The NIH notice, Financial Conflict of Interest: Investigator Disclosures of Foreign Financial Interests (https://bit.ly/33DHjIk), is a recap of existing NIH policies. Previously, these existing policies have been largely ignored by researchers and unenforced by the NIH.

The notice from the NSF reminds the NSF community about restrictions placed on those funded by the NSF and those who join the NSF as temporary “rotators.” The notice is in the form of a “dear colleague” letter (https://bit.ly/2TBlIvS0) from NSF Director France Córdova.

Agreement, something rare in Washington, DC, these days, made a brief appearance in late July. After weeks of secret negotiations, Capitol Hill Democrats and the White House reached an agreement on the overall size of the federal budget for the next two fiscal years. The agreement also suspends the need to increase the debt ceiling, a cause of political tension in recent years, through July of 2021.

Unlike previous years in which the defense and nondefense portions of the budget received equal increases, the agreement increases funding for these portions of the budget differently in FY2020. The nondefense portion of the federal budget, the portion that includes funding for the U.S. National Institutes of Health and the National Science Foundation, will be increased by 4%, whereas the defense budget will be increased by only 3%. In FY2021 both defense and nondefense budgets will be increased by around 1%.

Approval of the agreement will allow the Senate to begin to write and pass the 12 individual appropriations bills that actually fund the federal government. The Senate had withheld action until a deal was reached, while the House of Representatives moved forward and has passed almost all of its appropriations bills.

It is possible the House will have to make some funding changes to already-passed bills, since it had assumed that the nondefense budget would increase by 6%. Some of those changes may be made to science programs.
Office Hours
with the Education Committee

Moving beyond Student Evaluations but Replacing Them with What?

Dear Education Committee,

My university is starting a conversation about our problematic use of student evaluations of teaching for tenure and promotion. There are lots of reasons why we need to stop relying solely on student evaluations of teaching: They can be biased against women and people of color and they have little, if any, relationship to student learning. I am enthusiastic about moving away from student evaluations, but I wonder: What should we move toward? What else could be used to evaluate teaching effectiveness?

—Elevating Evaluation of Teaching

Dear Elevating Evaluation of Teaching,

Your question is both timely and accurate. A lot of evidence has accumulated about the biased nature of student evaluations of teaching. Numerous studies have detected gender and racial bias. This includes bias in measures that should be objective, such as the amount of time it takes for the instructor to return an assignment to students. For example, Boring et al. showed that female TAs who returned assignments at the same time as their male counterparts were rated as less prompt. The mounting evidence of bias has sparked conversations at colleges and universities around the country and within higher education literature because it is clear to many that the current system, which relies heavily on student evaluation, is broken. The evidence of bias is so strong that some have predicted class action lawsuits will be seen if universities continue to use student evaluations of teaching in hiring, tenure, and promotion decisions.

As is often the case, it is much quicker to diagnose the problem than it is to identify an effective solution. To truly assess teaching effectiveness, we would need to better understand what students have learned. Increasingly, pre–post assessments including concept inventories and other knowledge and skill-based tests are being used to determine the impact of teachers in the classroom. However, observed measures continue to play an important role in assessing teaching effectiveness.

A number of alternative approaches to evaluating educators have been suggested, many of which involve combined methods including peer/expert observation, self-evaluation, and student evaluation of teaching. Peer/expert observation of teaching may be useful because it allows someone with expertise in the discipline, pedagogy, or both to provide feedback to the instructor on what happens in the classroom. However, many questions remain: Is it best to have a content
expert or someone with expertise in teaching and learning? Should the observation come from someone within the department or an outside entity like a Center for Teaching and Learning? What will be observed? Lang argues that the bulk of the teaching process happens outside of the classroom and a peer observation would not capture the teaching process unless it considered evidence from multiple sources, such as a meeting with the instructor, review of syllabi, etc. Therefore peer/expert-evaluation requires significant resources in terms of time and energy, much more than simple observation. Peer/expert evaluation also requires a great deal of trust between colleagues and training for the reviewer to avoid his or her own implicit bias.

Another method considered for evaluation is self-evaluation, which can capture many elements of teaching that may not be apparent to a peer who visits a class session. Self-evaluation can provide a useful record of how an instructor has changed over time and where they plan to go as they continue to develop their teaching practice. Many questions remain about how best to do self-evaluation: What will provoke thoughtful self-evaluation? How can self-evaluation be used in combination with peer/expert and/or student-evaluations? What kind of structures can be used to create a fair and effective self-evaluation process?

