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What We Wish We Knew
by w. mark leader, editor

Forty years ago at the University of North Carolina, Chapel Hill, I attended Albert Harris’ course “Unsolved Problems in Cell Biology.” That was a long time ago, and I remember only one of the problems we considered. But I do remember enjoying the approach, a sort of tour of the leading edges of cell biology research with a focus not on what we knew but on what we (frustratingly) didn’t know.

So for this issue of the Newsletter, which has as its theme the very broad topic of Science, we asked several prominent ASCB members to answer the question, “What do you think is the most important unsolved problem in cell biology?” Of course almost any ASCB member could provide a thoughtful answer to that question, and I apologize if your viewpoint or even your entire field of study is not represented here. But we are fortunate that four members have shared their thoughts on the matter in the feature articles for this issue. George Langford wonders why and how microvilli translocate in the membrane lipid bilayer. Tim Mitchison contemplates “reverse engineering,” the challenge of progressing from a list of components and individual molecular functions to an understanding of emergent behavior and physiology of cells. Meng Wang explains why visualizing metabolites at a subcellular level and understanding spatial dynamics of metabolite actions remain unresolved challenges in cell biology. And Yukiko Yamashita discusses germline immortality. Whatever your own area of interest, I’m sure you will find these essays stimulating.

What is the one unsolved problem I can recall from long ago? The generation of antibody diversity. We know a lot more about that now, reminding us that even the most stubborn questions can be answered in time.

On the Cover: TIRF-SIM (Total internal reflection fluorescence structured illumination microscopy) live cell imaging of rat pancreatic beta cells (INS-1 832/13) transiently transfected with mRuby-LifeAct. The 3D kymograph in the bottom image shows the growing tip of a filopodium as it moved side-to-side over the 7.5-second time-lapse sequence. The Matlab function to generate 3D kymographs was written by Eric Wait, Advanced Imaging Center, HHMI Janelia Research Campus. Image courtesy of Torsten Wollert, Syracuse University.
Jean M. Sanger, professor in the Department of Cell and Developmental Biology at SUNY Upstate Medical University, was recently selected to be a Fellow of the American Association of Anatomists. She was also elected to be a Fellow of the American Association for the Advancement of Science Section on Biological Sciences “for distinguished contributions to Cell Biology, especially in imaging cell division, assembly, and maintenance of myofibrils, and the interactions of infectious bacteria with host cells.” She was elected as an ASCB Fellow in 2017 and has been a member of the Society since 1977.

A. Malcolm Campbell, the Herman Brown Professor of Biology at Davidson College, was recently selected by the National Association of Biology Teachers to receive the Four-Year College & University Biology Teaching Award. Campbell is the director of the James G. Martin Genomics Program and founding director of Davidson’s Genome Consortium for Active Teaching.
Professional Societies, Who Needs ’Em?

By Andrew Murray

You’re a hip graduate student looking at the latest installment of PhD Comics and checking your Twitter feed to find today’s hot takes on the role of the actin cytoskeleton in reprogramming somatic cells when your PI walks in and distracts you. Instead of asking what IMHO stands for or what a meme is, she wants to know why you’ve let your ASCB membership lapse. Simple, you reply, I went to the ASCB|EMBO meeting last year and found a fantastic lab that I will join as a postdoc, I’m writing up and getting ready to graduate, and I just don’t have the time, energy, or liver strength to go to this year’s meeting, much as I would like to see what our capital will look like during next year’s government shutdown.

You tell your PI that you understand that in the dark ages when she was a student and postdoc and there weren’t even cell phones or personal computers, she went to ASCB every year and that the people who saw her posters and listened to her talks had an enormous influence on her science and career. Those ancient stories are charming, but this is the 21st century and most of your peers can text and surf faster than they can speak and have ways to navigate the infosphere and scientific culture that don’t require them to take long plane rides breathing recycled air.

“Not so fast” goes your PI, and as the newly minted President of the society that you’ve just lapsed from, I’m right behind her. You’re right in thinking that the existence of the Web and the vast amount of information and opinion that it stores has changed how scientists access information, that you may never enter a library again, and that your problems are more about processing information than they are about finding it. But paradoxically, all that overload and excess of opinion over information might mean that you need ASCB and other professional societies even more than your PI did back in the halcyon days when she and I had to sit in the bowels of musty libraries to read papers in the yellowing back issues of journals that didn’t even have diverting advertisements.

So on her behalf, I’m going to list six different things that ASCB (and other scientific societies!) do for their members.

**ASCB Talks to Congress**

The first is that ASCB represents scientists’ views to the elected officials who propose and vote on the legislation and budgets that control how science is funded and regulated. We have a Public Policy Committee that just produced an impressive white paper on research on organoids. Every spring members of ASCB’s Council and committees go to Washington and meet the staff members who advise our senators and representatives and urge them to support science.
This spring we did three things: We thanked them for their unstinting support of biomedical research and the National Institutes of Health (NIH) budget, we told them that immigration is a critical issue because the global progress of science depends on free movement of scientists between countries, and we alerted them about an innocuous-sounding piece of legislation (HR 70) that would have dramatically slowed the appointment of scientists to the study sections that review and advise on funding decisions on research grants from NIH. You, too, could be part of this effort. Last year, Rocio Gomez, who is a member of COMPASS (COMmittee for Postdocs And Students), was one of the ASCB members who participated.

Sure, you say, a bunch of ancient cell biologists get to talk to even more ancient politicians, but where’s my chance to break the national gridlock? There are three problems with your response. The first is that there’s not that much congressional gridlock on the importance of biomedical research: The two politicians who’ve done the most to increase the NIH budget over the last few years are Republicans, Tom Cole from the 4th congressional district in Oklahoma (a member of the Chickasaw nation and a fifth-generation Oklahoman) and Roy Blunt, the senior senator from Missouri. The second is that the staffers are your age and are as smart and committed to their jobs as you are to your research. The third is that ASCB is committed to being transparent and inclusive: We welcome our members to nominate themselves to serve on our committees, of which one of the most active and exciting is COMPASS. That means that unlike me, who spent my time as a student and postdoc doing experiments and occasionally moaning about how little management cared about the workers toiling at their benches, you can play an active part in the discussion about where science in general, and cell biology in particular, should be going.

**MBoC Publishes Outstanding Work in Cell Biology**

The second thing that ASCB does is to publish a journal, *Molecular Biology of The Cell (MBoC)*, that features outstanding work in cell biology. Founded on the principle of “Is it new and is it true?” *MBoC* is dedicated to the idea that our Society should publish interesting, rigorous papers that advance our knowledge of cell biology. Counting me and ASCB’s President-Elect, Eva Nogales, the five most recent presidents of ASCB have published 33 research papers and 5 reviews or commentaries in *MBoC*. While ASCB is strongly opposed to the idea that impact factors (roughly speaking, how many times a paper gets cited by other papers in a given period) are a useful judgment of a journal’s worth, you might be surprised to know that the average number of times those 33 research papers have been cited is 47, which is more than many of the papers that appear in the “big three” biology journals (*Cell*, *Science*, and *Nature)*!

**ASCB Informs the Public**

The third thing that ASCB does is outreach, helping to inform the public about what we scientists do. You might not know this yet, but this year’s NIH budget is $37.3 billion dollars. In a nation of 329 million people, that means $113 for every child and adult in the United States. The next time someone at a party asks you what you do, you can say “I’m a money launderer.” And when they ask you “Who’s money?” you can answer “Yours!” and if that doesn’t interest them in what you do for a living, I’ll be surprised. Through its Public
Information Committee, ASCB gathers information to put on our website to explain to the general public what we’re doing with their money, both to understand the fundamental mysteries of life and to try and use what we learn to improve human health and reduce suffering. Through a grant from the Simons Foundation, ASCB sponsors small, member-initiated outreach projects that bridge the gap between scientists and the public.

**ASCB Can Help You Find a Fulfilling Career**

Our fourth area is professional development. At the annual ASCB|EMBO Meeting, on our website, and through courses we run, ASCB helps its members develop the skills and connections that will help them find and pursue fulfilling careers. We recognize that most PhD students and many postdocs aren’t going to be running labs at research universities, and we are committed to helping you find attractive and fulfilling careers that use the training you’ve gotten in how to produce, marshal, argue from, and make informed decisions on the basis of evidence.

**ASCB Helps Build the International Research Community**

Number five is the international scientific community. As much as the Olympics, science is an international activity. Knowledge belongs to humanity, not individuals or countries, and we scientists work together to add to what we know and use that knowledge to try and make a better world. The last two and the next annual ASCB meetings have been organized jointly with the European Molecular Biology Organization (EMBO), a transnational scientific organization that is funded by the European Molecular Biology Conference, which consists of 30 countries that are in or neighbor the European Union. ASCB is working hard to recruit members from other parts of the world and engage with national scientific societies to build international scientific partnerships to increase scientific dialog, interactions, and migration of scientists across the globe.

**ASCB Sponsors the Ultimate Jamboree for Cell Biologists**

And finally, at number six, comes our flagship activity, the annual ASCB meeting. Yes it’s huge, yes there are concurrent activities, yes you can’t look at more than a tiny fraction of the 2,494 posters, and yes you can get in your daily 10,000 steps by just walking back and forth through a convention center that is bigger than an aircraft hangar, but this is the ultimate jamboree for cell biologists, and since all of biology revolves around the activities of cells, biologists in general. You do need to get organized before you go, but if you’re a graduate student, you can contact people who you want to come look at your work or talk to about postdoc positions; if you’re a postdoc you can ask people on search committees to look at your poster or listen to your talk; if you’re a faculty member you can explore potential collaborations; and everyone can track down and catch up with friends and colleagues from their previous stops on the science circus, catch up with the latest developments in their field, and learn about new methods, instruments, and areas of research that they didn’t even know existed until they mistook one Minisymposium for another! In 10 years’ time, improvements in virtual communication, like the evolution of a third and fourth thumb, may have eliminated big meetings, but until then they remain an unparalleled way to visit the global village that is science and mingle with colleagues from near and far.

I close my first column by asking for two favors. If you did let your membership lapse, please renew it or ask your generous PI to renew it for you. And if you didn’t let your membership lapse, ask a colleague who did, or who never even thought of joining ASCB, to race his or her eyes across this column.
Ligand sensing structures like microvilli translocate in the plane of the plasma membrane. What is the functional significance of this and what are the mechanisms of force production and structural integrity?

