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READ CBE—LIFE SCIENCES EDUCATION TODAY! LIFESCIED.ORG
features
10 mira at three years: maximizing nigms' research investment
13 careers depend on how research is assessed
16 alliance managers: at the interface of academia and industry
18 explore!

regular issue content

ascb news
lehmann elected ascb president for 2021 .......................... 19
welch named editor-in-chief of mboc ................................. 17
green fluorescent protein image and video contest ........ 21
job, jcs, and mboc launch manuscript transfer system  . 22
newsletter design wins award ........................................ 23

science and technology
discovering how vitamin b12 is transported in living cells ......................................................... 24
highlights from mboc ..................................................... 26
under the microscope .................................................... 27

annual meeting
ascb | embo 2019 meeting ............................................... 28
doorstep meeting ......................................................... 30

columns
emerging voices ........................................................... 31
diversity matters ........................................................ 34
science and society ....................................................... 36
highlights from lse ......................................................... 38

careers
career navigator ........................................................... 39
dear labby ................................................................. 42

members
member profile .......................................................... 44
upcoming early career meetings .................................. 45
member gifts .............................................................. 46
letters to the editor ....................................................... 47
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Career Adventures
by w. mark leader, editor

Few things have a greater impact on your research career than how your work is funded and how it is evaluated. So we are pleased to offer in this Careers issue of the ASCB Newsletter two features that address those important topics. First, Jon Lorsch, director of the National Institute of General Medical Sciences, provides an update on the institute’s Maximizing Investigators’ Research Awards program, an innovation that seeks to fund researchers rather than research projects. Then Anna Hatch discusses efforts that build on the six-year-old San Francisco Declaration on Research Assessment to advance practical and robust approaches to assessment that address the breadth of contributions a person makes to research.

ASCB President Andrew Murray shares many thoughts on careers in his column, noting that academic research is more of an obsession than a profession and discussing alternatives to “climbing the greasy academic pole.” This leads naturally to a consideration of some of the careers for cell biologists that do not involve academic research. Erin Straub discusses one you may never have heard of: alliance manager. Mary Spiro profiles Robin Kleiman of Biogen, who has opted for a career in industry. And in her feature article, Lee Ligon urges young scientists not to be limited by their preconceived notions of what a career should look like.

And there’s more. How can training programs help prepare students and postdocs for the nonacademic careers that most of them will end up pursuing? Maitreyi Das tackles that question in her Diversity Matters column. Are you an academic considering a career in administration? Labby has some guidance. Has your work begun to generate large datasets? Emily Summerbell has advice on learning to code. Want to make STEMM careers accessible to a more diverse population? See Tricia Serio’s Career Navigator column.

Gone are the days when a young scientist could blithely assume that he or she would have a career in academia. But the career landscape is arguably more exciting than ever. We hope you find this issue to be of value as you build your own career or help others build theirs.

On the Cover: Attendees at the 2018 ASCB|EMBO Meeting discussed various career topics at Career Roundtables
members in the news

Susan Wente has been appointed Interim Chancellor at Vanderbilt University, effective August 15. Wente will retain her position as a professor in the Department of Cell and Developmental Biology and as Provost and Vice Chancellor for Academic Affairs.

Three ASCB members were among the 2019 Canada Gairdner International Award winners. Those honored include:

- **Connie Eaves**, professor of medical genetics, the University of British Columbia, and Distinguished Scientist at the Terry Fox Laboratory
- **Bruce Stillman**, President and Chief Executive Officer of the Cold Spring Harbor Laboratory. Stillman will be the keynote speaker at the 2019 ASCB|EMBO Meeting in Washington, DC.
- **Ronald Vale**, professor of cellular molecular pharmacology/HHMI at University of California, San Francisco

**Pietro De Camilli** is among the first members named to the advisory board of Casma Therapeutics, Inc., a Cambridge, MA, biotechnology company harnessing autophagy to design new medicines. De Camilli is the John Klingenstein Professor of Neuroscience and professor of cell biology at Yale School of Medicine; a Howard Hughes Medical Institute investigator; chair of the Department of Neuroscience; and director of the Kavli Institute for Neuroscience and Program in Cellular Neuroscience, Neurodegeneration, and Repair.

**Randy Schekman**, HHMI investigator and professor of cell and developmental biology at the University of California, Berkeley, received an honorary degree from the University of Michigan during its spring commencement ceremonies, where he addressed students receiving masters or doctoral degrees.

**Rebecca Heald**, professor of molecular and cell biology at the University of California, Berkeley, was honored with the 2018–2019 Leon A. Henkin Citation for Distinguished Service. This award recognizes faculty with exceptional commitment to the success of students from underrepresented backgrounds.

**Elaine Fuchs**, the Rebecca Lancefield Professor in the Department of Mammalian Cell Biology and Development at Rockefeller University and HHMI investigator, was elected to The Royal Society as a foreign member and was recognized for her work with skin stem cells.
Five ASCB members were named to the 2019 class of the American Academy of Arts and Sciences. They include:

- **Yifan Cheng**, Professor of biochemistry and biophysics/HHMI at the University of California, San Francisco;
- **Daniel Klionsky**, Research Professor at the Life Sciences Institute of the University of Michigan;
- **Yishi Jin**, Junior Seau Foundation Endowed Chair in Traumatic Brain Injury and professor and chair of Neurobiology at the University of California, San Diego;
- **Jennifer Lippincott-Schwartz**, senior group leader at HHMI’s Janelia Research Campus; and
- **Virginia Zakian**, the Harry C. Wiess Professor in the Life Sciences at Princeton University.

The National Academy of Sciences elected 100 new members and 25 foreign associates in recognition of their distinguished and continuing achievements in original research. Three are ASCB members:

- **Lila M. Gierasch**, Distinguished Professor, Department of Biochemistry and Molecular Biology and Department of Chemistry, University of Massachusetts, Amherst;
- **Rebecca Heald**, the Flora Lamson Hewlett Endowed Chair in Biochemistry, professor and head, Division of Cell and Developmental Biology, Molecular and Cell Biology Department, University of California, Berkeley; and
- **Susan Strome**, Distinguished Professor, Department of Molecular, Cell, and Developmental Biology, University of California, Santa Cruz.
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One advantage of being ASCB’s President is that I get this bully pulpit and can make an extended argument for a single point. Column one was “professional societies are good for science and scientists,” and column two was “scientists have an obligation to care about and be engaged in politics and public policy.” Careers is a much harder topic. I have more than one thing I want to say, and so, to the horror of my teachers and mentors, I’m going to try to say four different things: two about academic science, one about careers in general, and one about the importance of teaching as either all or part of a career.

**Scientists Are Like Painters**

The first point about academic science, and perhaps science in any setting, is that it’s an obsession not a profession. Ask any scientist who’s ever published a paper to imagine their lab notebook and mentally tear out every page that neither produced data in the paper nor described a step that was essential, even with perfect hindsight, to get to the pages that yielded published data. They’ll sigh, ask you for a stronger beverage, and tell you that they just axed 90% to 95% of their precious notebooks.

Now imagine a similar failure rate in a profession. You go to the dentist, moaning over a throbbing tooth and before the Novocain and drill come out, your dentist leans over you and says, “Nice to see you. Before we start, I need to outline the plan. There’s a 5% chance that half an hour from now, I will have fixed the problem, you’ll be smiling from the half of your face that isn’t numb, and you’ll owe me $100. There’s a 50% chance that I’ll do some drilling and fiddling, discover that I can’t fix things, tell you that it will hurt about the same when the Novocain wears off, and you’ll still owe me $100. Finally, there’s a 45% chance that during the first 30 minutes I’ll screw up, you’ll feel the pain sear through the Novocain, I’ll spend another 30 minutes trying to rectify the mistake, and when I’m done you’ll be screaming, not moaning, and you’ll owe me $200, since I took twice as long.”

I don’t think you’d go back, because dentistry is a profession, professionals are supposed to succeed at their jobs almost all the time, and bad things happen when they don’t. Scientific research isn’t a profession; it’s something that people can’t help themselves from doing when they describe their goal as seeing the face of God, trying to see what’s underneath Father Nature’s lederhosen, or making a better world. When the students arrive at the graduate program that I
codirect, I tell them that if their primary motive for being in the room is that they’d like, by the time they’re 40, to have a pleasant four-bedroom house, a partner of their chosen gender, two charming children, and one partner’s minivan and the other’s Mini Cooper side by side in the two-car garage, they’re in the wrong place: They’ve already demonstrated the smarts, initiative, and grit that would allow them to reach these goals using far less effort and enduring far less frustration than they’ll need to get there as a scientist.