A third form of evaluation, student-evaluation, we have already talked about. The inherent bias in student-evaluations also brings up important questions: Can student-evaluations of teaching be included if they are biased? At the same time, can students really be excluded from a review process of teaching and learning? Perhaps we can find more useful methods to get feedback from students that can inform the processes of self-evaluation or peer/expert-evaluation. Some advocate a more formative assessment of teaching by asking students for mid-term feedback about what is supporting student learning and what students would suggest the instructor change to better support their learning for the rest of the term. The benefit of this approach is that the feedback students give has the potential to impact their learning experience in the course rather than affecting only future students. It also could mean that student feedback is formative to the self-evaluation process rather than summative and independent. Questions about when and how to most effectively obtain student-feedback remain: Are there ways to get more effective feedback from students that reflect more about what they learned and less about the demographics of the instructor? How can we put student evaluations into a more useful context that is fair to all instructors?

As is often the case in cell biology research as well, there is no perfect experiment or approach to studying teaching effectiveness. This is why many institutions are opting for a multi-pronged approach combining peer evaluation, self-reflection, and student evaluation of teaching. Perhaps peer/expert and student evaluation could be used to inform instructors in their self-evaluation and this could be used as evidence to inform an instructor’s pedagogical decision making.

We have raised more questions than we’ve provided answers here because this is an important but complex issue and subject to institutional customization. Below we highlight some resources that may prove useful as your institution begins to reconsider your evaluation of effective teaching.

The TEval project is an effort funded by the National Science Foundation across the University of Colorado, Boulder; the University of Kansas; and the University of Massachusetts, Amherst, to develop a seven-dimensional rubric of teaching effectiveness that can be applied to different institutional or disciplinary contexts. An ongoing effort to reform teaching evaluations at the University of Oregon is being documented and updated in real time including pilot reforms to student surveys and peer
Teaching Practices Inventory is a self-reflection tool that was developed and tested by over 100 faculty at the University of British Columbia. Ultimately, there is an increasingly strong call to move away from student evaluations of teaching as the single method of assessing teaching effectiveness. ASCB recently published a Declaration on Effective and Inclusive Undergraduate Biology Education “advocating for more holistic and informative evaluation of teaching,” so your question is part of a larger conversation for the Society as well. Precisely what will work best for your teaching context is dependent on you and your colleagues. We hope these tools will help you to design an effective assessment tool for your teaching context.

—The Education Committee

References
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ASCB’s education journal, *CBE—Life Sciences Education (LSE)*, is your source for

- Tried and tested ideas for improving your teaching and mentoring
- Data-driven strategies for improving students’ learning, development, and success
- Evidence-based approaches for engaging students and overcoming everyday teaching challenges
- Valid and reliable assessment tools

Here are some highlights from the September 1, 2019, issue:

**ARTICLES**

**Defining and Measuring Students’ Interest in Biology: An Analysis of the Biology Education Literature**  
Ashley A. Rowland, Eva Knekta, Sarah Eddy, and Lisa A. Corwin  
Students’ interest in their fields of study is an important motivating factor that affects their academic achievement and persistence in STEM. Here, the literature addressing students’ biology interest is analyzed in order to clarify how this important construct is defined and measured by the biology education research community.

**“Seeing” Data Like an Expert: An Eye-Tracking Study Using Graphical Data Representations**  
Joseph A. Harsh, Molly Campillo, Caylin Murray, Christina Myers, John Nguyen, and Adam V. Maltese  
This study used eye tracking to compare how students and scientists direct their attention when making sense of graphs. Experts focused on information relevant to data interpretation, using directed search patterns. Novices were more likely to complete graphing tasks by drawing on cues and used more sporadic search patterns.

Check out LSE’s Evidence-based Teaching Guides at [https://lse.ascb.org](https://lse.ascb.org).

Explore the Anatomy of an Education Research Study at [http://www.ascb.org/annotations](http://www.ascb.org/annotations) and learn about the design, conduct, interpretation, and presentation of education research.