Many different types of cells in the intact organism elaborate cell membrane protrusions for a variety of functions. Neuronal cells, for example, produce mushroom-shaped spines that function as sites of synapse formation on the surfaces of the dendrites. Pancreatic beta cells and T cells produce microvilli that function as sites of ligand sensing. These tubular protrusions contain a dense core of actin filaments that function to generate force and maintain the membrane deformation. In addition, these tubular membrane compartments contain specific protein complexes involved in signaling cascades that serve to initiate downstream processes such as long-term potentiation in neurons and glucose-stimulated insulin secretion in pancreatic beta cells.

Interestingly, in most cell types, these membrane protrusions have been shown to be motile, i.e., they have the ability to translocate in the plane of the membrane. In the case of microvilli on pancreatic beta cells, the movement is directed and occurs over distances that are several times the diameter of individual microvilli. These observations raise important questions: What is the functional significance of this motility, what is the mechanism of movement, and how is structural integrity of microvilli maintained?

These questions touch on a variety of important problems in cell biology including cytoskeletal–membrane dynamics and ligand sensing at the cellular level. The microvillus represents a structural unit that has the ability to translocate in the fluid lipid bilayer. Membrane fluidity at the junction between the microvillus and the plasma membrane becomes important for movement of the microvillus as an integral unit. These unanswered questions have profound implications on how we understand the sensory function of structures like microvilli and how we design studies to understand complex diseases like type 2 diabetes.

Why are these structures motile? One obvious answer is to improve search efficiency for ligands or binding partners that may exist at low concentrations. Microvilli on rat islet beta cells are hot spots for GLUT2, the high-K_m glucose facilitative transporter, and therefore represent the primary sites for glucose sensing and uptake. To definitively demonstrate that movement represents an efficient search strategy...
for ligands, one has to record the dynamics of these structures in real time in living cells at sufficient spatial and temporal resolution and with multicolor fluorescent markers of membrane and cytoskeletal components to capture the membrane and cytoskeletal dynamics.

Imaging techniques are improving at a rapid rate, but a significant gap exists between the super resolution (SR) techniques that rely on fixed specimen and those that have the ability to image living cells in real time. Total internal reflection fluorescence structured illumination microscopy (TIRF-SIM) is one SR technique that has the advantage of imaging live cells far faster and with orders of magnitude less light than is required for other forms of SR fluorescence microscopy. However, the resolution achieved with TIRF-SIM is limited to a 2-fold gain beyond a conventional fluorescence microscope, or ~100 nm with visible light. This improvement in resolution is sufficient to image microvilli that average 150 nm in diameter, a size that is difficult to detect without SR capability. Nevertheless, the spatio-temporal resolution of TIRF-SIM is not sufficient to capture the full range of dynamic changes that occur in the subsecond time frame and in the sub-100-nm size domain.

Betzig and colleagues developed a technique called patterned activation nonlinear SIM (PA NL-SIM) that extends TIRF-SIM to the sub-100-nm spatial domain by exploiting the spatially patterned activation of a reversibly photoswitchable fluorescent protein to reach 45- to 62-nm resolution at subsecond acquisition. Consequently, they were able to acquire substantially more frames at an improved signal-to-noise ratio by this technique.

The improvement in spatio-temporal resolution achieved by PA NL-SIM is of great benefit to such studies, but this imaging modality is not currently available commercially. One of the best commercially available systems for live cell imaging that has high temporal and enhanced spatial resolution approaching that of TIRF-SIM is the Airyscan system by Zeiss. The Airyscan uses laser scanning confocal imaging to achieve enhanced resolution at a framing rate of 15 frames/sec with minimum photobleaching. The Airyscan technology improves the spatial resolution and signal-to-noise ratio by exploiting a combination of the equivalent of confocal imaging with a 0.2-Airy unit pinhole setting, Wiener filter-based deconvolution, and the pixel reassignment principle. However, as with TIRF-SIM, the Airyscan fails to achieve the level of resolution required for these
studies. The ability to track the motile behavior at subsecond resolution with sufficient spatial resolution remains a stumbling block and makes it difficult to conduct the motion analysis required to determine conclusively that movement of microvilli represents an efficient search strategy. Recent studies using time-resolved lattice light-sheet (LLS) microscopy and quantum dot–enabled synaptic contact mapping microscopy have shown that microvilli moving on T cell surfaces engage in a search and detection strategy that functions to improve the efficiency of ligand detection by T cells. Therefore, microvilli motility appears to function to increase efficiency of ligand detection as shown by these studies.

SR fluorescence microscopy remains the method of choice for nanoscale imaging of protein dynamics in living cells. As new, enhanced resolution systems become available commercially, studies like these that require long-term imaging of living cells will benefit greatly and push this important field of research forward.

References

About the Author
George M. Langford is Distinguished Professor at Syracuse University.
Molecular biology conceptualizes biology through the chemistry of individual macromolecules or discrete complexes. Cell biology is fuzzier. It conceptualizes through the biology of cells, and its molecular arm focuses on ensembles within or between cells where multiple macromolecules act collectively to build some assembly and execute some process. The membership and spatio-temporal boundaries of these ensembles are often poorly defined and subject to change. Even when we have a reliable parts list, we are still deeply challenged to understand the emergent behavior of dynamic ensembles that involve multiple macromolecules, particularly those that are built from weak bonds and dissipate energy. I will use the term “reverse engineering” to refer to the challenge of progressing from a list of components and individual molecular functions to an understanding of emergent behavior and physiology.

Mitotic spindle assembly has long been a paradigm for self-organization and collective action (Figure 1A). Using microscopy to measure dynamics and defects caused by loss of single proteins, the field was able to build a rough molecular picture of spindles in the 1990s and 2000s. But I don’t think we grasped the conceptual heart of the problem. Mathematical models helped, but they tended to make untested assumptions and had trouble dealing with three-dimensional organization. We now know all the proteins involved in mitosis, and something about their functions, but much is still missing at the conceptual level. This year my group will report the concentration and spindle/cytoplasm ratio of all spindle proteins based on mass spectrometry. This is a step forward, but how will we progress from even a quantitative list to a deep understanding of assembly principles, steady-state dynamics, emergent mechanics, and response to perturbation? How will we reverse engineer the spindle proteome? I’m excited by a recent paper from Thomas Surrey’s group1 where the transition between monopolar and bipolar spindle organization was reimagined as between polar and nematic networks, reconstituted with two key proteins (tubulin and Kif11) and analyzed with a physically plausible model. This is a step forward in understanding a central emergent behavior, but it’s still unclear how we will reverse engineer the full complexity of the spindle.

A different area where my group has been profoundly challenged to understand collective action is in signaling biology and its connection to pharmacology. Figure 1B conceptualizes the system. To understand how cells respond to drug-induced perturbation of microtubules we cast a broad net, measuring time-dependent changes in protein phosphorylation and gene expression using “omics” technology. We observed thousands of phosphorylation sites and hundreds of genes changing in response to a drug (solid green arrow). These data revealed the existence of complex networks of control pathways that orchestrate the drug response (grey text). Our challenge is reverse engineering
the measurements to decipher these networks, and progress is currently halted at the red cross in Figure 1B. We don’t know how to distinguish significant signals from noise, or how to organize the data into coherent pathways and input–output relationships. We are trying to understand how the cell “thinks,” and we have many relevant measurements, but not the tools and concepts needed to solve the problem. The same questions can be asked of any drug, or indeed any physiological input.

From a disease treatment perspective, perhaps we don’t care about the details of collective action implied in the grey central box in Figure 1B. We just need drugs that work. Maybe we can use genetics, with its awesome simplifying power, to cut straight from molecular perturbation to phenotypic response, ignoring the complexity in between. But that attitude dodges our fundamental responsibility as cell biologists. Molecular perturbations ripple outwards through the cell, perturbing an interconnected network of signaling pathways and genes. One of those ripples might unexpectedly amplify into a tsunami that dominates the drug response. Responses often differ between disease models or species for unclear reasons, which makes drug discovery difficult and failure-prone. Currently, it’s almost impossible to predict the effect in the human body of a drug with a new mechanism. I am convinced that the way cells and organs “think” is not impossibly complex, there will be logic and predictability once we know how to find it, and that knowledge will make drug discovery more predictable. I see this as another challenge in reverse engineering the collective action of macromolecules.

Reference
A cell is a bustling factory carrying out hundreds if not thousands of chemical reactions concurrently. These reactions are compartmentalized into different organelles within the eukaryotic cell and generate specific chemical products with unique functions. Collectively, these chemical products are called metabolites and are direct indicators and vital drivers of cellular activities. In the past decade, advances in chromatography/mass spectrometry–based and nuclear magnetic resonance spectroscopy–based metabolomics have not only been rapidly expanding the list of metabolites but have also enabled analytical quantification of metabolites in different biological samples and linked changes in their levels to a variety of diseases and health issues. Despite the ever increasing power to identify more and more metabolites biochemically, visualizing metabolites at a subcellular level and understanding spatial dynamics of metabolite actions remain unresolved challenges in cell biology.

Spatial partitioning of metabolic functions is a phenomenon fundamental to life, and these partitions constitute a hierarchy ranging from organs to cells to subcellular organelles. “Where you are is who you are” definitely applies to biological molecules, including metabolites. Many of these metabolites exhibit unique distribution patterns among different organelles in the cell, and their spatial specificity contributes to their functional specificity. First of all, the spatially restricted production of metabolites specifies organelle functions, and is in turn highly sensitive to changes in these functions. As a result, specific metabolites derived from different organelles serve as direct mediators of organelle activities. Second, exchanging metabolites between organelles is a crucial means of metabolic coordination and a key facet of organelle interplay. Last, metabolites can traffic away from their production site and cooperate with other factors to drive signal transduction and transcription responses. Mislocalization of metabolites can disrupt cellular homeostasis, leading to functional decline and deficits. Thus, resolving the spatial distribution of metabolites in vivo is essential for understanding cellular mechanisms governed by metabolites and for revealing pathological mechanisms underlying metabolic disorders.