None of this means that people who are professionals can’t be admirably dedicated and passionate about their work. Nor does it mean that scientists shouldn’t be admired for their obsession, treated reasonably by their employers (be they PIs or deans), compensated reasonably for their work, and encouraged to stop and smell the roses and play with their children. But to me, at least, it makes us much more like painters, poets, or dancers: people trying to do something that’s new and difficult, accepting that the elegance of the final product will reflect hours of struggle and failure, and recognizing that society’s appetite for paying people to follow their passion is limited and that as a result, not everyone who wants to follow their passion as a day job will succeed. At least as importantly, a significant fraction of people who walk into college, graduate school, or a postdoc with a burning passion for scientific research will discover that the process or the sacrifices it asks for aren’t for them or that they have greater passion for something else and will therefore pursue a different career. There’s absolutely nothing wrong with such exemplary sanity, and one of the things I most dislike about academic science is the presence of a substantial minority who see such sanity as a form of failure, weakness, or worse yet, abandoning the cult!

...But Not Like Pool Players

The second point about academic science is how to advance your career. I preach a very simple message to those I mentor: “Do the best expletive deleted science you can, and the rest will look after itself.” That doesn’t mean I believe that science is a pure and beautiful meritocracy and that your gender, your ethnicity, your nationality, your faith or lack of it, or your sexual orientation couldn’t have any effect on what positions you will be offered, how fast you will be promoted, and how likely you are to be asked to lead. Importantly, one way of making these things matter less is to measure and try and compensate for our own implicit associations (which you can start on at www.implicit.harvard.edu). What I’m talking about is avoiding seeing progress through science the way a professional pool player plays their game: thinking so far ahead that as well as putting colored balls in the pockets, they’re controlling where the cue ball will end up three shots from now. To me, there’s a crucial difference between trying to advance your career, while at a conference, by flattering someone important by telling them how great you think they and their work are, instead of dragging them over to your poster, giving them the two-minute description, and then asking them to question and criticize your work. The first isn’t following the advice at the beginning of this paragraph, and the second is.

Beyond the Greasy Academic Pole

That’s quite enough about academic careers I hear you saying, and you’re right. We live in an era where climbing the greasy academic pole is the minority pursuit and commerce, society, and government all need the well-honed and (mostly) rational minds that a scientific education produces. How do you decide
what’s right for you? If you’re a graduate student or postdoc, do exactly what you do when you’re in the lab: research. Find people who do the things you’re interested in as a career and ask them what they do on a day-to-day basis, what the three best things about their job are, what three things they’d use a magic wand to change, and what skills and talents employers are looking for.

Having found something that you want to do, try and get some experience as an intern or volunteer or in a postgraduate position. As examples, the American Association for the Advancement of Science runs a fellowship program for those interested in science policy and there are programs that offer a two-month training fellowship to bridge the gap between academia and becoming a data scientist. If you’re a mentor, do everything you can to help those you mentor find out about and get access to careers they want to pursue. As an example, persuade the graduate programs that house the students you work with that they should be encouraging interested students to pursue internships and looking for philanthropic funding that would make it easier for students to do internships in nonprofit organizations.

Thinking about Learning and Teaching

My last point is about education, both as part of any career and as a career itself. Every day, each of us learns and teaches. Frequently we rediscover that the act of trying to teach is a reliable and sometimes painful way of learning how little you know or how muddle-headedly you’ve been thinking, and both things are true in almost any career you pursue. That means that thinking about learning and teaching is a critical part of any career and we’d all be much better at our jobs if we took 15 minutes at the end of every day to ask what we learned, either from our colleagues or from the strictest of all teachers, our experiences. As hackneyed as it sounds, the surest test of whether you understand something is whether you can explain it, to your doltish PI if you’re a graduate student, a harassed elected representative if you’re a civil servant, or a patent examiner if you work in intellectual property.

Finally, we come to those whose job is teaching. Popular as “Those who can do, those who can’t teach” may be with the anti-intellectual crowd, almost every scientist I know has been inspired by one or more teachers, and more of those have been grade- or high-school teachers than have been college professors. In my case, it was the late David “Doc” Powell, my high-school chemistry teacher. A tall Scot with ginger hair, he went way beyond the syllabus to expose us to the Schrödinger equation, quoted Shakespeare as he explained chemical principles, and memorably told us, “If you’re nay a socialist before you’re thirty, ye’ve nay heart, and if you’re nay a conservative after, ye’ve nay head.” A great deal of the better parts of me as both a scientist and a teacher come from the example and inspiration of a man who had a PhD in chemistry and had “descended” to teach pimple-faced and long- and greasy-haired (for such was the fashion then) English school boys. If you’ve reached the point in your PhD where you’ve decided teaching fires you up more than research, I’d urge you to consider following Doc Powell’s path rather than fighting to get a precious liberal-arts college professorship. You’ll find it easier to get a job and easier to get tenure, and you’ll have a larger effect on more students.

About the Author

Andrew Murray is 2019 ASCB President. He is Herchel Smith Professor of Molecular Genetics, Howard Hughes Medical Institute Professor, and Director of the NSF/Simons Center for the Mathematical and Statistical Analysis of Biology at Harvard University.
MIRA at Three Years: Maximizing NIGMS’ Research Investment

By Jon R. Lorsch

The National Institute of General Medical Sciences (NIGMS) is the home of fundamental biomedical research at the National Institutes of Health. Three years ago, we launched MIRA (short for Maximizing Investigators’ Research Awards), an important experiment in how we fund research. Here I describe the rationale for that program and take a look at how it’s meeting our goals.

With an annual budget of more than $2.8 billion, NIGMS is always looking for ways to invest optimally in a broad and diverse research portfolio. When I first came to the NIGMS in 2013, the primary mechanism used to support investigator-initiated research was the traditional R01 grant, which funds distinct projects with specific aims. While this funding mechanism is well suited to some types of research, it does not allow scientists to easily explore new directions. Researchers who want to pursue a new idea must apply for another grant to fund it. Not only does this create inefficiencies for investigators, the project-based funding model doesn’t reflect how research is actually conducted. For example, who can actually predict what experiments they will be doing next month, let alone four years from now?

I felt the time had come to examine an alternative funding model to ensure we were using taxpayer dollars as efficiently as possible. After consultation with internal and external stakeholders, we set out on an experiment to transform how we support fundamental biomedical research, moving away from a mechanism that funds specific projects to one with broader reach. Through the novel MIRA program we began funding grants that supported the program of research in an investigator’s lab that falls within the NIGMS mission. We hoped that this new way of funding would provide scientists with more flexibility to “follow their noses” and allow them to explore new directions as promising observations and ideas arise during the course of their studies. We also expected the program would enable NIGMS to support a larger number of talented researchers, including more early-career investigators. So far, the results are promising.

There are two types of MIRAs: one for established investigators, and another for early-stage investigators (ESIs). Both programs offer five years of support; for established investigators, this is one year more than a typical R01 grant. Awards to established investigators are generally in the range of $250,000 to $400,000 direct costs per year, although some are higher. Most MIRAs for ESIs are for $250,000 direct costs per year, about $40,000 more than the typical ESI R01. Both programs offer grants that can be renewed at
the end of the 5-year project period. Unlike the R01, MIRA applications do not have specific aims. Instead, applicants must describe the overall research questions they’re interested in exploring and discuss their past productivity. In other words, applicants should describe why the questions they want to answer are important ones and why they are the right people to answer them. MIRA applications are evaluated based on the importance of the proposed research and the researcher’s record of accomplishments relative to his or her career stage. Upon receiving a MIRA, grantees are not eligible to apply for most other types of NIGMS research grants and must dedicate at least 51% of their research effort to MIRA-funded work.

Ultimately, MIRA is designed to produce a more stable, flexible, and efficient research environment because it allows scientists to focus more on productivity and innovation—to take scientific risks and to pursue important, new scientific questions that arise during the course of their research. It also aims to reduce the time scientists spend writing and reviewing grant applications, freeing up time to focus on research, training, and mentoring.

The MIRA program has now been running for three full fiscal years and, overall, is meeting our intended goals. You can learn more about MIRA review and funding outcomes to date in our recent Feedback Loop blog post (https://bit.ly/2KtjCx0). We also recently outlined our plans for the next MIRA funding opportunity announcement, which will be the first one that covers renewal applications (https://bit.ly/2VxiKso). As part of this plan, we intend to keep success rates for MIRA renewals higher than those for R01 renewals and to implement other measures to improve funding stability for MIRA investigators. We also intend to continue having ESIs reviewed separately from established investigators and, during the established investigator panels, to cluster the reviews of those applicants who are on their first major NIH grant renewal—either because they are applying to renew an ESI MIRA grant or to convert an ESI R01 into a MIRA—and to instruct reviewers to evaluate applicants relative to others at their career stage.