Stay up to date with all that LSE has to offer by following us on Twitter @CBELifescied.
Navigating your career can be messy. Too often, we leave career exploration to chance and assume that over time we will simply figure out what we want to do next. However, career exploration is a developmental process, requiring reflection and experiences to develop toward your next step. The linear process we crave may exist for some, but for most of us the path is much less clear or direct. As demonstrated in a video from the University of California, San Francisco (UCSF) Motivating INformed Decisions (MIND) Program, career exploration and decision making—whether as a student, postdoctoral scholar, or midcareer professional—is often a process of trial and error that involves setting hypotheses (about what career step may be a good fit), testing your hypotheses, and adapting your plan. There is no simple formula; we are all unique, with unique strengths, interests, values, personality styles, experiences, and networks, and our career trajectories will each be unique.

At the University of Massachusetts Medical School, we have adapted our core PhD curriculum to guide and support students through this developmental process. We train our students as future professionals: scientists who will move out into the world and contribute in a myriad of ways to the scientific ecosystem and society. Here are some of the strategies we emphasize that can be put into practice regardless of your career stage.

**Make time to reflect and to build your own awareness of self.**

Consider your strengths, what you enjoy doing, and your values; myIDP or other self-assessment tools may be helpful for this reflection. For any projects you work on—whether in the lab or as hobbies—notice how they align with and shape your skills, interests, and values. As you periodically reflect, you will become more and more aware of your own evolving identity—your sense of self. Celebrate the many elements of YOU that compose your unique self, and the strengths and perspective you bring to any project. This self-awareness will be valuable as you consider next career steps. One exercise to help you explore your identity is to write a tagline for yourself. Describe your professional self in one sentence, without listing your job or how you got into your job. Instead, focus on the lens through which you approach your work, the impact you strive to have, or other factors. Consider adapting your professional social media accounts to describe yourself in this light.

**Be curious, have an open mind.**

As scientists, we are trained to be critical of any data that comes our way. As you consider next career steps, this critical eye may exacerbate negative impressions of career options, making career exploration frustrating (after all, no career options are perfect!). I have found it helpful to frame career exploration through a different lens: that of curiosity, interest, and fascination. As you meet people, be curious about their own career trajectories, what they do, and how they have navigated. You can track your progress—and continually assess potential fit of each professional role you learn about—via UCSF’s Career Exploration Road Map. Consider writing in a journal as you do so—similarly to how you would document and reflect on your science in a lab notebook. Even if you have a strong sense of what you want to do next in your career, keep an open mind and continue to learn about others’ journeys and roles. This will help you be better informed about the roles in science around you, how
they intersect, and the value they bring to the broader ecosystem.

**Create an Individual Development Plan, with explicit goals for career exploration.**

Among the plethora of important-and-urgent tasks facing us each day, it is easy to continually put off thinking ahead to the next career step. Address this head-on by creating an Individual Development Plan in which you define specific actions you will take to reflect on your future, explore career options, expand your network, sustain your well-being, and further your professional development.

**Talk to people!**

Career exploration does not need to be an isolated process, and in fact it can be greatly beneficial to talk with others. Talk to professionals in a career of interest to learn more about their experiences. As you process what you learn, discuss your interests, doubts, excitement, and concerns with others—your peers, career counselors from your current or former university, a paid career coach, and/or mentors. Talking with others can facilitate your own self-reflection, help you practice different framings of your career identity, inform your career decisions, and help identify strategies to enhance your professional development and wellness.

**Have an innovation mindset.**

Scientists are increasingly following novel paths through their careers, whether taking on a professional role that has rarely existed before or taking a new route into an established type of role (for example, moving directly from graduate student into regulatory affairs, bypassing the typical route of first becoming a scientist in a company setting). As you hear others’ career stories, do not assume you will need to take the same path. Instead, learn more about the rationale and context of their experience by asking: Why did you choose to do training X? In what ways was that training helpful for transitioning into your next role? What types of things did you learn on the job? What are other ways that someone like me could transition into this type of work?

**Prioritize your wellness.**

The process of career exploration may awaken a number of emotions; accept this, give yourself time and space to feel these emotions, and know that this is normal when looking toward a career transition. Taking a walk or being active, sleeping and eating well, continuing with hobbies, and talking to others (including peers, mentors, and mental health professionals) can bring perspective and balance to your professional work and aspirations.

**Take the plunge!**

“What if I don’t like that type of work?” This is a common concern, and can cause career decision paralysis (that is, pausing in a transition role longer than needed, mostly due to doubt about what to do next). Don’t be afraid to dive in and just try something new. Try it via a job simulation, internship, or volunteer opportunity. Ultimately, you may need to just take a leap of faith, move into a new position, give it some time, and see if it fits. Even if it’s not a perfect fit, you will learn more about yourself and gain unique experience that will contribute to your evolving career identity and experience. I don’t believe that doors ever really close; you can shift across types of work by being strategic and taking steps to align your network, experience, and skills with the new type of work you desire.