Richard Feynman said “to answer many of these fundamental biological questions, you just look at the thing!” It is true that advances in microscopic techniques have been transforming the way we study biology, especially cell biology. Nowadays, we can image specific proteins at unprecedented resolution, and the Cell Atlas has mapped over 12,000 proteins at a single-cell level to subcellular structures. Metabolite imaging, on the other hand, is lagging far behind. Direct visualization using fluorescence...
Microscopy is applicable to only a handful of metabolites that intrinsically emit fluorescence, like NADH/NADPH. For non-fluorescent metabolites, one way to detect them is to use fluorescent protein and RNA sensors. These genetically encoded sensors can bind to specific metabolites and undergo conformational changes to generate fluorescent signals. The labeled metabolites can then be visualized at a subcellular level using fluorescence microscopy. Although fluorescent sensors are powerful tools for revealing the spatial distribution of metabolites in living cells, only a small number of sensors have been generated and their selectivity is influenced by a highly complex cellular environment. On the other hand, Raman chemical imaging techniques do not require labeling and can directly visualize metabolites in living cells at a subcellular level. This technique targets metabolites based on their chemical structures, and offers high detection specificity independently of cellular environment. However, when metabolites lack characteristic chemical features, distinguishing them using Raman imaging can be difficult. Mass spectrometry imaging (MSI) is another way to visualize metabolites directly. Although not applicable to living cells, MSI can detect many types of metabolites in a single scan with unprecedented specificity and sensitivity. By reducing the laser spot size using a pinhole or laser-focusing optics, the spatial resolution of MSI can now reach down to ~5 µm, about the size of a red blood cell. But this resolution is incapable of localizing metabolites to subcellular structures.

Facing this challenge, others and we are working to improve the capacity, selectivity, sensitivity, and resolution of metabolite imaging with current technologies. At the same time, new techniques may emerge that will tackle this problem from a very different angle, or as Sydney Brenner said, “Progress in science depends on new techniques, new discoveries, and new ideas, probably in that order.” Making invisible metabolites visible and mapping a cell atlas of the metabolome will open new avenues to understand the active role these molecules play in organelle interactions, cellular signaling, and epigenetic regulation, and their vital contributions to health and diseases.

About the Author
Meng Wang is Howard Hughes Medical Institute Investigator and holds the Robert C. Fyfe Endowed Chair on Aging in the Department of Molecular and Human Genetics and the Huffington Center on Aging at Baylor College of Medicine.
True mysteries often lie in something that we take for granted. One such mystery in biology that remains almost entirely unaddressed is germline immortality. Each of us, as a multicellular organism, was once two germ cells (one from our mother, the other from our father), each of which was once two germ cells in our grandparents, each of which was once...... Throughout this journey of the germ cells, they never died or senesced. And the implication of this, although obvious once stated, is that the very existence of each of us can be tracked back to the gonad of somebody (something) that was not Homo sapiens or even a mammal, but something like a choanoflagellate.

This magical process is vaguely called “rejuvenation” or “resetting,” but we know essentially nothing about how this can happen. Currently, the idea of rejuvenation/resetting is discussed mostly in the context of epigenetics and conferring totipotency to zygotes at the beginning of each generation, by resetting the memories of cells and preparing the genome for a new start. However, we know that the materials that constitute our genome and cells are not resistant to damage or decay; cells can accumulate many forms of damage to their genomes and the cellular components, and this damage normally leads to cellular aging/senescence. Such damage includes mutations and damaged proteins. Therefore, germ cells must have mechanisms to reset or eliminate this damage.

Critically, these mechanisms must be somehow harmful or unaffordable for somatic cells or individual organisms. Otherwise, I would imagine that evolution might have found a way to reset every single somatic cell to create an immortal animal that can reproduce forever. In sum, I consider the germline’s ability to rejuvenate every single generation, as it is passed from one generation to the next, to be the most fascinating unsolved question in biology.

I am often asked why I study germ cells, a nonessential cell type not required for human health. Although germ cell biologists can snap back or respectfully disagree (whichever they prefer) by saying, “Without germ cells we’ll all be extinct fairly soon,” I wonder that being nonessential might be the very job of germ cells. Germ cells are dispensable for organismal survival, whereas somatic cells are not. There are lots of things a cell can do only when it is nonessential. I imagine two strategies germ cells could take to support their immortality, grounded on their dispensability. First, germ cells could be extremely picky about their quality control and discard any subpar cells via cell death. In this manner, the germline could protect its genome by selecting a “precious few,” while trashing anything that does not meet the highest standard. Such an approach would not be affordable for somatic cells, because development and maintenance of multicellular organisms require concerted actions of somatic cells, and therefore
somatic cells’ logic will be skewed more toward survival.

Being nonessential may further allow germ cells to rejuvenate by a means that cannot be explained purely by selection. “Selection of the least damaged” described in the previous paragraph is not an active process and can only passively protect the germline from damage. However, such selection cannot counteract damage and decay that occurs to all cells, and even the least damaged cells/genomes will soon be too damaged to move on. Therefore, germ cells must have some active mechanisms that truly removes damage and rejuvenates the cells/genomes. Again, I wonder if germ cells’ dispensability (for organismal survival) might be the key. For example, after investing two cells’ worth of material, cells could divide asymmetrically segregating all “good” components into one cell and all the “bad” ones into the other cell. This would lead to one rejuvenated cell and the other, bad cell, which could be sacrificed if it is too bad because germ cells are not supporting organismal survival. Again, somatic cells might have a limited capacity to do this, because they have critical functions to perform to keep the organism alive.

These are pure speculations of mine on the mechanism of germ cells’ immortality, which may be a hilarious misconception in the eyes of future biologists. However, the very fact that these speculations might be embarrassingly wrong reveals how little we know about the immortality of germ cells.

About the Author
Yukiko M. Yamashita is James Playfair McMurrich Collegiate Professor of the Life Sciences and a Howard Hughes Medical Institute Investigator at the University of Michigan, Ann Arbor.

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An ASCB Regional Meeting
May 31, 2019, University of Georgia, Athens, 9:00 am–6:30 pm
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EARLY CAREER SCIENTISTS

Early Career Life Scientist Award
Who is Eligible: An outstanding scientist who has served as an independent investigator for no more than seven years as of May 15.
Winner receives: Plaque, $1,000, meeting registration, economy airfare, up to four nights’ hotel, up to four days per diem, and gives a Minisymposium talk at the ASCB|EMBO Meeting.

WICB Junior Award for Excellence in Research
Who is Eligible: A woman in an early stage of her career (within seven years of appointment to an independent position at the nomination deadline).
Winner receives: Plaque, $1,000, meeting registration, economy airfare, up to four nights’ hotel, up to four days per diem, and gives a Minisymposium talk at the ASCB|EMBO Meeting.

MID-CAREER SCIENTISTS

WICB Mid-Career Award for Excellence in Research
Who is Eligible: A woman at the mid-career level (7–15 years in an independent position at the nomination deadline).
Winner receives: Plaque, $1,000, meeting registration, economy airfare, up to three nights’ hotel, and gives a Minisymposium talk at the ASCB|EMBO Meeting.

ESTABLISHED SCIENTISTS

ASCB Fellows
Who is Eligible: All Regular and Emeritus members may nominate two of their colleagues or self-nominate. Fellows must have been an ASCB member for at least 10 of the past 15 years and a scientist whose research has had a significant and sustained impact on the field of cell biology.
Winner receives: Plaque and pin and acknowledgment before the ASCB|EMBO Meeting Keynote.

E.B. Wilson Medal
Who is Eligible: An individual who has demonstrated significant and far-reaching contributions to cell biology over a lifetime in science.
Winner receives: E.B. Wilson Medal, meeting registration, economy airfare, up to four nights’ hotel, and up to four days per diem, and gives the E.B. Wilson Lecture at the ASCB|EMBO Meeting.

ASCB Prize for Excellence in Inclusivity
Who is Eligible: An individual who has made an impact by encouraging a diverse workforce and creating an inclusive environment through mentoring, cultural change, outreach, or community service.
Winner receives: $5,000 to further inclusion activities, is featured in a video at the ASCB|EMBO Meeting Keynote, is featured in an article in the ASCB Newsletter, and contributes an essay in MBoC.

Sandra K. Masur Senior Leadership Award
Who is Eligible: A woman or man at a later career stage (generally full professor or equivalent) whose outstanding scientific achievements are coupled with a record of active leadership in mentoring both men and women in scientific careers.
Winner receives: Plaque, $1,000, meeting registration, economy airfare, and up to three nights’ hotel to attend the ASCB|EMBO Meeting.

GRADUATE STUDENTS AND POSTDOCS

ASCB Porter Prizes for Research Excellence
Who is Eligible: Graduate students and postdocs.
Winner receives: $2,000 for outstanding predoctoral research and $4,000 for outstanding postdoctoral research, plaque, dinner with the Porter lecturer, travel costs of up to $1,000, and give Minisymposium talks at the ASCB|EMBO Meeting.
Deadline: July 15; abstract submission required first.

Merton Bernfield Memorial Award
Who is Eligible: An outstanding graduate student or postdoctoral fellow (at the time of nomination) who has excelled in research.
Winner receives: Plaque, $1,000, meeting registration, economy airfare, up to four nights’ hotel, and up to four days per diem and gives a Minisymposium talk at the ASCB|EMBO Meeting.
Deadline: July 15; abstract submission required first.

UNDERREPRESENTED MINORITIES

E.E. Just Lectureship
Who is Eligible: An underrepresented minority scientist who has demonstrated outstanding scientific achievement.
Winner receives: Plaque, medal, and up to $1,800 to attend the ASCB|EMBO Meeting and gives the E.E. Just Lecture.
Deadline: July 15; abstract submission required first.

EDUCATORS

Bruce Alberts Award for Excellence in Science Education
Who is Eligible: An individual who has demonstrated innovative and sustained contributions to science education, with particular emphasis on the broad local, regional, and/or national impact of the nominee’s activities.
Winner receives: Plaque, meeting registration, economy airfare, and up to three nights’ hotel and gives a talk at the ASCB|EMBO Meeting.

DISTINGUISHED INDIVIDUALS OUTSIDE ASCB

Public Service Award
Who is Eligible: An individual who has demonstrated outstanding national leadership in support of biomedical research.
Winner receives: Certificate and is featured in a video at the ASCB|EMBO Meeting Keynote.