MIRA grants currently represent ~20% of the Institute’s “R01-equivalent” awards, and as MIRA becomes a larger part of NIGMS’ research portfolio, we’ll continue to monitor the program closely to ensure it is optimally serving the scientific community and the taxpayers. We hope that MIRA’s flexibility will ultimately lead to an increase in research productivity and an acceleration of important discoveries emerging
from the science we support. To learn more about the program and find out if you are eligible to apply, visit www.nigms.nih.gov/Research/mechanisms/MIRA.

**About the Author**
Jon R. Lorsch is Director of the National Institute of General Medical Sciences.

**Key MIRA Advantages**
- Offers five years of funding, a year more than established investigators currently receive from NIGMS
- Provides flexibility to pursue new ideas and opportunities as they arise
- Increases funding stability
- Reduces time spent managing multiple grant awards and writing grant applications
- Reduces burden on the peer-review system, improving the quality of reviews

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Careers Depend on How Research Is Assessed

By Anna Hatch and Stephen Curry

Filling a faculty position can be a daunting process. Universities can receive hundreds of applications for a single opening. But with so many people to consider, how can universities give each applicant his or her due? It’s a significant challenge, and there are not a lot of easy answers. Research evaluation takes time, and faculty who serve on hiring committees have other roles and responsibilities they need to balance with assessment.

It can be tempting to rely on the Journal Impact Factor (JIF) and other proxy measures of quality and impact when time is scarce. But when you look at the data, the JIF is not a reliable tool for research assessment—not for individual articles and certainly not for people. Journals have broad citation distributions, and the JIF has long been known to be a poor predictor of how many citations a paper will receive. Despite this shortcoming and the well-known systemic effects of an undue fixation on JIFs, a recent survey of review, promotion, and tenure documents across the United States and Canada found that JIFs are still widely used in evaluation of individuals. Of the research-intensive universities sampled, 40% mention the impact factor or other closely related terms in their review, promotion, and tenure documents.

Impact is Not Quality

There are other shortcuts that can lead to bias in decision-making during evaluation. Some of them quietly slip into the process without the reviewer even noticing. For example, it is easy to skim an academic CV and make unconscious judgments based on aggregate information that may provide a less-than-accurate image of what someone has contributed to the field. Shortcuts include things like the reputation of the institution where the applicant completed his or her training, or personal attributes such as gender or ethnicity.

Short-term impact is not the same thing as quality, and reliable, carefully done research that enables others to build on the results. It takes time to understand the total value of an article. For example, when a lab does not authenticate cell lines, its research may not be reproducible by others and trust in its results is eroded. Likewise, verifying antibodies increases confidence in the work by avoiding false results due to cross-reactivity or batch-to-batch variability. Though it may not seem so immediately, in many ways quality is more objective than impact, and that should make it easier to assess. For example, it is possible to objectively assess whether sample sizes are appropriate or whether data are shared according to the FAIR (findability, accessibility, interoperability, and reuse) principles.
DORA
The San Francisco Declaration on Research Assessment (DORA) was launched in 2013 as a call to action to improve the ways we assess the outputs of scholarly research. It specifically discourages using the JIF or other journal-based metrics in research evaluation and highlights the need to consider the value and impact of all aspects and outputs of scholarly research. The declaration has since accrued more than 1,300 organizational and 14,000 individual signers.

Now DORA has become an initiative that is building a community of practice to improve how we evaluate researchers. A big part of this involves reaching out to the academic community and listening to needs, challenges, and concerns. At the ASCB | EMBO Meeting in December 2018, DORA hosted an interactive red-pen session, “How to improve research assessment for hiring and funding decisions,” as part of the career enhancement programming. Participants worked in small groups to provide feedback on grant applications and faculty position postings. They identified minor changes to applications and CVs that would encourage reviewers to pause and reflect before making judgements, such as moving the educational history to the end of a CV or application, removing journal names in bibliographies, and recognizing preprints, data, and protocols as outputs of research.

How We Assess Researchers Matters
Unintentional bias can disadvantage stereotyped groups in hiring, promotion, and funding decisions—but change is possible. At a session we organized at the 2019 American Association for the Advancement of Science meeting, Patricia Devine, a professor of psychology at the University of Wisconsin, Madison, showed how a 2.5-hour bias intervention workshop increased the number of female faculty hires in STEMM departments in a randomized controlled trial at the University of Wisconsin, Madison. The composition of hiring committees and review panels is another place where institutions can take action, since a more diverse group may help achieve more equitable outcomes.

Do We Even Speak the Same Language?
The language related to research assessment can be another source of frustration for applicants and reviewers. Definitions can vary depending on location. For example, what is the difference between an outcome, an impact, or an output? Using broad phrases to describe desirable applicant qualities can also be confusing. What is meant by world-class research? Ill-defined terms like these are also open to interpretation, which means that different standards are applied to different people. Setting clear and meaningful expectations for applicants, hiring committees, and grant panels is an important step to achieving fairer outcomes. It is also important for institutions to think about the breadth of applicant contributions that they want to assess. For example, the University of California, Berkeley, developed a rubric to assess candidate contributions to diversity, equity, and inclusion. Rubrics can also increase transparency in decision-making and provide a constructive way to give applicants feedback.
**Conclusion**

Meaningful evaluation of researchers takes time, and changing deep-seated practices is not simple, but we owe it to the community and early-career researchers in particular to advance practical and robust approaches to assessment that address the breadth of contributions a person makes to research. We are trained as researchers to experiment, and exploring new ways to evaluate research will lead to a more reliable and equitable system. DORA is working with the community to build capacity and develop workable alternatives.

**References**


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**About the Authors**

Anna Hatch is the DORA Community Manager.

Stephen Curry is a professor at Imperial College London and chair of the DORA Steering Committee.

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Alliance Managers: At the Interface of Academia and Industry

By Erin Langdon Straub

In my job as an alliance manager I work at the interface of academia and industry, managing large-scale, industry-sponsored research projects, or “alliances.” I work with Harvard University faculty to connect them to our corporate partners, which include some of the largest international pharmaceutical companies but also many local biotech start-ups. I provide strategic and business development support to their projects, ensuring the success of Harvard researchers in translating their academic discoveries into new therapies, drug targets, medical devices, clinical platforms, and new companies.

Some of you had probably never heard of an alliance manager before reading this article. To be honest, a year ago I hadn’t either. During my time at grad school, I had a very successful and rewarding career, publishing multiple journal articles, giving research talks at national and international conferences, and ultimately obtaining my PhD last year. However, as my graduate career was ending, I was faced with the daunting question, what do I do now?

Leaving the Bench

While grad school was full of successes, there were long hours in the lab, with countless experiments, many of which failed. I wanted to take a break from the bench, or maybe say goodbye to it forever. I also had a growing interest in the business side of science. Signs pointed toward leaving academia, forgoing a postdoc to pursue some other career. I wanted to find a career where I could still be surrounded by science, but at the end of my PhD I was ready to never touch a pipette again. Thus, I spent many hours networking, chatting, and calling friends and friends of friends who already went down the non-academic career path. I wanted to know how they did it, what they like and don’t like about their new careers, and if they knew anyone that was hiring.

In the end, all the networking I did was fruitful. I wound up in the biotech hub of Boston, where I started a position in the Office of Technology Development at Harvard. I have been an alliance manager since last October, so I’m just over six months in. While I do occasionally miss experiments and that feeling of discovery, I am still challenged every day to use my critical thinking skills to solve complex problems. I get to learn about lots of different scientific projects and interact with many different scientists in both academia and industry.

At the end of my PhD I was ready to never touch a pipette again. … I am still challenged every day to use my critical thinking skills to solve complex problems.
Being at this intersection of academic science and biotech/pharma is truly fascinating and extremely rewarding. Although I do not make the discoveries myself anymore, I am instrumental in translating those initial discoveries from academia into real products—drugs, therapies, etc.—and bringing them into the clinic. The alliances I manage and the critical connections between academia and industry are making a real difference in the world.

Do Not Be Afraid

While I do enjoy my new career path, the leap from academia was not without its challenges and adjustments. Over the past six months I have done my fair share of second-guessing and worrying over whether I made the right decision, but I have followed the advice I received as an undergraduate, and it has led me to where I am today. That advice was: Do not be afraid to take risks, to deviate from “the plan,” or to try something new.

However, figuring out what new thing to try was not easy. I ended up reading a lot of blogs on the *Science* and *Nature* websites and I even tried googling alternative careers for PhDs just to see what would come up. I found several books that were aimed directly at the questions I was asking, including *Next Gen PhD* by Melanie V. Sinche. I also networked at the ASCB|EMBO Meeting with collaborators, colleagues, and friends. We talked about their different career choices and the paths they took. All in all, my advice is to use every available resource you can. Be informed. Don’t just do the next step because it seems like the obvious next step. I encourage everyone at the end of their PhDs to do some soul-searching and to be truly honest with themselves about what they are passionate about in science (and in life for that matter). For me, I loved learning about new scientific landscapes and technologies, but I was also very ready to move on from experiments. It was a hard decision, but it was the right one, and now that I am on the other side, I can without doubt acknowledge that I am personally and professionally happier.