It is common for scientists to move through multiple career transitions across their lives. Whether early in your career or already several stages along, looking ahead to your next career transition can be both exciting and unnerving. Be proactive: This is an opportunity to think more intentionally about who you are as a professional and how you see yourself growing and contributing as you navigate the next stage of your career.
Explore Career Options at the ASCB|EMBO Meeting

The annual ASCB|EMBO meeting can be a great opportunity to learn about career options and enhance your professional network. Here are some strategies to maximize this opportunity:

- Review the list of participants, and reach out to a handful ahead of time to inquire about setting up a 30-minute informational interview during the meeting.
- Attend professional development workshops.
- Attend the WICB–COMPASS panel discussion and networking reception “The Art of Self Advocacy” or the WICB mentoring theater. Participate in focused Discussion Roundtables on a number of career development and mentoring topics.
- Bring business cards; they are a good way to help the person you are talking with remember your name. (If you are a student or postdoc, ask your department about obtaining business cards; printing costs are typically minimal).
- Note that many of the exhibitors are scientists themselves. Visit the Exhibit Hall, introduce yourself, and learn more about their role at their organization in addition to their products.
- Attend the poster sessions. These are a great opportunity to learn about the different science and labs that are represented at the meeting and also another way to network.
- Schedule time to meet with one of the career coaches, available onsite to provide one-on-one career advice for conference attendees.
- Keep track of who you meet throughout the meeting. On the flight home, draft a short “it was nice to meet you” thank-you email to each person, referring to one or two parts of the conversation that you found helpful. Consider also connecting via social media.

About the Author
Cynthia N. Fuhrmann is Assistant Dean, Career & Professional Development in the Graduate School of Biomedical Sciences, and associate professor, Biochemistry & Molecular Pharmacology, at the University of Massachusetts Medical School.
DEAR LABBY: After a scientifically exciting, very productive, and intense postdoc, I got my dream job and am ready to hit the ground running. Since this also seemed like the right time for me to start a family, I am now faced with the challenge of juggling an independent academic position and the responsibilities and joys associated with a new baby.

My partner and I are new to parenting and new to our community and we don’t have family nearby.

Things are really going wonderfully in the lab and I am learning about the challenges of being a PI. Although my research is going really well, my latest results are in a new area for me and it’s very important to make collaborative connections outside my institution, since no one here is in this new field. Going to the ASCB|EMBO Meeting would be a perfect way for me to share my findings and find collaborators, but any additional expenses will break the bank and I can’t see how to get parental coverage either at the meeting or at home.

My grad school and postdoc mentors were really helpful for scientific and job advice, but they are less knowledgeable and therefore less forthcoming with advice about how to juggle the competing demands of work and family.

Thanks for any advice you can give me,

—Momma Doc

DEAR MOMMA DOC: First of all—congratulations on so many positive changes in your life. Yes, each of these poses different challenges, but there is help available for each.

As your question suggests, you’re now at a career stage where you could benefit from a diverse group of new mentors. Some mentors should be very local to help you learn the rules and the scientific resources of your new institution. These mentors may also be helpful in pointing you to parental resources like daycare centers, student babysitting services, and parental interest groups. Depending on the makeup of your department, you may have to broaden your network at your new institution to tap peers who are facing similar challenges, so look for opportunities at the welcome/orientation events you’re no doubt being invited to as you start your new position.

Some of the mentors in your new scientific network will be peer mentors who may be distant from your home institution, but such relationships can still be
valuable. For example, check out the New PI Slack community at https://newpislack.wordpress.com. It’s made up of people who are also starting their own labs and are sharing information for new PIs covering general topics and grants, hacks/tools, personnel issues, resuscitation (to get support on those bad PI days), teaching, tenure, and work–life integration.

Labby agrees that presenting your science at the ASCB|EMBO Meeting and going to the relevant sessions would be an efficient way to find new scientific collaborators and mentors. How to do this now that you are a parent? The ASCB Women in Cell Biology Committee offers childcare grants so you can present your science at the meeting. The variety of expenses it can cover include extra babysitting at home while you are at the meeting, travel expenses for a caregiver to accompany you and baby to the meeting, travel expenses for a relative who will substitute for you at home— pretty much any justifiable expense related to childcare so that you can be freed up to network and learn and present your research.