Letters of support should explicitly address whether a nominee’s professional conduct over his or her career embodies the principles and expectations noted in ASCB’s Mission Statement, the Anti-Harassment Policy, and the Workforce Diversity Statement.
Do you want to help shape the ongoing revolution in scientific communication? If so, the ASCB seeks an innovative, forward-thinking leader with a bold vision for the future of publishing and data sharing. As Editor-in-Chief (EiC) for the journal *Molecular Biology of the Cell (MBoC)* the ideal candidate will work with the ASCB to lead us through a period of transformative change and help to create a new paradigm to shape the future of scientific publishing. The new EiC must be committed to raising the profile of the journal and the Editorial Board, but will be free to pursue new ideas in peer review and publishing outside of historical confines.

As the primary research publication for the ASCB and a core journal for the cell biology community, *MBoC* is an ideal platform to pursue a new vision for high-quality, high-profile peer review and scientific publishing. *MBoC* already has a history of innovations. These include: offering open access of manuscripts upon acceptance and of final articles two months post-publication; creating a new manuscript transfer network with the *Journal of Cell Biology* and the *Journal of Cell Science*; and developing special topical editions on quantitative cell biology, forces on and within cells, and stem cells.

Leadership functions of the EiC include:

- Work with the ASCB Council and its Executive Committee to develop policies and new paradigms related to peer review and scientific publication;
- Work with the ASCB leadership and Editorial Board members to develop and implement ideas for raising *MBoC*’s profile and its benefits to the cell biology community;
- Advocate for the interests of both readers and contributors by ensuring that *MBoC* offers a fair, fast, and thorough review process that provides a clear and constructive decision;
- Recruit and engage Editorial Board members.

The ideal EiC will be:

- Forward thinking
- Innovative
- Organized
- Energetic, motivated, and motivating
- A leader in the cell biology community

The EiC position is an independent contract position supported by a stipend and by staff at ASCB. The five-year term will begin January 1, 2020, with the expectation that the successful candidate will become involved with the journal in July 2019 in order to overlap with the present EiC, David Drubin, who will be stepping down at the end of his second term.

To self-nominate or nominate someone for this position, please send a statement of interest and the candidate’s CV to ascbinfo@ascb.org with the subject line *MBoC* EiC nomination.
Council members gathered on December 7, 2018, in San Diego prior to the start of the 2018 ASCB|EMBO Meeting. The Society’s governance structure, the future of peer-reviewed publishing, and new programming for annual meetings were among the topics that generated lively discussion. The Council also thanked 2018 Society president Jodi Nunnari for her service and welcomed incoming President Andrew Murray and President-Elect Eva Nogales.

Over the next few months, the Council will be working with Michael Gallery of OPIS Consulting to examine the effectiveness of the Society’s governance structure. A Governance Task Force developed a list of 16 performance requirements to be evaluated. Performance requirements describe an ideal approach to how the Society should be governed. The Council tweaked and then approved those requirements. Some of these requirements state that the structure of the Society enable inclusiveness and broad participation, that the Council members reflect the diversity of the membership, that the decision-making process be transparent and systematic, that Council members be actively engaged and accountable, and that the budget be aligned with the strategic plan, among several others. The Governance Task Force will then work with Gallery to compare the Society’s current structure with what it should be based on the approved performance requirements. Gaps in performance will be identified and solutions suggested, which will be submitted to the Council the next time it meets.

Lead by ASCB’s Director of Publications, Mark Leader, the Council considered the future of peer-reviewed publishing in light of the “Plan S” initiative recently posited by the organization Science Europe, the European Research Council, the European Commission, and funders. Under Plan S, by the year 2020 researchers who receive public funding may have to publish in journals that provide immediate open access. While many Councilors recognized that such a move would increase the flow of scientific data and enhance collaboration across disciplines and borders, it certainly impacts the subscription model of many journals, including ASCB’s own *Molecular Biology of the Cell* (*MBoC*). Furthermore, the current editor-in-chief of *MBoC*, David Drubin, will be stepping down at the end of 2019, so the Council noted that it would need to find a new leader for the journal who would be able to face the challenges of the rapidly changing landscape of scientific publishing.

Council approved the scientific program for the 2019 ASCB|EMBO meeting, which will take place in Washington, DC, December 7–11, 2019. The program was developed by Elly Tanaka, senior scientist at the Research Institute of Molecular Pathology in Vienna, Austria, and Sue Jaspersen, associate professor of Molecular and Integrative Physiology at the University of Kansas School of Medicine. In addition to the scientific program, the Council brainstormed seven possible scientific threads (or tracks) that will run through the Annual Meeting programming.
beginning with the 2020 meeting and for three years after that. The threads will be aimed to encompass the many facets of cell biology and to recognize how they are interconnected.

The Council heard reports from the various committees. Among the highlights was a presentation by Brian Thiel, ASCB’s new Director of Membership, who described the structure of online communities for members, set to launch sometime in the second quarter of 2019. The ASCB members-only online communities will serve as a platform for networking, support, and relationship building among participants. Also, ASCB’s “Improving Diversity and Career Transitions through Society Support” IPERT grant from the National Institutes of Health was funded in the fall of 2018 for three million dollars over five years, and Minorities Affairs Committee (MAC) co-chairs Franklin Carrero-Martinez and Verónica Segarra reported that the committee has begun organizing and implementing how those funds will be used. MAC also discussed the outcomes of its Career and Diversity Member Survey. MAC and the Education Committee will be working together on a project, as outlined in the “Declaration of Effective and Inclusive Education,” which was approved by the Council.

New ASCB Committee Chairs, Co-Chairs, and Committee Members Approved by the Executive Committee

With the exception of members of the Nominating Committee, who serve one-year terms, the other committee members will serve three-year terms beginning in 2019.

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MBoC, JCB, JCS to Offer Manuscript Transfer Option

When a manuscript submitted to one of the participating journals is declined, the journal editor may offer the authors the opportunity to transfer their manuscripts and reviewer comments between journal manuscript submission systems. Authors will be given the option to update their manuscript files prior to resubmission. This new feature is aimed at limiting the time a paper spends in peer review and to provide quick, concise, and informed editorial decisions.

“Everyone will benefit from this new transfer process: authors, reviewers, and readers,” says MBoC Editor-in-Chief David Drubin. “It has always been MBoC’s mission to help cell biologists publish their work quickly, and this innovation will eliminate unnecessary re-review of manuscripts. And almost any great cell biology paper can find a home in one of these journals.”

More details will be announced soon.

ASCB Launches New Digital Offerings

By Thea Clarke

By now all ASCB members should be receiving the AI-powered ASCB Newsbrief. Delivered twice-weekly via email, the curated Newsbrief helps you stay current on news and discoveries related to cell biology and your career.

The Newsbrief includes cell biology news from highly credible sources, such as Molecular Biology of the Cell, PNAS, BioRxiv, and the Journal of Cell Biology. As you click on articles to read, the AI learns your reading preferences and increasingly tailors content to match your individual interests. We hope the Newsbrief becomes a valuable go-to resource for all ASCB members.

Other new digital resources coming in 2019 include a new member portal and online collaboration communities. A redesigned website was launched on February 19.
DORA Community Interviews Examine Innovation in Research Assessment

By Anna Hatch

In celebration of last May’s fifth anniversary of the San Francisco Declaration on Research Assessment (DORA), the DORA Steering Committee created a community interview series to provide a space for discussion about how we evaluate researchers, especially in hiring, promotion, and funding decisions. These interviews are an opportunity to connect with organizations and individuals who are innovating in research assessment.

Summaries and audio from our 2018 interviews with Sandra Schmid (University of Texas Southwestern Medical Center), Shahid Jameel (Wellcome Trust/DBT India Alliance), Philip Campbell (Springer Nature), and Christopher Jackson (Imperial College) can be found on the DORA blog (www.sfdora.org/blog).

The series will continue in 2019 to examine new approaches to researcher evaluation. Our first interview, on February 5, focused on the relationship between publishing and assessment in Latin America and featured Dominique Babini, Open Access Advisor, El Consejo Latinoamericano de Ciencias Sociales, and Arianna Becerril Garcí, the Executive Director of Redalyc. Information about upcoming interviews will be made available on the website (www.sfdora.org). They take place online and are free to join.
A Human Cell Atlas Could Soon Be Reality

By Mary Spiro

The Human Genome Project provided researchers with valuable information by identifying and mapping the three billion DNA base pairs and estimated 25,000 human genes that make up the human genetic code. Likewise, cell scientists across the globe are collaborating on the construction of a similarly detailed atlas of all human cells.

Part of that effort is the Human BioMolecular Atlas Program (HuBMAP), a National Institutes of Health (NIH) Common Fund Program that began in 2018 with the aim of mapping human tissues at the individual cell level. Together with an international effort to create the Human Cell Atlas, the HuBMAP platform will bring together data to build detailed and comprehensive biomolecular maps of human tissues. According to HuBMAP program leader Richard Conroy, this information could become the “Google map of the human body atlas.”

“Human bodies have more than 40 trillion cells,” Conroy said. “We want to find out not only which types of cells are there, but how they are organized spatially, and how they vary from person to person and within individuals over time.”

The NIH program is specifically geared toward defining the spatial orientation of cell types. The end result, Conroy said, is to create a baseline of what is normal and what is otherwise a disease state. “Our challenge is: How do we approach this as a coordinated effort across all the PIs and funders to make sure that what we are doing is complementary to one another? How do we make sure we are sampling in the right space and over the course of lifespan?”

The NIH has multiple programs to study different parts of the body, Conroy explained, such as The Brain Initiative® Cell Census Network, The Human Tumor Atlas, and other groups working on mapping cells in the lung, the kidney, and other organs. “HuBMAP is trying to knit these different programs together,” he said.

One benefit that Conroy envisions from all these gathered data is better tissue engineering. Synthesizing data about the vascular system, the lymphatic system, and how tissues are innervated, he says, will elucidate the fundamental principles of how tissues are organized.

The atlases will also take into account the cell cycles of the hundreds of different cell types, how they interact with each other in different environments, and more. These atlases will also address what Conroy referred to as the “dark matter” between cells. “We know there is a complex extracellular environment between cells and we want to know more about what happens in these areas and how important they are,” he added.

By combining the sequencing of DNA and RNA with advanced imaging methods, researchers can obtain both the genetic and the spatial data need to complete initial drafts of the human cell atlas. Conroy says that first drafts could be realized within the next three to five years. “In the last five years there has been an explosion of sequencing and imaging techniques that have enabled this kind of work,” he said.