If you’re interested in becoming an alliance manager, or in landing any business-oriented scientific position, a minimum requirement will be a PhD, preferably in the life sciences, but at Harvard some of our team have a physics or chemistry background instead. Business degrees (e.g., an MBA) are a plus but not typically required. If you want to pursue the business side of science, do not feel counted out for not having prior business experience! However, experience is always welcomed and there are multiple ways to expose yourself to business, possibly including internships and fellowships in your own university’s technology transfer office. Alliance management, and other business scientific positions, can end up being a rewarding alternative career well worth your consideration.

**About the Author**

Erin Longdon Straub is an alliance manager in the Office of Technology Development at Harvard University.

**Editor’s Note:**

ASCB offers several courses to help graduate students and postdocs transition to careers in industry. Two weeklong courses are held each summer (one on the West Coast and one on the East Coast), and a one-day mini-course is held the day before the ASCB|EMBO Meeting. More information is available at www.ascb.org.
I often speak to students, both undergraduate and graduate, about their career plans. And one of the things that has struck me about these conversations is how narrowly focused many of their career plans are. Most undergraduates see their options as limited to medical school, graduate school, or maybe an entry-level job in a biotech or pharmaceutical company. Graduate students often see their options as a binary choice—the postdoc/academia track versus the industry track.

These conversations have led me to reflect on my own thoughts about my career options when I was at those stages, and I think that I also suffered from a lack of imagination about what choices I had. But in the intervening years, I’ve learned that it’s a wide world out there and there are A LOT of choices—and a background in the biological sciences is great preparation for a very wide variety of jobs and careers. Not only do you develop strong analytical skills, but especially by the end of a PhD, you should have a suite of “transferable skills” such as project management, written and oral communication, and teamwork. The trick is to learn more about the options that are available to you, and then to frame those skills in the context of the career paths that interest you.

So, how do you learn about these other career paths? Explore. At every step along the way, try to find and take advantage of opportunities to learn something outside your sphere. If you are a graduate student, try to do rotations in multiple labs. Go to talks and seminars, even if the topics aren’t directly relevant to your work. Go to scientific meetings and make sure you talk to a wide range of people. Not only will these steps improve your science by giving you a broader context, exposure to different techniques and approaches, and insight into different ways of thinking, you will invariably meet people who have had diverse experiences and you can learn from them. If your program offers it, consider doing an internship or a co-op—there’s nothing like direct experience in a workplace to really understand what a job is all about. In addition, big meetings like the ASCB|EMBO Meeting have a large number of career-related sessions and resources. Even if a topic doesn’t seem as if it will be of interest to you, check it out anyway. You might be surprised! And finally, try not to be limited by your preconceived notions of what a career should look like. Don’t let a lack of imagination hold you back!

One more thing: This advice is not just for students and postdocs. It’s never too late to explore! A few years ago, I took a risk and applied for a AAAS Science and Technology Policy Fellowship. I took a sabbatical from my university job, moved to Washington, DC, for a year, and worked at the U.S. Agency for International Development on human rights. Although it was a challenge to juggle this job with my obligations to my family and lab, and it was not directly related to my research or my university job, the fellowship was one of the most meaningful and interesting experiences of my life. So, explore!

About the Author
Lee Ligon is associate professor of biological sciences and associate dean for academic affairs in the School of Science at Rensselaer Polytechnic Institute.
Lehmann Elected ASCB President for 2021

Ruth Lehmann was elected by ASCB members to serve as ASCB President in 2021. Lehmann is Laura and Isaac Perlmutter Professor of Cell Biology, HHMI Investigator, Director of the Skirball Institute Biomolecular Medicine, chair of the Department of Cell Biology, and director of the Helen and Martin Kimmel Stem Cell Center at New York University School of Medicine. She will serve as President-Elect on the Executive Committee in 2020.

Others elected to Council include Stephanie Gupton, University of North Carolina at Chapel Hill; Bill Bement, University of Wisconsin, Madison; Needhi Bhalla, University of California, Santa Cruz; and Jordan Raff, University of Oxford, UK. Each member of Council will serve a three-year term beginning January 1, 2020.

The ASCB thanks the Nominating Committee members for their service: chair Sue Biggins, Arshad Desai, Laura Machesky, Dyche Mullins, Karen Schindler, Ahna Skop, Shirley Tilghman, and Erika Shugart (ex officio).
The ASCB Council has selected Matthew D. Welch to be the new Editor-in-Chief of Molecular Biology of the Cell (MBoC), effective January 1, 2020. Welch is a professor of Cell and Developmental Biology at the University of California (UC), Berkeley. The current Editor-in-Chief, David G. Drubin, will step down when his second term is over at the end of 2019.

Welch states that he is “honored and excited to take on this role” and hopes to further “leverage the amazing scientific strength and diversity of the ASCB community to sustain and grow the quality of the Society’s journal.” Welch notes that “MBoC is our journal, and I look forward to working with ASCB members to implement innovations that will best serve our community’s needs. By focusing on quality and service, opening access, broadening scope, and experimenting with new modes of content delivery, MBoC can be a go-to forum for communicating cell biology research. As scientific publishing evolves, I believe MBoC will be well positioned for the future.” Welch brings two decades of experience serving as a member of the editorial boards of many respected scientific journals, including being on the Board of Reviewing Editors for MBoC since 2006.

Sandra Schmid, who chaired the search committee for the job and who is herself a past Editor-in-Chief of the journal, noted that the landscape of research publishing is in transition. She says Welch has the skills and enthusiasm to capitalize on MBoC’s unique strengths.

“Change is in the wind for scientific publication, and Matt brings just the kind of experience, transformative leadership, and vision that MBoC needs to build on its success and position itself for a new future,” said Schmid, the Cecil H. Green Distinguished Professor in Cellular and Molecular Biology and chair of the Department of Cell Biology at the University of Texas Southwestern Medical Center.

“ASCB is fortunate to have Matt stepping into this critical role,” said ASCB CEO Erika Shugart. “Based on his participation in ASCB activities, including membership on the Women in Cell Biology Committee, he has shown that he is committed to the strategic goals of the Society to expand the centrality of cell biology and to support promotion of inclusiveness.”

Welch has been a longtime member of ASCB, joining the Society in 1994 when he was a postdoctoral fellow. He was chosen to be an ASCB Fellow in 2018. In addition, he was named a fellow of the American Academy of Microbiology in 2017 and received the R.R. Bensley Award in Cell Biology from the American Association of Anatomists. In 2018, he became Division Head of Cell and Developmental Biology at UC Berkeley, where he has been a member of the faculty since 1998. Welch has published nearly 80 scientific papers and given dozens of invited talks worldwide related to his work on the intricacies of the actin cytoskeleton.
Green Fluorescent Protein Image and Video Contest

To celebrate the 25th anniversary of the development of Green Fluorescent Protein as a tagging tool for bioscience, ASCB is searching for the most amazing images and videos that demonstrate the beauty of fluorescent proteins. Winning entries will be showcased at the 2019 ASCB|EMBO Meeting in Washington, DC, December 7–11. Follow #GFP25 on Twitter! Enter at www.ascb.org/green-fluorescent-protein-contest before October 15, 2019.

Cells keep their shape with actin filaments (red) and microtubules (green). Image: James J. Faust and David G. Capco, Arizona State University

Does Your Institution Pay for Your ASCB Membership?

It may be possible to bill ASCB membership dues to direct or indirect costs under a National Institutes of Health (NIH) grant. NIH guidelines state that subscriptions are allowable as direct costs and memberships as indirect costs (see section 200.454 of the U.S. Federal Government Uniform Guidelines). Your ASCB membership includes an annual subscription to Molecular Biology of the Cell valued at $626 per year.

Some universities allow membership fees as a direct cost to a project if it reduces the overall cost of attending a conference by more than the fee. The difference in price between a nonmember and member ASCB Annual Meeting registration far exceeds the cost of an ASCB membership. Savings range from $13–25 for undergraduate students, $75–85 for graduate students, $107–192 for postdocs, and $68–75 for regular members. You will also save $30 on your abstract submission as a member.

Check with your university, granting agency, or professor to find out if either of these circumstances applies to you.

If you have questions, contact ascbinfo@ascb.org.
Three cell biology journals now allow authors of manuscripts declined at one journal to transfer their submission seamlessly to another publication. Journal of Cell Biology (JCB), Journal of Cell Science (JCS), and Molecular Biology of the Cell (MBoC) have empowered researchers to transfer their rejected manuscript files, metadata, and editor’s decision letter with reviewer comments directly to one of the other journals, if the editor of the original journal invites them to do so. First announced at the 2018 ASCB|EMBO Meeting by the publishers of JCB (Rockefeller University Press), JCS (The Company of Biologists), and MBoC (ASCB), this new transfer option was formally launched on May 16.