And finally to deal with the challenges of being a scientist and a parent, this may be a good time to renegotiate with your partner about how to share the home responsibilities now that they include childcare. Some people describe weekly meetings of the “management team” to go over the week’s calendar and who is doing what. Others have a printed list of home/family tasks and each person signs up weekly or monthly for a specific role or task. There is a terrific webinar of scientist-parents sharing their highly diverse experiences in the work-life integration: https://bit.ly/33kSeqb.

You can be both a great scientist and a great parent. So full steam ahead!

—Labby

The Newsletter Welcomes Letters to the Editor

Have thoughts you’d like to share with your colleagues? We’d be happy to consider your Letter to the Editor for publication in the ASCB Newsletter. Write to the Editor at mleader@ascb.org.
books by members


When his son was diagnosed with cancer, the author became frustrated by his inability to explain the biology of the disease to friends and relatives with no scientific background. This book is a result of his quest to make a textbook about cancer that is readable by people without prior training in biology.
Patricia J. Pukkila passed away on June 20, 2019, at the age of 70, from pancreatic cancer. Pat was an accomplished scientist, educator, and musician and a life-long member of the ASCB. In addition to her research on meiotic chromosomes, Pat was a dedicated teacher who pioneered inquiry-based methods for scientific study. In 2007, Pat received the ASCB Bruce Alberts Award for Excellence in Science Education in recognition of her passion, creativity, and commitment that brought inquiry-based education and undergraduate research to the University of North Carolina, Chapel Hill (UNC), which served as a model nationwide. In 2005 Pat was elected as a Fellow of the American Association for the Advancement of Science for her work on regulation of meiosis and for her leadership in promoting undergraduate education and research.

Pat did her PhD research in the lab of Joe Gall at Yale, where the method of in situ hybridization had been developed to detect the cytological positions of specific DNA sequences. Joe suggested that Pat extend this method to detect RNA. Using lampbrush chromosomes from the newt Notophthalmus (Triturus) viridescens, she reported the first RNA in situ hybridization. In situ methods for DNA and RNA hybridization transformed cell biology and are still widely used today. Pat was a postdoc with Robin Holliday in England and then with Matthew Meselson at Harvard, where she discovered methyl-directed mismatch repair in Escherichia coli. Paul Modrich credited Pat’s discovery as fundamental for his own work and his 2015 Nobel Prize. She joined the faculty at UNC in 1979 and rose through the ranks to professor and associate dean.

Pat pioneered the use of the basidiomycete Coprinopsis cinerea as a model for study of chromosome behavior in meiosis. Meiosis occurs synchronously in this mushroom. With her collaborators, Pat developed DNA-mediated transformation in Coprinopsis, and she headed the genome project that produced the sequence assembly of the 13-Mb genome. These analyses revealed that sub-telomeric hot spots for meiotic recombination are also the sites where chromosome synopsis initiates.

In addition to her research, Pat transformed undergraduate education at UNC. Pat was the founding director of the Office of Undergraduate Research (OUR), which promoted independent research for undergraduates in all disciplines. In addition to the ASCB Bruce Alberts Award, Pat received two UNC awards for excellence in undergraduate teaching: the Tanner Award and a Bowman and Gordon Gray Associate Professorship. She was also a founding editor of the Genetics
Education section of *GENETICS* (1999-2012).

We have lost a talented researcher, educator, administrator, and friend who enriched the lives of many and made significant contributions to multiple aspects of cell biology.

**References**


member gifts

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Thank you to our recent donors to the ASCB Partnership Initiative. Their generous donations help to support ASCB’s programs and services.

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Q: What do a poster presenter traveling to the ASCB|EMBO Meeting, a researcher funded by the National Institutes of Health, and a fifth-grade student have in common?

A: They all benefit from programs supported by your donations.

To support programs ASCB depends on income from a variety of sources including dues, journals and meeting revenue, and individual donations. We use donations to help support travel awards to the ASCB|EMBO meeting, our advocacy work in Congress that gets scientific issues in front of policy makers, and science outreach in communities around the world, as well as so much more.

When you donate you choose what programs your gift will support including:

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- Or opt for “Where need is greatest” to help us across all of these areas.

I hope that you will consider making a donation before the end of the year. If you are ready to take the step and donate to ASCB you can make your donation at www.ascb.org/donate.

Thank you for your support!

Erika Shugart
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