Conroy and his colleague Ananda L. Roy have published a review of the state of the art on the human cell atlas in Molecular Biology of the Cell. The Perspective, “Toward mapping the human body at a cellular resolution,” can be found in the August 1, 2018, issue.
Highlights from MBoC
MOLEcular BIOLOGY OF THE CELL
www.molbiocell.org

Some noteworthy Features from recent issues

A fruitful tree: developing the dendritic nucleation model of actin-based cell motility
Henry N. Higgs (December 1, 2018)

Turning the microscope on power dynamics in the lab
Sophia C. Tintori (December 15, 2018)

A nostalgic look back 40 years after the discovery of receptor-mediated endocytosis
Sandra L. Schmid (January 1, 2019)

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

Mating in wild yeast: delayed interest in sex after spore germination
Allison W. McClure, Katherine C. Jacobs, Trevin R. Zyla, and Daniel J. Lew (December 15, 2018)
In the wild, yeast mating has been thought to occur between germinating spores. It is now shown that many wild strains exhibit delayed interest in sex following germination, so that mating occurs in microcolonies of haploid cells.

ACVR1R206H FOP mutation alters mechanosensing and tissue stiffness during heterotopic ossification
Julia Haupt, Alexandra Stanley, Claire M. McLeod, Brian D. Cosgrove, Andria L. Culbert, Linda Wang, Foteini Mourkioti, Robert L. Mauck, and Eileen M. Shore (January 1, 2019)
FOP (fibrodysplasia ossificans progressiva), a debilitating and as yet untreatable genetic disorder of ectopic ossification, is due to an activating mutation in ACVR1 (BMP type I receptor). The mutation alters cell mechanotransduction, mechanosensing, and physical properties of lesion tissue consistent with promoting chondro/osteogenic pathways.

Interphase cohesin regulation ensures mitotic fidelity after genome reduplication
Benjamin M. Stormo and Donald T. Fox (January 15, 2019)
Cells that undergo multiple S-phases without intervening division face a chromosome structure problem when returning to mitosis. This study in Drosophila demonstrates that a cohesin exit gate opening pathway plays an important role in preparing genome-reduplicated cells for mitosis. By doing so, mitosis with conjoined chromosomes is prevented.

Actomyosin contractility modulates Wnt signaling through adherens junction stability
Eric T. Hall, Elizabeth Hoesing, Endre Sinkovic, and Esther M. Verheyen (February 1, 2019)
In an in vivo RNAi screen of kinases and phosphatases the authors found that myosin phosphatase regulates Wnt activity. They establish that myosin phosphatase and nonmuscle myosin II activation stabilizes E-cadherin and sequesters β-catenin to adherens junctions, inhibiting β-catenin nuclear localization and transcriptional initiation of Wnt target genes.
About the Image
Super-resolution microscopy (iSIM) image of a heterozygous MEF cell expressing nonmuscle myosin heavy chain 2C-GFP under control of the Myh9 promoter encoding nonmuscle myosin heavy chain 2A, stained with antibodies against nonmuscle myosin (NM) 2A (red) and 2C (blue) together with phalloidin (green, for stress fibers). NM 2C (blue) is more concentrated in the rear-positioned transverse arcs compared with NM 2A. The front transverse arcs contain both NM 2A and 2C. See Mol. Biol. Cell 29, 2326–2335. (Image: Xuefei Ma, Laboratory of Molecular Cardiology, National Heart, Lung and Blood Institute, National Institutes of Health)

How to Submit
Do you have an image you would like to see published here? Please contact Mark Leader at mleader@ascb.org.
1. Attendees enjoying the popular bean bag chairs
2. Elevator Speech finalists
3. Origami microscopes, called Foldscopes, are a crowd favorite
4. Foldscope creator Manu Prakash
5. Keynote speaker Sean Morrison
6. A jubilant Jodi Nunnari, ASCB President, opens the 2018 ASCB/EMBO Meeting.
A Deluge of Exciting Research Floods the 2018 ASCB|EMBO Meeting

By Mary Spiro

Attendees arrived for the 2018 ASCB|EMBO Meeting in early December to the aftermath of flash flooding that had recently inundated the usually sunny streets of downtown San Diego. But skies cleared as the meeting began featuring Symposia, a rousing Keynote Address, awards lectures, workshops, networking, and interactive poster sessions on the most advanced and innovative research currently happening in the realm of cell biology.

Stem Cells and Subgroups

Stem cells under stress formed the focus of Saturday’s Doorstep Meeting, a more intimate gathering just prior to the kick off of the larger meeting. The 2018 ASCB Doorstep Meeting talks centered on the different challenging environments and conditions that stem cells encounter, especially with regard to tissue regeneration following injury or disease. Organized by Elaine Fuchs of Rockefeller University and Sean Morrison of the University of Texas Southwestern Medical Center, the meeting included discussions of many different types of stem cells—from muscle to skin to hepatic cells. Highlights included the lively roundtable discussions lead by each meeting speaker and the poster session that was so engaging that participants seemed to not want it to end. Along with the scheduled speakers, Lauren Goins, a postdoctoral scholar from the Uptal Banerjee laboratory at the University of California, Los Angeles, and Andres Lebensohn of the National Cancer Institute were selected to speak as a top abstract submitters. ASCB’s Doorstep Meeting, which was limited to 200 participants, provided a great chance for early career researchers to pick the brains of their scientific heroes and mentors.

Member-organized Special Interest Subgroups also began on Saturday. They provide members a way to independently explore some of the most challenging and fascinating topics in cell biology. For example, organizers from the National Institutes of Health (NIH) and the Chan Zuckerberg Initiative led the discussion “Spatial and Temporal Analytical Tools for Cell Atlases” (see related story on the NIH Cell Atlas efforts on page 23). One speaker, Ana Pombo from the Max Delbrück Center for Molecular Medicine in Berlin, explained the development of an inexpensive method of genome architecture mapping that could be applied to challenging samples from the brain, embryos, or tissue biopsies.
“Building the Cell” was a highly multidisciplinary subgroup that focused on matters of basic cell assembly—or how a linear genetic code gets translated into structures that live and function in a 3D space. Eric Deeds from the University of Kansas used concepts from information theory to discuss how cells interpret their environment. With dense populations and a high degree of heterogeneity among cells, only a fraction of the information (signaling) can get through. Exceeding this cellular “bandwidth” can trigger apoptosis. Marija Zanic of Vanderbilt looked at the mechanisms involved in the dynamic instability of the microtubule network of the cytoskeleton, which ensures healthy, growing, and dividing cells. With tubulin available, microtubules form bundles and star-like “asters.” Zanic has been able to study aster formation artificially without the presence of tubulin with the use of streptavidin quantum-dots.

Cell biologists are also using machine learning to understand the 3D structure of cells. Robert Murphy of Carnegie Mellon University explained that machine learning methods can reverse engineer the assembly instructions for the cell by coding spatial models of where organelles are in relation to the nucleus and where both are in relation to the cell boundary. Murphy is combining microscopy with machine learning methods to study proteins with data from the Human Protein Atlas.

Welcome and Keynote Address
Saturday night, the crowds gathered in the main ballroom to hear the welcome speeches from ASCB President Jodi Nunnari, EMBO President Maria Leptin, ASCB CEO Erika Shugart, and Rockefeller University’s Elaine Fuchs. Nunnari and Leptin’s comments echoed one another as they remarked that, despite the trend toward nationalism worldwide, doing science has remained a collaborative effort. Shugart honored Ahna Skop from the University of Wisconsin, Madison, with ASCB’s inaugural Prize for Excellence in Inclusivity. And Fuchs announced the 2018 cohort of ASCB Fellows and introduced Keynote speaker Sean Morrison.

Morrison took the stage to describe his research using deep 3D imaging to map the locations and niches for all the hematopoietic stem cells within large segments of bone marrow. Better understanding stem cell niches and hematopoiesis is critical for helping patients who have had a bone injury or irradiation. A practical takeaway from his talk was that ascorbate deficiency is directly linked to leukemia initiation, so take your Vitamin C!

Back to Basics
Although Saturday’s subgroups are fascinating and the evening’s opening speeches and reception are inspiring, Sunday morning always feels like the actual official start of the meeting. This is the day when Symposia start, the Exhibit Hall opens, and the main poster sessions begin. Without a doubt, the core content of the ASCB|EMBO Meeting is about answering the fundamental questions of cell biology. The Microsymposium “Cell Cycle and Signaling” featured a talk by Vinson Lam of the University of California, San Diego, on the ancient circadian rhythms of the cyanobacterium Synechococcus elongatus based on cryo-electron tomography to reconstruct...
7. From left: ASCB President Jodi Nunnari, Elaine Fuchs, Sean Morrison, EMBO Director Maria Leptin, and ASCB CEO Erika Shugart before the Keynote.

8. The crowd was packed and ready for Sean Morrison’s Keynote.

9. E.E. Just Awardee Guillermina (Gigi) Lozano with 2018 Minorities Affairs Committee Co-Chairs Veronica Segarra and Franklin Carrero-Martinez.

10. Minorities Affairs Committee (MAC) poster competition winners. Back row (left to right): Manuel Ruiz, grad 2nd place; Frederick Santana, grad special recognition; Christopher Arnette, postdoc 2nd place; Armond Franklin Murray, grad special recognition. Front row (left to right): Leticia Vega, session co-organizer; Veronica Segarra, MAC co-chair; Jacqueline De Lora, postdoc 1st place; Gabriela Ortiz-Soto, grad 2nd place; Roberto Segura, undergrad special recognition; Yolanda Rivera-Cuevas, grad special recognition; Guillermina Ramirez-San Juan, postdoc 1st place; Sahra Gabure, undergrad 1st place; Amera Dixon, undergrad 1st place; Camille Santiago Negron, undergrad 1st place; Nicole Rodrigues, undergrad 2nd place; Franklin Carrero-Martinez, MAC co-chair. Not pictured: Lilian Kabat, postdoc special recognition; Paulina Villanueva, grad 1st place; Natalie Speer, grad 2nd place.