“Everyone will benefit from this new transfer process: authors, reviewers, and readers,” said MBoC Editor-in-Chief David Drubin when the initiative was announced. “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.”

Here’s how the manuscript transfer works: An author who is offered the transfer option will be provided with a link in the decision letter from the original journal that will enable him or her to easily upload files, metadata, and reviewer comments to the new journal. The author also has the chance to revise the manuscript and cover letter before submission to the new journal.

Whether to take advantage of an editor’s invitation to transfer a manuscript is entirely up to the author. An author who wants to submit the manuscript to one of the three journals without transferring the reviewer comments may still submit a manuscript by traditional means. The editors of the three journals will not confer about manuscripts, and editors at a recipient journal will not know about a previous submission unless the author chooses to use the electronic transfer process.

The three publishers set out to harmonize their manuscript submission systems to cut the time that manuscripts spend in review and to spare authors the burden of having to begin the submission process anew for a manuscript that has been declined. Because the reviewer comments will also be transferred, the initiative decreases the collective burden on reviewers as well. (A reviewer’s identity will also be transferred to the new journal if the reviewer has given the original journal permission to do so.)

The recipient journal is not obligated to evaluate the manuscript solely on the basis of the transferred reviewer comments. However, the new journal editor may feel that those comments and the manner in which the author has addressed them are sufficient to allow a decision without further review.
Newsletter Design Wins Award

By Mary Spiro

In June of 2018, ASCB rolled out a new magazine-style design for the *ASCB Newsletter*. The new look was honored in March 2019 with a Silver Award from Association Trends, a Maryland-based organization for trade associations. The newsletter redesign was accomplished with input from the entire ASCB communications department with W. Mark Leader, editor of the *Newsletter*, leading the content overhaul and Leeann Kirchner spearheading the visual redesign.

“It took a creative vision and an eye for detail to conceptualize and create these marketing and communications tools, and the communications team did an outstanding job,” said ASCB CEO Erika Shugart.

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Apply for a COMPASS Outreach Grant

A Committee for Postdocs and Students (COMPASS) Outreach Grant can provide up to $1,000 to implement science outreach projects, such as science fairs, science talks at a local cafe, or other creative ideas for engaging the public.

Next Deadline: August 16

More Info/Apply at ascb.org/grants-awards/compass-outreach-grants
Discovering How Vitamin B12 Is Transported in Living Cells

By Mary Spiro

Vitamin B12 (or cobalamin) is unquestionably important for mammalian nutrition. The vitamin is obtained by consuming animal products or supplements. A deficiency of this micronutrient interferes with DNA synthesis and can lead to megaloblastic anemia or neural disorders. Scientists want to know how this vitamin is taken up and transported in living tissue, but elucidating the precise transport mechanism in vivo has remained elusive.

Now, researchers at Aarhus University in Denmark report that they have developed a platform and mathematical approach that can quantify the in situ cellular transport of B12 in a whole cell. The work, “Kinetic analysis of transcellular passage of the cobalamin-transcobalamin complex in Caco-2 monolayers,” was published in the February 15, 2019, issue of Molecular Biology of the Cell. The method is universally applicable to measure any receptor–ligand interactions, and the B12 transport system provided a convenient model.

Although cells require only tiny amounts of B12 to function properly, the micronutrient cannot move across the cell membrane on its own, explained Sergey Fedosov and Christian Heegaard from the Department of Molecular Biology and Genetics section on Molecular Nutrition at Aarhus University. The process, they said, involves protein carriers that bind B12 outside the cell and membrane receptors that recognize this complex and help move it across the membrane barrier.

“Under laboratory conditions the receptors are usually taken out of their natural environment to simplify monitoring of the interaction, which is not the best way to assess ligand affinity,” added Fedosov.

The team from Aarhus University set out to create a whole-cell assay that could estimate both the affinity and the number of active receptors in the membranes of living cells. The researchers used a platform with an upper (starting) compartment and the lower (finishing) compartment, separated by a tight monolayer of polarized human epithelial colorectal adenocarcinoma (Caco-2) cells, grown on a permeable membrane.

“Radioactive B12 in complex with a specific carrier (that is, the ligand) was added to the upper compartment,” Fedosov said. “The ligand bound to a specific receptor on the upper surface, endocytosed, transported across the cell, and was then secreted into the lower compartment.” By counting radioactivity in the upper and lower compartments, as well as inside the cells, the team was able to monitor transition of the ligand and develop a mathematical model to quantify the receptor–ligand interactions under nearly natural conditions.

In addition, the use of inhibitors to block receptors on the upper compartment helped the researchers to identify the specific membrane receptors involved in the process. The study also revealed that bovine transcobalamin did a better job of transporting B12 across the membrane monolayer than the human transcobalamin did. Does this suggest that consumption of dairy products could enhance the transport of B12?

“There is a possibility that the specific milk carrier of B12 directly interacts with an alternative
intestinal receptor and enters the body via a shunt pathway, described in our study,” said Fedosov and Heegaard. “Yet, this mechanism can take place only at a decreased digestion, when the milk carrier can survive within the digestive tract. In such cases, milk might present a better source of B12 than most of B12-containing products, such as meat, eggs, or fish. Usually, B12 must be liberated from these products to bind to another, human carrier (intrinsic factor) and interact with another receptor, thereby following the ‘conventional’ uptake of B12.”

Going forward, the group would like to study how some forms of B12 are better converted to cofactors than others. “We intend to establish the critical step of this intracellular processing via a similar kinetic study at the cellular level,” they said.
Highlights from

MBoC
MOLECULAR BIOLOGY OF THE CELL
www.molbiolcell.org

Be sure to check out MBoC’s collection of Career Perspectives (see the drop-down Features menu on the homepage taskbar).

See the March 15 issue for ASCB Annual Meeting Highlights (www.molbiolcell.org/toc/mbco/30/6)

A recent MBoC Perspective

Desiccation tolerance: an unusual window into stress biology
Douglas Koshland and Hugo Tapia (March 15, 2019)

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

A method of quantifying centrosomes at the single-cell level in human normal and cancer tissue
Mengdie Wang, Beatrice S. Knudsen, Raymond B. Nagle, Gregory C. Rogers, and Anne E. Cress (March 21, 2019)
Centrosome abnormalities are emerging hallmarks of cancer and are currently being explored as a promising target for therapy. Thus, a reliable method for accurately quantifying centrosomes in human tissue samples is needed. Here we establish a simple, accurate way to distinguish alterations in centrosome numbers at the level of single cells.

Effects of altering histone posttranslational modifications on mitotic chromosome structure and mechanics
Ronald Biggs, Patrick Z. Liu, Andrew D. Stephens, and John F. Marko (March 21, 2019)
Using micropipette-based force measurements and epigenetic drugs, we show that hyperacetylated histones do not change mitotic chromosome stiffness, but hypermethylated histones increase stiffness. We model mitotic chromosomes as a chromatin gel network to describe how the underlying chromatin fiber affects the overall mitotic chromosome structure.

A computational model of the early stages of acentriolar meiotic spindle assembly
Gaelle Letort, Isma Bennabi, Serge Dmitrieff, François Nedelec, Marie-Hélène Verlhac, and Marie-Emilie Terret (March 21, 2019)
Meiotic spindle assembly relies on an inside-out mechanism, starting from an initial ball of microtubules that self-organizes into a bipolar spindle in several hours. We reproduced, explored, and predicted in silico the early steps of spindle assembly. Our simulations also suggested experimental perturbations to affect chromosome individualization.

Isoform-specific Ras signaling is growth factor dependent
Using novel cell models and a network biology approach, this study challenges dogma in the Ras field by finding that isoform-specific Ras signaling is highly context dependent. Furthermore, oncogenically mutated Ras is dependent on coincident growth factor stimulation for efficient effector engagement and activation.
About the Image
An active Src-transformed NIH3T3 fibroblast forming plasma membrane protrusions called invadopodia and higher-order rosettes. The invadopodia and rosettes secrete matrix metalloproteinases that can degrade the underlying extracellular matrix, facilitating invasion. The cell is expressing GFP-tagged Hic-5 (green) as well as mCherry-tagged actin (red). See *Mol. Biol. Cell* 30, 1298–1313. (Image: Anushree C. Gulvady, SUNY Upstate Medical University)

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

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

SYMPOSIA
SUNDAY, DECEMBER 8
Beyond Figure 7: Integrating modeling and experiment in cell biology
Margaret Gardel, University of Chicago; Iva Tolić, Ruder Bošković Institute, Croatia; Petra Schwille, Max-Plank Institute of Biochemistry, Germany

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

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

MONDAY, DECEMBER 9
21st Century Machinery: The Structure, function, and evolution of protein machines
Andrea Musacchio, Max-Plank Institute of Molecular Physiology, Germany; Pierre Gönczy, Swiss Federal Institute of Technology Lausanne (EPFL), Switzerland; Tatsuya Hirano, Chromosome Dynamics Laboratory, RIKEN, Japan

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

TUESDAY, DECEMBER 10
Getting from Here to There: Individual and collective cell migrations
Ana-Maria Lenon- Dumënil, Institut Curie, France; Rodrigo Fernandez-Gonzalez, University of Toronto, Canada; Carl-Philipp Heisenberg, Institute of Science and Technology, Austria

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

WEDNESDAY, DECEMBER 11
D’Arcy Thompson at 100: Controlling cell shape and function
Ethan Garner, Harvard University; Jennifer Zallen, Sloan-Kettering Institute/HHMI

MINISYMPOSIUM/MICROSYMPOSIUM TOPICS
Controlling the Cell The Nucleus, Chromosomes and Cell Division
(includes Regulation of Cell Division, Mitosis & Meiosis, Chromosome Structure, the Nucleus, and From DNA to RNA)

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

Intracellular Organization & Quality Control
(includes Trafficking, Organelles and their interactions, Lipid trafficking and membrane recycling, Phase transitions, Autophagy, protein turnover & Quality Control)

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

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

WANT TO GIVE A TALK?
On average 30% of first-deadline abstracts are selected for a Minisymposium or Microsymposium talk.

IMPORTANT DATES AND DEADLINES
May 1  Registration and Housing Open
June 1  Scientific Abstracts Open
Aug. 1  Abstract Submission Deadline (Minisymposium/Microsymposium talk and/or poster consideration)
Sept. 3  Abstract Submission Deadline (Poster Only)/Travel Award Deadline
Oct. 3  Early Registration Deadline (rates go up on October 4)
Oct. 8  Final Abstract Submission (Poster Only)
Nov. 12  Hotel Reservation Deadline

JOIN THE CONVERSATION #ASCBEMBO19
ascb.org/2019-ascbembo-meeting
2019 ASCB MEMBER-ORGANIZED SPECIAL INTEREST SUBGROUPS

NEW THIS YEAR! Submit your abstract by August 1 to be considered for a talk in a Special Interest Subgroup.

Bacterial Cell Organization
Biological Timing: Molecular Clocks and Timers, from Systems to Synthetic Biology
Bottom-Up Cell Biology
Building Complexity to Understand the Microtubule Cytoskeleton: From Regulation of Microtubule Dynamics to Coordination of Motor Ensembles
Building the Cell
Cell Biology Meets the Hippo Pathway
Cell Dynamics and Matrix Interactions in Three-Dimensional Environments
Cellular Symmetry Breaking
Epithelia and Their Stem Cells
Kinesin Motors—What Is Conventional?
Lipids and Proteins in the Secretory Pathway—Homeostasis and Stress
Machine Intelligence and Statistics in Cell Biology

Maintenance of Genome Integrity in Health and Disease
Mechanics of Large Cellular Machines
New Frontiers in Multifactor Regulation of Cytoskeleton
Nucleoporin Roles in Tissue Architecture, Development, and Genetic Disease
Organelle Membrane Contact Sites and Cell Plasticity Control
Redrawing the Cellular Map: Cytoskeletal Forces, Organelles and the Crossroads
Signaling at the Primary Cilium
Specialized Cellular Protrusions, a Mechanism for Cell-Cell Communication
The Cellular and Molecular Basis of Invasive Metastatic Cancer
Tools and Devices for Cell Biology
Using Advanced Imaging to Redefine the Cell and Tissue Biology
Visualizing Immune Cell Activation
Visit https://www.ascb.org/2019ascbembo/subgroupdescriptions for more information about each subgroup.

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

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

NEW THIS YEAR! MEMBER-LED ROUNDTABLE DISCUSSIONS

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

Apply to lead a conversation among your peers on an emerging topic in the cell biology community. Facilitators will pose a topic or question and provide a brief description of the conversation to be printed in the program. Application opens late August. You can indicate your interest in leading a topic during the meeting registration process.
CONGRESSIONAL BIOMEDICAL RESEARCH CAUCUS

2019 Briefing Series

Each year the Coalition for the Life Sciences (CLS) plans a series of caucuses on Capitol Hill for congressional members and staff that are designed to foster an appreciation for and understanding of biomedical research. (ASCB is a founding member of the CLS.) ASCB members are invited to attend. To see any past briefing, please visit www.coalitionforlifesciences.org. All presentations take place on Capitol Hill in Washington, DC, and start promptly at 12:00 pm. Here are the 2019 topics and speakers:

**FRIDAY, JULY 26**
Human Genome to Precision Medicine
Eric Greene, National Human Genome Research Institute
Room: 2043 Rayburn House Office Building

**WEDNESDAY, SEPTEMBER 11**
The Future of Cancer Immunotherapy
James Allison, The University of Texas MD Anderson Cancer Center
Room: 2043 Rayburn House Office Building

**WEDNESDAY, SEPTEMBER 25**
The BRAIN Initiative: Is This Grand Challenge Living Up to Expectations?
Eve Marder, Brandeis University
Room: 2043 Rayburn House Office Building

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**DOORSTEP MEETING**
Cancer: From Genome Instability to Therapy

Date: Saturday, December 7
Location: West Salon, Walter E. Washington Convention Center, Washington, DC
Registration and abstract submission are now open.
Abstract deadline is Wednesday, October 12.
You must be registered to attend to present an abstract.

*Discounted registration will be available to those who also register for the 2019 ASCB-EMBO Meeting. The Doorstep Meeting is limited to the first 200 registrants.*
Emerging Voices

From Bench to Bytes: Learning How to Code as a Biologist

By Emily Summerbell

I am a cell biologist by training. Give me a cell culture dish or a microscope, and I’m happy. During the first two years of grad school, my work lived solidly and happily within the realm of cancer cell biology that I knew and was comfortable with. However, during my third year, my datasets got larger and my project took a sharp and intimidating turn toward bioinformatics. To be honest, this prospect terrified me. I am not particularly computer-savvy, and I had zero computer science or coding experience. But, given enough time, practice, collaboration, and coffee, I managed to grasp the basics of bioinformatics and analyze a brand new and exciting dataset that was previously uninterpretable to me.

In fact, there is a shift in the entire field of biology toward larger and more complex datasets that will require bioinformatics and machine learning to fully understand. As technologies such as single-cell sequencing, metabolomics, and live-cell imaging analysis become more common, we as scientists will need to diversify our skill sets to analyze the massive volumes of “-omics” data we can now produce. Although moving from “wet lab” to “dry lab” research may seem like an intimidating prospect, I would like to share some things that helped me along the way and may be of use to other beginners as well.

Pick the Language(s) You Need

A wide variety of coding languages are used, and every field has its favorites. However, for bioinformatics-related applications (like analyzing sequencing or proteomics data), two standouts are good choices for novice coders: R and Python. I will spare you a lengthy discussion of the differences between the two, but just know that these are both great languages for biologists who are beginning to code because huge communities of biologists are already using them. This means that there is a vast array of plugins and packages already developed by people who know what they’re doing, i.e., you don’t need to reinvent the wheel. For example, I wanted to analyze a DNA methylation array, and I used a package in R called ChAMP that already had exactly the functions I needed without having to write a whole new protocol. In addition, R and Python both have integrated development environments (IDEs) and code editors. Basically, IDEs and code editors add a user interface that makes your coding workspace more organized and user-friendly for beginners; they make it much easier to add additional packages, manage multiple scripts/files/plots at once, autocomplete code as you type, find errors in your code with detailed error messages, and more. For R, RStudio is the go-to
standard, and Python has many available options, including Jupyter, Spyder, and PyCharm. Note that R and Python are only two of MANY programming languages (https://bit.ly/2WCZN83), so talk to your colleagues and see which languages they are already using to decide the best choice for you.

**Find Training Resources in Person When Possible**

When I started to learn how to code, I used a mix of different resources to learn what I needed. By far my most useful resource was a grad student in our neighboring lab who is an expert in R. He was able to point me to the best resources to learn, the best packages to use, scripts he had already written for a similar project, etc., and he answered all of my many questions along the way. I strongly recommend finding a colleague at your institution who is already familiar with the language you want to learn. Learning from others who know what they’re doing is a fantastic way to polish your skills and get constructive feedback.

In addition, it’s great to have someone else proofread your scripts to make sure they make sense and are usable by other people.

And, good news, if you can’t find an expert to learn from at your home institution, both R and Python (and many other languages) have many online support groups of other people using and learning the languages. Sometimes there are even city-specific groups where you can meet up in person with coders of all skill levels (e.g., Python Local User Groups and R-Ladies).

I also took two courses at my home institution to learn and practice more of the coding skills I needed. Having in-person training and feedback was incredibly valuable to me, so I encourage you to look for courses or workshops as well.