11. Bruce Alberts Awardee Erin Dolan with Education Committee Co-Chair Melanie Styers and Bruce Alberts.

12. Maya Schuldiner (left) receives the EMBO Gold Medal Award from EMBO Director Maria Leptin.

13. Celldance video creator Tyler Allen with producer Ryoma (Puck) Ohi (left) and executive producer Janet Iwasa.
[A] student with an interest in snakes was able to produce functional snake venom gland organoids from stem cells.

the cell’s 3D architecture at different times of day or night. Jayson Smith from the State University of New York at Stony Brook spoke on the role that the SWI/SNF chromatin remodeling complex plays in invasive types of cells found in Caenorhabditis elegans. John Kuhn discussed his research that shows how, based on the number of microtubules bound to the kinetochore, the kinetochore can switch the spindle assembly checkpoint on or off during mitosis to help maintain genetic integrity.

The Minisymposium “Biology of Stem Cells” covered a wide array of challenging questions in this realm. Stephanie Grainger of the University of California, San Diego, described her work on Wnt gene ligands and Frizzled (Fzd) receptors. Although 19 Wnt ligands and 10 Fzd receptors have been identified in mammalian genes, no one knows exactly how they all work. Grainger’s lab used cells from humans and zebrafish to determine that an unusual Wnt9a and Fzd9b interaction signals for the development of hematopoietic stem and progenitor cells. Goosebumps were the theme of a talk given by Ya-Chieh Hsu of Harvard University. Hsu explained that the sympathetic nerves and arrector pili muscles responsible for this hair-raising response to chill also stimulate hair follicle stem cells through the release of the hormone norepinephrine.

Sunday night, members of ASCB’s Committee for Postdocs and Students ventured out in small groups to area watering holes for the “Ask a Scientist” bar night. One hundred t-shirts that read “I’m A Scientist, Ask Me About My Research” were distributed to
participants who soon found themselves engaged in conversations with regular bar patrons about science and science-related topics.

The Future Is Organoids

Monday’s Symposium “Regeneration and Morphogenesis” showcased fabulous illustrations and animations from the laboratory of Hans Clevers of the Hubrecht Institute. Clevers' talk, “Stem Cell-Based Organoids as Avatars in Human Disease,” described “mini gut” organoids derived from mouse intestinal epithelial cells. Even more fascinating was a side project in his lab, where a student with an interest in snakes was able to produce functional snake venom gland organoids from stem cells. Later, Magdelena Zernicka-Goetz of the University of Cambridge discussed work in her laboratory building mouse and human embryos in vivo and in vitro that could provide invaluable insight into the early stages of human development and disease processes.

That same day ASCB released a white paper, *Organoids: The Future of Life Science Research*, with a press conference and panel discussion featuring members of the Society’s Organoid Task Force. The panel discussion addressed issues of reproducibility, the need for training, and the importance of educating the public and policymakers about the emerging field of research in cell biology. The organoid white paper can be downloaded from the ASCB website.

Continuing along the organoid theme, Stanford
19. ASCB Public Engagement Grantee Lorena Benedetti at her poster about the Flipped Science Fair outreach project.

20. This year’s judged poster competition attracted 181 participants, including undergrads, and students and postdocs receiving travel awards from the Minorities Affairs Committee.

21. Elizabeth Chen, recipient of the Women in Cell Biology Mid-Career Award for Excellence in Research, with nominator Eric N. Olson.

22. Eva Nogales, recipient of the Women in Cell Biology Sandra K. Masur Senior Leadership Award with Sandra Masur and nominator Matt Welch.

23. Sophie Dumont (left), recipient of the Women in Cell Biology (WICB) Junior Award for Excellence in Research, with WICB Chair Diane Barber.
University’s Sergiu Pasca, winner of the ASCB Early Career Life Scientist Award, spoke about stem cell–derived human brain organoids developed in his lab that accurately recapitulate in 3D several specific regions of the brain. These “assembloids” can be connected to study cell–cell interactions and neuronal pathways. Studies on these cultures will provide new knowledge about neuropsychiatric disorders.

Monday afternoon also featured a workshop on cancer cell biology jointly hosted by ASCB and the National Cancer Institute. Among the talks given, Rosalie Sears from the Oregon Health and Science University shared new findings regarding the nuclear pore complex and how Myc oncogene activity is spatially regulated by the physical location of a cancer cell. Jan Lammerding from Cornell University demonstrated how the effect of deformation on the nucleus—tested by experiments that forced cells to squeeze through tight spaces in their environment—damages DNA and can increase metastasis.

Manuscripts, Movies, and Mechanics

Tuesday marked the formal announcement of a manuscript transfer network agreement among ASCB’s basic research journal *Molecular Biology of the Cell*, the *Journal of Cell Biology*, and the *Journal of Cell Science* (see p. 21). The chief editors from each journal gathered at the ASCB booth in the Exhibit Hall to describe the collaboration that will allow authors to seamlessly transfer their papers and peer-review reports among these community journals.

The 2018 Celldance videos premiered, featuring entertaining and informative works by filmmakers from the University of North Carolina, Chapel Hill, which explained the behavior of cells in groups versus as individuals, and from Ryerson University in Toronto, which compared the process of clathrin-mediated endocytosis to the movements of modern dance. Both videos, along with past Celldance videos, can be found on ASCB’s YouTube channel.

Also on Tuesday, the Microsymposium “Tissue Architecture and Mechanics” explored the poorly understood mechanisms that cells use to affect their surroundings. For example, David Li of Carnegie Mellon University described some of the signaling pathways involved in the “conga-line” like migration behavior of cells, termed contact following locomotion, which accounts for cells moving in streams, sheets and clusters. Katherine Goodwin of Princeton University demonstrated the importance of smooth muscle differentiation for the proper geospatial development of mouse lung tissue into its stereotypical tree-like structures.

New Model Organisms and Quality Control

Every day of the meeting was packed with exciting talks, workshops, and opportunities for networking, and Wednesday’s last half day of talks was no exception. One of the final Special Interest Subgroup topics addressed the cell biology of marine protists as potential new model organisms that can provide novel insights into the cell biology of eukaryotes. Elin Einarsson from Cambridge University described the challenges she’s faced trying to develop genetic tools to study the poorly understood marine parasite *Perkinsus marinus*. 
This organism resides at the evolutionary crossroads between dinoflagellates and apicomplexan parasites.

Quality control refers to the cell’s ability to correct its own genetic errors. This final meeting Symposium showcased the work of two of ASCB’s most well-respected researchers: Rachel Green of Johns Hopkins University and Peter Walter of the University of California, San Francisco. Ribosomes need to move, Green reminded her listeners, but sometimes, in response to stress, ribosomes get stuck. Her lab is looking at distinct molecular signatures created by “ribosome footprints” of different lengths and what these molecular markers can reveal about translational stress. Walter’s talk, “Targeting the Cell’s Stress Pathways for Therapeutic Benefit,” discussed how his lab is harnessing the power of the unfolded protein response for new therapeutic possibilities to treat cancer, as well as neurodegenerative and cognitive disorders. Walter astonished this writer with reports that a small-molecule inhibitor developed in his lab, called ISRIB, has the ability to rescue cognitive function in mice that had either had a traumatic brain injury or been engineered to be born with Down syndrome. Treated animals seemed to permanently regain and retain normal levels of cognitive function, performing well on maze and water tasks weeks and even months after treatment. The potential benefit to humans, if this research can make it into clinical trials, seems nothing short of miraculous.

Certainly you do not want to miss the next ASCB|EMBO Meeting. Mark your calendars now for the 2019 ASCB|EMBO Meeting to be held December 7–11 in Washington, DC.
The ASCB wishes to express deep appreciation to all the exhibitors who attended the 2018 ASCB | EMBO Meeting and helped ensure its success.
The ASCB thanks the following organizations for supporting the 2018 ASCB|EMBO Meeting

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The ASCB thanks the following organizations for supporting the 2018 Doorstep Meeting, Beyond Homeostasis: Stem Cells Under Stress

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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.
Emerging Voices

Practical Tips to Make Your Lab More Sustainable

By Jennifer Heppert

If you’ve done bench work in a cell biology lab in the last 10 years, you’ve almost certainly used a product called a mini-prep kit to purify plasmid DNA from a bacterial culture. Depending on how many samples you have, it can take a while, and it’s kind of boring: pipet, spin, pipet, spin. Maybe because it’s boring, when I do mini-preps my mind usually wanders. Over the years, I started to read the standard protocol more like this:


After the final spin, I am always left with a small mountain of plastic tubes and pipette tips. This observation spread my attention to the large amount of consumable, one-time-use items that we use in the lab every day.

Of course, these items are essential to research. They are part of what allows us to work with the rigor and care critical for accurate and well-controlled experimentation. Reagents and experiments have to be pure, defined, and uncontaminated, and it is costly, useful, and energy efficient to keep them that way. Even with this knowledge I still feel guilty about the ecological impact of my research and wonder if there is more I could be doing.

About a month ago, I saw a tweet about a Sustainability Summit being held by a nonprofit called My Green Lab. I was excited! The fact that this initiative exists is evidence of what I already knew: Many members of the scientific community actively consider how their work (not just their brilliant discoveries) impacts the world.

The meeting was live-streamed, and I watched from my desk. Erika Daley, a program manager for My Green Lab, was the first speaker, and she laid out some facts about the problem: Lab spaces use approximately five times as much energy per square foot as office spaces, and in 2014 labs produced an estimated 12.1 billion pounds of plastic waste worldwide. A single –80°C (or ultra-low temperature, ULT) freezer can consume as much energy per day as a house.
a fume hood burns the energy equivalent to 1,733 gallons of gasoline every year.

Yikes! Every lab I’ve ever worked in had at least one –80°C freezer and one fume hood. I think this as I began frantically taking a mental tally of the number on the floor of the building was I sitting in.

Next, she talked about the top five most impactful things you can do to make your lab more sustainable. Yes, I thought, right to the point!

1. Cold storage. Because ULT freezers use so much energy, focused action here can make a big difference. If the temperature of a –80°C freezer can be raised 10° to –70°C, it can reduce energy consumption by 30%–40%. When you buy a new ULT freezer make sure you buy one that is energy efficient, and all labs can maximize the use of their total freezer space by keeping a searchable electronic inventory (Google Docs, Quartzy, etc.).