**Google and Online Help Sites Are Your Best Friends**

If in-person courses aren’t available, there are many online training courses (both free and paid) to learn everything from the basics of “What the heck is coding?” to specifics like “How do I make a heatmap from my RNAseq data?” Online tutorials are great resources because they almost always have practice datasets for you to use. I used the beginner R tutorials from swirl and DataCamp, but there are plenty of other sites to use as well, including Codecademy, Free Code Camp, and Coursera.

In addition, I can’t tell you the number of times I’ve googled “How to do ___ in R” or “What does XYZ error message mean?” Fortunately, the Internet is full of people with the same problems and with many opinions on how to fix them. One of the biggest online communities for coding help is Stack Overflow, which is full of Q&A pages on any and every programming problem you can think of. In addition, GitHub is
a great site for sharing your code with other people on a project, or even the wider scientific community, to debug or get more feedback.

You Don’t Need to Become an Expert in Everything Coding-Related

Let’s say you are planning to go on a month-long trip to a foreign country where people don’t speak your native language. There’s no need for you to quit your job, study that language every day, and become 100% fluent before your trip. Instead, it would be wise to spend a little time each day learning practical phrases, like “Good morning, how are you today?” or “Where is the bathroom?” In the same way, there is no need for you to become a coding expert to perform the analyses you need. Instead, decide on what specifically you want to accomplish and focus on the skills and commands needed for your specific project instead of trying to absorb everything. Once you start figuring out the steps you need to take to get from dataset to paper figure, it’s easier to decide what you really need to learn and what you can skip.

Fail Often, but Also Celebrate the Small Victories

Coding is hard, especially for beginners. It’s an entirely different way of thinking that’s not always intuitive to people who have spent their lives in the world of biology. But remember that it’s perfectly normal (and even good) to “fail” at programming. The stakes are incredibly low; you don’t need money or precious lab resources to practice coding, only time and patience. If your code keeps running into bugs, take the time to figure out what’s wrong and adjust. Every little mistake in coding is a learning opportunity and a chance to find creative solutions to complex problems. And every time something goes right, be proud of your progress! So go ahead, celebrate that first data table you finally compiled, or print out that first heatmap and post it above your desk for all to admire. Even small victories in coding are major steps on the way to becoming a more well-rounded scientist.

About the Author
Emily Summerbell is a graduate student in the lab of Adam Marcus at Emory University.
How can we empower students and postdocs to cope with the scarcity of academic jobs by embarking on other careers where their skills are needed?

When I first came to the United States in 2006 as a postdoctoral fellow at the University of Miami, I was struck by how many of my colleagues had been working as postdocs for years. Being somewhat naïve, I had assumed that a typical postdoc experience lasts for about three to four years, after which one would transition to a faculty position or move to industry. Unfortunately, in reality things are a lot different. For most postdocs, a faculty position is a distant dream. There are very few jobs and too many postdocs. This has led some to suggest that the postdoctoral system is a pyramid scheme. Lab heads recruit postdocs to do research, publish papers, and help get funding. But there aren’t nearly enough faculty opportunities for the number of postdocs. So how should we address this problem? Should we stop recruiting postdocs? Or worse, not train as many graduate students? While I have heard that argument in some circles, I do not agree with it. In our current environment, where science is greeted with much skepticism, we need more people trained in the scientific method and possessing scientific expertise.

Not Enough Jobs?

In the United States, about 12,500 students obtained a PhD degree in 2014. While in the 1970s more than 50% of PhDs in biology successfully transitioned to a faculty position, this number currently is less than 15%. Just because we are graduating more PhD students each year does not mean that universities will grow their departments and faculty accordingly. Outside of jobs in academia, trainees can consider working in industry. But even here, there aren’t enough jobs for the majority of PhD graduates.

Most students who obtain a PhD degree do not follow a traditional career path in academia. Given the broad range of skills doctoral students acquire during their training, this should come as no surprise. Our students are not trained just to design experiments and test hypotheses; they are trained in skills that are very easily transferred to other fields of work. The way I describe it, a graduate student practices and perfects over five to six years what students pursuing a master of business administration degree learn in only about 18 months. A graduate student is trained to think critically, troubleshoot effectively, manage projects, communicate complex information, train peers and subordinates, work in teams, gather new information, network, and the list goes on. Most importantly, graduate students learn how to learn. This large repertoire of skills is valuable to most industries, and there is no reason why students should limit themselves to academia or research industry positions after graduation.

Changing the Culture

I have heard PIs lament that their trainees are not pursuing careers in academia. Some believe that if you do a PhD and pursue a career outside academia, you are wasting your training. This is a culture that is frankly not helpful to either the trainees or society in general. Insisting that trainees pursue a career in academia contributes to a society where scientists continue to live in their bubbles and fail to interact with the public at large. Some of this skepticism about careers outside academia is understandable. Most PIs are not well informed about such careers. We are not
equipped to provide our trainees with useful career advice in other fields. Since academia is all we know, that is what we insist on and push for. Most graduate training programs do not emphasize formally training their students for the nonacademic careers on which most STEM PhD graduates will embark. This dissonance creates ill-prepared students who do not consider nonacademic careers.

An argument against obtaining a PhD to pursue a career outside academia is that a doctoral degree takes longer than other degrees. Thus, PhD graduates starting out in nonacademic careers fall behind in pay in comparison with non-PhD graduates in the same age group. While this may be true in some cases, in several jobs a PhD degree is very valuable and enhances the ability of the individual to excel. For example, science communication, scientific writing, and research development are careers where a PhD degree provides an invaluable advantage. One must also take into consideration the cost of the degree. Most PhD programs pay a stipend and students pay nearly nothing out of pocket for tuition and fees. Almost all other terminal degrees are expensive and often result in significant student debt. A PhD degree is often the only terminal degree that students from humble means can afford.

Professional Development for Graduate Students

We at the Department of Biochemistry & Cellular and Molecular Biology at the University of Tennessee, Knoxville, are not immune to these challenges. To improve our students’ preparedness for entering the workforce, we organized a seminar series that featured speakers with PhDs working in diverse fields. This seminar series was funded by the National Science Foundation supplement “Improving Graduate Student Preparedness for Entering the Workforce, Opportunities for Supplemental Support.” We invited speakers with expertise in patent law, scientific writing and editing, start-ups and entrepreneurship, business consulting, science policy, government sector, and pharmaceutical industry. The seminar presentations were designed to introduce students to different careers and familiarize the students with the requirements for each career. For longer-lasting impact, the seminar speakers discussed with departmental faculty how to best prepare our graduate students for a career like theirs. Apart from the valuable information that the students learned, they also got an opportunity to network with the speakers. In some cases, the speakers expressed an interest in extending internships for students interested in their respective careers.

University career services should be more active in helping trainees navigate different career options. We also need to redesign the PhD curriculum to meet the careers goals of the degree recipients. It may be worthwhile to train students in formal project management courses, scientific writing, or other relevant courses. With a changing career landscape for PhD graduates, it is indeed time to modernize the curriculum and optimize it to the students’ needs.

In the past few years, several universities have developed strategies to improve career development for trainees. In addition to the National Science Foundation, the National Institutes of Health has also funded several initiatives to promote career development (www.nigms.nih.gov/training/instpredoc/Pages/car-cur-dev.aspx). There is clearly a change in the culture, and students should feel more empowered now to venture into diverse careers after graduation.

References


About the Author

Maitreyi Das is assistant professor in the Department of Biochemistry & Cellular and Molecular Biology at the University of Tennessee, Knoxville.
Recent congressional hearings on the FY20 U.S. National Institutes of Health (NIH) budget were a bipartisan lovefest. The support for NIH that was evident in congressional oversight hearings before both the House and Senate Appropriations Subcommittees on Labor, Health and Human Services, Education, and Related Agencies is notable because the Trump Administration’s FY20 budget proposal called for a $5 billion cut to the NIH, rolling the budget back two years.

Committee leaders on both sides of the aisle were clear in their support for the NIH and for budget increases for the NIH. Representative Nita Lowey (D-NY), chair of the full House Appropriations Committee, said, “I would like to increase this budget as much as we possibly can.”

Representative Tom Cole (R-OK) said, “While I appreciate and sympathize with the fiscal restraint expressed in the president’s budget, I do not think a reduction of the magnitude this budget [proposal] recommends for NIH is in the best interest of the American people.” Cole, along with Senator Roy Blunt (R-MO), chaired the House and Senate Labor Subcommittees for the previous five years and has been responsible for major increases for the NIH. Cole and Blunt were the recipients of the 2018 ASCB Public Service Award.

NIH leaders, who testified before the two committees, were met with a similar welcome at the hearing before the Senate. Senator Richard Shelby (R-AL), chair of the full Senate Appropriations Committee, echoed the comments of his House colleagues, “I’m not interested in cutting your budget,” he told NIH Director Francis Collins. “I’m interested in increasing it.”