2. Turn off equipment that’s not in use. Pretty simple, but not necessarily a common practice in my experience.

3. Green chemistry. This one I understood less (unlike Erika, I’m not a chemist by training), but the general idea is to manage chemical waste by using the safest and most sustainable practices possible.¹ ²

4. Shutting the sash of the fume hood when not in use saves energy by lowering the fan speed and the volume of air exhausted.

5. Installing low-cost aerators on faucets decreases water consumption. They cost less than $5 and can decrease water usage by 50%–70%.

Some of these practices, such as buying an energy efficient freezer and installing aerators, if implemented in new labs, would make a lasting difference without ever being noticed or thought of again. Others, such as closing the fume hood and practicing low-waste chemical hygiene, require a change in researcher behavior.

This is where the second talk by Ellen B. Garcia, a graduate student from the Department of Biological Sciences at Virginia Polytechnic Institute and State University (Virginia Tech), came in. Her story started with changing her own behavior and the behavior of her research group, and then it spread to other labs across campus. Through a persistent grassroots effort and creative problem solving, she organized a green lab movement at Virginia Tech that led to the implementation of recycling, reuse, and low energy usage programs in labs across campus. She also described talking with biological supply company representatives, and purchasing products specifically from those that would reuse and recycle the solid waste from their products. Her story of personal advocacy and the change she embodied was an inspiring reminder of the impact a single, motivated individual can have on a seemingly insurmountable problem.

From Tonya Randell, a program manager at More Recycling, I learned that recycling is more complex than I had imagined and that there are increased challenges associated with recycling items used in laboratory science. As you can imagine, items that have been used with potentially harmful substances should not be recycled in a form in which they could not.
potentially harm people who might come into contact with them. Some of the plastics we use in the lab also pose a recycling challenge: They may have been structurally and chemically modified to resist heat and degradation. Many items we use for molecular biology (such as those in my mountain of mini-prep plastic) are too small for conventional recycling because the first step in the process passes the materials to be recycled over a giant mesh. That means items such as pipette tips would fall through the mesh and end up in a landfill. But many everyday items in our labs can be recycled: shipping boxes, printer cartridges, and Styrofoam boxes and peanuts, for example.

If you’re interested in learning more about what you can do and the efforts of My Green Lab, their website is full of helpful information. Also, check your university for an existing lab sustainability program; my institution had a certification program I hadn’t previously heard about.

It is easy to feel helpless with the global environment appearing to fall apart around us.

Through a persistent grassroots effort and creative problem solving, [Garcia] organized a green lab movement at Virginia Tech....

However, I was reminded this week that scientists should be leaders in modeling behaviors that conserve energy and reduce waste. As cell biologists, we work to reveal secrets of the incredible biology provided by our one and only Earth, and it’s important to remember we can simultaneously strive to save it.

Disclosures

I have no affiliation with My Green Lab. I paid a modest registration fee ($15) out of pocket to attend the Sustainability Summit that occurred on October 15, 2018.

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About the Author

Jennifer Heppert is a postdoc in John Rawls’ laboratory at Duke University.

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.
An earthquake is slowly rumbling across the international scientific publishing landscape. Depending on the size of the quake, it could have a major impact on the scientific community.

On September 4, 2018, 11 national science funding agencies in Europe released a plan, referred to as Plan S, stating that beginning in 2020, scientists funded by the group of 11 must publish the results of their research in open access journals, those that make articles freely available immediately upon publication. The 11 funders are from Austria, France, Ireland, Luxembourg, Italy, Netherlands, Norway, Poland, Slovenia, Sweden, and the United Kingdom. It is expected that other funders in Europe will join the original 11. Since the release of the original plan, China has also expressed support for Plan S.

Support for Plan S is not universal, however. Research funding organizations in Switzerland, Sweden, the Netherlands, and Germany have not joined the plan. Despite rumors, most major biomedical research funders in the United States have yet to take a position on Plan S. It is also uncertain if the U.S. National Institutes of Health and other federal science funding agencies will adopt the plan.

Plan S could have a significant impact on professional scientific societies with peer-reviewed scientific journals and on researchers themselves. There is much confusion about the details of the plan, but it may require compliant journals to be completely open access, i.e., not derive any income from subscriptions. Without subscription income, society revenues may be greatly reduced and the complete publishing cost may be shifted to authors. Revenue from professional society journals funds not only peer review and journal production, but other important programs for society members.

To learn more about Plan S, visit the Plan S website at www.coalition-s.org.

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Science and Society

U.S. Science Advisor Finally Confirmed

By Kevin M. Wilson

It took the Trump White House about 18 months to nominate a director of the White House Office of Science and Technology Policy (OSTP). Now, after two years in office, the Trump administration finally has someone in the post.

During the closing hours of its 115th session the U.S. Senate confirmed Kelvin Droegenmeier, a meteorologist, to the post. The reason for the Senate’s delay in approving his appointment has never been clear. He has an outstanding scientific record, including being a member of the faculty at the University of Oklahoma for over 30 years and serving as the school’s vice president for research for a decade. His research has focused on numerical weather forecasting and atmospheric modeling.

He is also familiar with the ways of Washington, DC, and with science policy. In 2004, President George W. Bush appointed him to serve on the National Science Board, which oversees the National Science Foundation. He was reappointed in 2011 by President Obama and has been serving as vice chair of the board since 2014.

His nomination was highly praised by members of the scientific community and from within Washington, DC. In a story in Science, John Holdren, President Obama’s science advisor, gave him glowing recommendations, calling him “a very good pick.”

Questions remain about how much Droegenmeier will be able to use his scientific and policy experience in his new position. OSTP, which played an important role in policy making during the Obama administration, has seen its staff and budget sharply reduced in recent years.

Along with the title of Director of the Office of Science and Technology Policy, many previous OSTP directors also held the title of either Presidential Science Advisor or Assistant to the President. These additional titles often indicate the importance the administration puts on science and on advice from the OSTP. It is also an indication of the level of access the OSTP Director will have to the president. At press time, it is unclear if Droegenmeier will have additional titles beyond Director of OSTP and what role he will play in Trump administration decision making.

ASCB Member Benefit: One-on-One CV Review

Need some help with a cover letter, CV, resume, statement of teaching philosophy, or other document for the next step in your career? Members of the ASCB are willing to help. Just fill out a short form (www.ascb.org/cvreview), and we’ll put you in touch with a reviewer. Then the two of you can decide which digital collaboration tool to use (email, Google Docs, Skype, Wikispaces, etc.). You must be a current ASCB member to take advantage of this service.
ASCB’s education journal, CBE—Life Sciences Education (LSE), is your source for

- Tried and tested ideas for improving your teaching and mentoring
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- Valid and reliable assessment tools

Here are some highlights from the December 1, 2018, issue:

LETTER TO THE EDITOR
Structuring and Supporting Excellence in Undergraduate Biochemistry and Molecular Biology Education: The ASBMB Degree Accreditation Program
Victoria Del Gaizo Moore, Jennifer Loertscher, Diane M. Dean, Cheryl P. Bailey, Peter J. Kennelly, and Adele J. Wolfson

MEETING REPORT
Recognizing and Reducing Barriers to Science and Math Education and STEM Careers for Native Hawaiians and Pacific Islanders
JoNita Q. Kerr, Donald J. Hess, Celia M. Smith, and Michael G. Hadfield
A workshop with 25 participants, mostly college or high school teachers, many from Pacific Island ethnic groups, explored the causes underlying the underrepresentation of Native Hawaiians and Pacific Islanders in college majors and careers that focus on math and science, especially the biological sciences. Solutions were advanced.

ARTICLE
The Graph Rubric: Development of a Teaching, Learning, and Research Tool
Aakanksha Angra and Stephanie M. Gardner
The development of a graph rubric informed by literature from the learning sciences, statistics, representations literature, and feedback and use of the rubric by many users is described. The result is an evidence-based, analytic rubric that consists of categories essential for graph choice and construction.

ESSAY
Representation of Industry in Introductory Biology Textbooks: A Missed Opportunity to Advance STEM Learning
Sharotka M. Simon, Helen Meldrum, Eric Ndung’u, and Fred D. Ledley
This work characterizes representations of industry in undergraduate biology textbooks and explores how these representations could impact STEM learning for students. A significant number of passages embodied negative connotations regarding business. How the representation of industry in these textbooks may affect student engagement is discussed.

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

Explore the Anatomy of an Education Research Study at 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.
Most readers of this column are very familiar with research grants to single PIs. However, you may know far less about the various multi-investigator grants that could be a great source of support for your next academic career stage. These include multi-PI R01s and program project or center grants (the National Institutes of Health [NIH] P series), pre- and postdoctoral training grants (the T series), shared instrumentation grants (the S series), and NIH research contracts (the U series), as well as the new multidisciplinary team grants from the National Institute of General Medical Science (NIGMS).

There are compelling reasons for midcareer and senior faculty to become familiar with multi-investigator proposals. Importantly, much high-impact 21st century biomedical and life science research involves collaborative projects. Multi-investigator funding mechanisms are aimed at hastening and enriching the research enterprise, including, for the NIH, speeding up the translation of fundamental discoveries into practical applications to improve human health and wellbeing. The extent to which this aim is actually accomplished with the current array of grant structures is a matter of ongoing dialog and debate. Therefore, it is useful for faculty to discuss the pros and cons of participating in, and possibly taking leadership roles in, the development of one or another multi-investigator grant.

If you wait to respond to a request for application (RFA) for a thematic center or program project grant or the like, you will be faced with a next-to-impossible deadline for proposal submission. Rather, consider two sources to learn about multi-investigator grants earlier.

### Using Funding Agency Expertise

Recipients of multi-investigator grants often credit their success to the advice of the NIH institute program officers (POs) who oversee various multi-investigator grants. When you are starting to explore the possibility of developing an application, POs can give you inside information about what the institute currently wants (or doesn’t want) to fund, which is critical since multi-investigator grant options can vary among institutes. Thus, for example, the National Institute of Diabetes, Digestive, and Kidney Diseases recently introduced the High Impact Interdisciplinary Science Grant and the National Institute of General Medical Science has introduced the Collaborative Program Grants for Multidisciplinary Teams to replace the program project and center grants.

When it’s time to develop the proposal, POs can give unbiased...
perspectives on, for example, the strength of the assembled team and available resources. Because these POs have often overseen multi-investigator projects for many years, they can offer a wealth of information, answering questions before you even think to ask them.

For applications in response to an RFA, the announcement will identify the scientific administrator in charge. Otherwise, you can find the names of POs who administer P-, T-, S-, or U-type grants on topics similar to the one you might be considering by using the Matchmaker function in the NIH Reporter Database, searching on “similar program officials.”

Using Local Expertise: Round Up a Panel of Multi-Investigator Grant PIs

If you are in a research-intensive academic institution, you are surrounded by in-house experts, scientists who have been successful in multi-investigator funding mechanisms. Consider bringing them together as a panel of current and former PIs of multi-investigator grants. Obvious hosts for this panel discussion would be the dean’s office (e.g., faculty development or research, or the combination) or a faculty organization such as a women’s faculty group.

What to Talk about in the Panel Discussion

Without much preparation, the invited speakers could recount how they developed their multi-investigator proposals: how they assembled the group; how they determined the overall theme; and what are the key ways in which the proposal differs from a single-PI R01. It’s important that speakers tell how they best articulated their ideas. Panelists who are currently PIs on multi-PI R01s can also provide insights into possible future directions being discussed at the funding agency. Panelists with long-term experience as multi-investigator grant PIs may also bring important historical perspectives including changes they have observed in the funding landscape over time.

Planning and writing successful multi-investigator proposals requires skills beyond those needed for fundable single-investigator research proposals. These include learning to think more broadly and strategically as a scientist, a leader, and a manager and then articulating those thoughts in a persuasive fashion. Therefore, panelists could be charged with recounting how they assembled their research team, got them to work together (if relevant), and expressed this interactivity in the grant application. In addition, given that some of these projects are time- and resource-consuming to develop, panelists could discuss the sort of administrative support they got for putting together the grant and how they went about negotiating for that help.

Such a panel discussion is an opportune time to discuss when to consider dual- or multi-PI vs. individual-PI R01s. It is also a perfect venue to (anecdotally) compare and contrast the multi-PI R01 and program project grant mechanisms with which to fund research on a large but focused question. Whereas multi-PI R01s provide funding just for the science, program project grants give funding for both administrative and research cores to support the work. With the extra money comes extra responsibility and complexity, and hearing experienced investigators discuss these two mechanisms could be useful in helping to decide which route to take for certain projects. (NIGMS has begun to assess its return on investment, and has a blog posting on the topic. The comments following the main post make it clear that the topic is still open to discussion.)

Some Nuts and Bolts of the Panel Discussion

Before the panel discussion, the organizers should 1) provide panelists with a few questions to answer to create a cohesive thematic discussion; and 2) hold a conference call for the panelists, organizers, and the designated moderator. The moderator can review the proposed format and articulate his or her expectations. The panelists can raise questions or make suggestions in response to the organizers’ instructions and comments. At this time, the moderator can outline
the actual structure of the event, including how much
time each panelist will have to speak and whether
questions will be taken during each presentation, at
the end of each presentation, or only after all panelists
have spoken.

As for the panel discussion itself, budget an hour
or so. This means that time should be allocated
judiciously. To save time and also provide a good
resource for the attendees, do not give lengthy
oral introductions of the panelists. Rather, provide
their brief biographical sketches in the online
announcement and in handouts distributed at the
event. After a brief oral introduction of each panelist
at the event, the moderator should review the protocol
for presentations, including the length of time each
panelist has and how the questions will be handled.
If that information has been sent to the panelists
ahead of time, reiterating it at the event makes the
moderator’s timekeeping task much simpler and less
stressful and ensures that all panelists will get their full
turn at speaking.

Going Forward
The panel discussion on multi-investigator grants
can be a first step in the process of increasing
institutional participation in grant applications of
this sort. Meeting organizers could facilitate sharing
of successful multi-investigator grant proposals along
with the accompanying critiques. Since panelists are
local, they might continue to serve as resources for
prospective applicants seeking more information and
might even offer to read some sections of applications.
They could also point potential applicants to existing
descriptions of institutional resources that need to be
included in multi-investigator proposals.

Conclusion
Programs such as the ones described here can help
give mid-career and senior scientists the wherewithal
to successfully move into leadership roles. Academic
investigators who have succeeded in moving into
tenured positions have the opportunity to help
shape their research environment, both within
their institution and within the broader research
community.

These initiatives are good for you and for your
institutions. Onward!

Note
The article was based in part on a panel discussion
moderated by the author for FOCUS on Leadership
& Health for Women, Perelman School of Medicine,
University of Pennsylvania, in May 2017.

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DEAR LABBY: I am a new graduate student at an “impressive” university. I come from a small, well-known liberal arts college. We had great teachers who involved us in research. In my graduate program, I have decided to work in a laboratory with two postdocs and four graduate students. The research and learning culture here is really different from my experience as an undergraduate. Lab training is accomplished by watching and learning techniques from “my” postdoc. As a first-year student, I only interact with the PI during lab meetings, and we all seek input from her on our projects at that time. In our lab meetings, we discuss our results, lab issues, and our shared reading for the week. The meetings often turn into exercises to point out the holes in the work presented by our lab mates. I find it troubling because I know that my postdoc likes to “nail” or even ridicule others in the group. The PI has not intervened so far. I understand constructive criticism, but this does not seem like that to me. I am not looking forward to my upcoming presentation, which will be based on the work that I have done with my postdoc. This is not how I learned science was done! But is it?

—New Kid on the Block

DEAR NEW KID ON THE BLOCK: Congratulations on your new adventure. Yes, there are a cultural differences between liberal arts colleges and research-focused institutions, the major one being the mission of the institutions! One focuses on developing young people to reach their academic and professional goals, while the other is focused on pushing the boundaries of knowledge and training others to do the same. Developing critical thinking skills is one of most important things that one learns in graduate school. Your postdoc seems to be overzealous in this exercise, as ridicule, condescension, and sarcasm are indeed inappropriate. It is essential to get strong constructive feedback during these group meetings, with a stress on the word “constructive.” Perhaps you could engage your postdoc in your presentation as you develop it. This may help him or her feel a partnership in your presentation. Also, Labby suggests that you have a heart to heart talk with your postdoc, letting him/her know how these derisive comments make you feel. In addition, you should schedule a one-on-one appointment with the PI, who may also want to be aware of the effect that this person may be having on the lab culture. An environment that allows ridicule as a normal and acceptable way to interact may become hostile. So, no, this is not the way science is done! Ideally, science is carried out in a supportive and open environment where new ideas can be examined and explored.

—Labby

Got Questions?
Labby has answers. ASCB’s popular columnist will select career-related questions for publication and thoughtful response in the ASCB Newsletter. Confidentiality guaranteed if requested. Write us at labby@ascb.org.
Eva Karasmanis, a PhD candidate in the Department of Biology at Drexel University, studies septins in an attempt to understand how cancer cells arise. When cells fail to divide properly, they become multinucleated, which results in aberrant DNA that can cause them to become cancerous.

“There are checks and balances in place to prevent abnormal multinucleation from happening,” Karasmanis explained. One of the final steps is the physical separation between two daughter cells. While we knew septins were involved in this process, we didn’t know the whole story. We found that septins demarcate the sites of functional assembly of the ESCRT machinery, which promotes membrane fission and the final separation of two daughter cells.”

Although septins are notoriously difficult to work with, Karasmanis said, she is fortunate to have found herself working in the lab of Elias Spiliotis, which has been studying septins for a long time. “We have the tools, we know how to work with septins, we know how to best image them,” she said.

Working in a well-equipped lab, however, is not something Karasmanis takes for granted. While working as an undergraduate researcher at the Democritus University of Thrace in Greece, she recalls washing and reusing pipette tips, sterilizing tools in pressure cookers brought from home, and piecing together equipment from the cast-offs gleaned from more well-appointed labs from other countries. “If we needed something in our lab, we had to build it,” she said.

Joining an American research team was a culture shock, as she recalled her first few days in graduate school. “I ordered reagents and expected to have a couple of weeks before they arrived to plan out my experiments,” she recalled. “Everything I ordered arrived the next day! I thought, ‘What is happening in this country?’”

Although she has now adjusted to the pace and wealth of resources available to American researchers, she has never forgotten the lean times of trying to conduct research in Greece. David Drubin, Editor-in-Chief of ASCB’s basic research journal *Molecular Biology of the Cell* (*MBoC*), encouraged her to write about her experiences, as well as those of others who have had to struggle to find lab resources, for the publication. Her Perspective, “Doing science in difficult socioeconomic circumstances,” can be found online in the June 1, 2018, issue of *MBoC*.

Karasmanis knows that the scientific community is missing out on the contributions of these bright researchers because “research is about the finances, unfortunately,” she said. However, simply sending these labs money can be problematic due to the political nature of the regions where these labs are located.

“The best thing that can happen,” she said, “is for the scientific community, led by organizations like ASCB, to provide a platform where these researchers are encouraged to present their findings and where they can find help to access the resources they need in the countries and regions they choose to establish their labs.”
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- Henry Brown
- Donald Brown
- Keith Burridge
- Trisha Davis
- Richard Hynes
- J. Richard McIntosh

Bronze ($250+)

- Simon Atkinson
- Alexander Bershadsky
- Richard Blanton
- Julie Brill
- Alex Nunnari

Friends (<$250)

- Benjamin Abrams
- Stephan Abramson
- Brian Adams
- Robert Adelstein
- David Allred
- Derek Applewhite
- Debra Baluch
- Lance Barton
- Jessica Bell
- Robert Adelstein
- David Allred
- Derek Applewhite
- Alex Nunnari


The 2019 ASCB Partnership Initiative

A huge thank you to all of our 2018 donors who helped us reach our goal of $300,000! Because of your support we were able to launch new programs as well as support some important existing programs including:

- Professional development
- Travel awards
- Outreach grants
- Advocacy work
- And more!

We are now at the start of 2019, which promises to be an exciting year from ASCB. We are launching a number of new digital initiatives, including an East Coast version of our popular Managing Science in the Biotech Industry Course, and expanding our capacity to help our members network.

We hope that you find value in your ASCB membership. We hope that you will consider supporting ASCB with an additional gift this year. You can make a donation at www.ascb.org/donate.

Thank you for your support!
In 2018 your generous, tax-deductible donations helped provide the following awards:

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

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

We would like to thank you for supporting ASCB. Your support is vital to allow ASCB to continue to provide valuable resources to scientists.

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