Increasing the NIH budget for FY20 will not be without difficulty. Both the House and Senate Appropriations Committees are facing overall limitations on the amount that can be spent for defense and for domestic programs. Those limits will need to be increased for any increases in spending for important programs to take place. There seems to be universal agreement on the Hill that these budget caps should be raised. It is just a question of how much.

As with all appropriations committee hearings, there was discussion about some of the policy issues facing the NIH. The need to focus funding for young investigators was brought up in both hearings. Discussion in the Senate hearing also focused on concern that foreign governments are taking advantage of the openness of science in the U.S. to steal data and results from American scientists. Both committee members and NIH leadership at the hearing expressed concern that federally funded researchers were not identifying collaborations they have with other nations.
Important NIH Regulations on Foreign Financial Connections

By Kevin Wilson

Recent science media attention has focused on foreign nations stealing data and research results from research laboratories in the United States. U.S. intelligence agencies and Congress are addressing the matter. The issue has highlighted the need for members of the U.S. National Institutes of Health (NIH) research community to pay attention to some important regulations regarding foreign collaborations.

- Does a research institution outside the United States help fund your research?
- Have you received fees for consulting with an international company?
- Do you have a second laboratory in another country?
- Has a foreign organization paid for your travel to participate in science-related activities?
- Do you have any financial interests with foreign entities?

If you answered “yes” to any of these questions, you should be reporting the activity to the NIH and any other federal agencies that fund your research. Reporting financial connections is a condition of receiving funding from the federal government. Not only is it the law, but it helps to provide a reasonable expectation that federally funded research is free of financial conflicts of interest.

For more information, including Frequently Asked Questions, visit the NIH’s Conflict of Interest webpage (https://grants.nih.gov/grants/policy/coi/).

ASCB President Visits NIGMS

By Kevin Wilson

ASCB President Andrew Murray traveled to Bethesda, MD, in April to visit the National Institute of General Medical Sciences (NIGMS) leadership. He met with Jon Lorsch, NIGMS Director, and several division directors.

Murray and Lorsch, along with ASCB CEO Erika Shugart and Director of Public Policy and Media Relations Kevin Wilson, discussed a wide range of issues important to the ASCB community.

Topics that were discussed ranged from concerns about foreign governments’ efforts to steal American intellectual property, including research results; the implications of Plan S on American science; and an update on the NIGMS Maximizing Investigators’ Research Award (MIRA) program (see p. 10). The group also discussed ways to make sure the NIGMS has a visible presence at the annual ASCB|EMBO meeting.

The meeting gave the ASCB the opportunity to improve the already strong relationship it has with the leadership of NIGMS, the leading funder of ASCB members.
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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Here are some highlights from the June 1, 2019, issue:

**LETTER**

Regression to the Mean in Pre-Post Testing: Using Simulations and Permutations to Develop Null Expectations

Robert E. Furrow

**EVIDENCE-BASED TEACHING GUIDE**

Inclusive Teaching

Bryan Dewsbury and Cynthia J. Brame

**ARTICLES**

A Framework to Guide Undergraduate Education in Interdisciplinary Science

Brie Tripp and Erin E. Shortlidge

This essay provides an overview of challenge(s) and varying definitions of interdisciplinary science. We present a model for practitioners to use in developing and assessing instruction that fosters students’ ability to tap into the interdisciplinary nature of science.

Burnout and Mental Health Problems in Biomedical Doctoral Students

Gabriela A. Nagy, Caitlin M. Fang, Alexander J. Hish, Lisalynn Kelly, Christopher V. Nicchitta, Kafui Dzirasa, and M. Zachary Rosenthal

We discovered high levels of burnout, depression, and anxiety. Additionally, we identified that burnout was significantly associated with thoughts related to dropping out, subjective appraisal of employment opportunities, functional impairment due to a mental health problem, and having at least one current psychiatric disorder.

A Multi-Institutional Analysis of Instructional Beliefs and Practices in Gateway Courses to the Sciences

Joseph J. Ferrare

This paper reports findings from a study of instructional practices in 71 introductory STEM courses across 6 institutions of higher education. Data collection included over 140 hours of classroom observations, as well as in-depth interviews with the instructors of record concerning their beliefs about teaching and learning in STEM.

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.

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Over the past month alone, a series of reports have highlighted the role of scientists in promoting gender and racial disparities in work-life balance, grant awards, and academic achievement, to say nothing of our shortfall in creating learning and workplace climates devoid of sexual harassment. These studies reveal that scientists (that’s us) are restricting who advances and persists in science, technology, engineering, mathematics, and medicine (STEMM) careers. Making these decisions based on anything other than ability inhibits personal and scientific progress. To reverse this reality, it’s up to each one of us to work to make our profession more diverse, equitable, and inclusive.

I have been interested in and have been an advocate for that goal throughout my academic career, and I am often asked to speak about “what works.” I firmly believe that it will take our collective effort to get there. That’s why I have grown increasingly concerned about the polarizing chatter on social media around this challenge. These efforts have clearly and importantly increased the urgency to promote positive change. Rather than settling into despair, use these data to create teachable moments to change our trajectory toward a future that supports the success of all members of our community and the scientific enterprise. For example, I began a project in 2016 to collect stories about microaggressions in STEM not only to give voice to our experiences but also to raise awareness of them. I have used these submissions to identify common themes that negatively impact perceptions of learning and workplace climate in STEMM (e.g., comments on pregnancy, choice of dress, dedication) and discussed them in presentations and workshops to demonstrate that impact is often independent of intent. You might consider doing something similar in your own department by presenting published studies in a journal club, where discussion is possible.

Learn from the Past, Work toward the Future
Statistics on the lack of diversity in STEMM fields and studies of its underlying causes can push even the most optimistic of us to a sense of helplessness in the face of seemingly insurmountable challenges. Rather than settling into despair, use these data to create teachable moments to change our trajectory toward a future that supports the success of all members of our community and the scientific enterprise. For example, I began a project in 2016 to collect stories about microaggressions in STEM not only to give voice to our experiences but also to raise awareness of them.

I have used these submissions to identify common themes that negatively impact perceptions of learning and workplace climate in STEMM (e.g., comments on pregnancy, choice of dress, dedication) and discussed them in presentations and workshops to demonstrate that impact is often independent of intent. You might consider doing something similar in your own department by presenting published studies in a journal club, where discussion is possible.
Careers

Career Navigator

Engage to Create a Learning Culture

Our lived experiences give us unique perspectives on our learning and workplace climates that may inhibit us from seeing the challenges faced by others. It’s difficult to motivate people, including ourselves, to change if the problem is not apparent or if we are being criticized for not seeing it. Respectful conversations across divides are an important component of building that understanding and often the most challenging because we have to be willing to publicly unpack, confront, and reconsider the basis of our own beliefs. In my own life, a friend elsewhere on the ideological spectrum has broadened my perspective by challenging my viewpoints and answering even my naïve questions on topics ranging from consent to scientific credit. These conversations push both of us outside of our comfort zones. Yet we emerge with greater understanding rather than with bruised egos because we come to these conversations from a place of mutual respect, where blame, criticism, and personal attacks are absent. Be a part of creating such a learning culture at your institution by emulating the psychological safety of my friendship. For example, you can build and/or participate in forums for exchange, such as surveys, book clubs, focus groups, and workshops. In these activities, suggest ground rules for discussions and plans for addressing conflict before sensitive topics are broached. My own university, the University of Massachusetts, Amherst, has successfully implemented these strategies to foster honest dialog and the work necessary to respectfully bridge divides.

Focus on End Goals Rather than a Single Fix

In my current role, I’m often asked to “fix” things in a way that is specific to the perspective of a single person or group, but I’m wary of doing so because such actions can often have unintended consequences. For example, term limitations on postdoctoral appointments were introduced to promote career progression but have created new challenges for persistence of underrepresented groups in STEM. Instead, find ways to bring people together to leverage the power of diverse groups to solve complex problems. In my own college, I have approached systemic learning and workplace climate change by creating a network of climate advisory committees with broad representation. I have found that working together to articulate a shared vision, empowering the groups to identify the actions that will have the greatest impact, and recognizing and rewarding success tailors solutions to the unique needs of each unit. By bringing these groups together, we allow common themes to be identified more quickly and addressed more globally. You can do the same by creating advocacy groups not only to advise leaders on concerns and possible solutions but also to listen to their constraints. By giving light to all perspectives, we enable outcomes to emerge that are better than any single group could have constructed on its own.

Recognize the Importance of Your Own Contributions

Our workplace and learning climates place each of us within a network. Be bold in engaging your own sphere of influence. No matter how small our individual contributions may seem, they will positively ripple outward from our primary connections. Over time, the scale of my own efforts has expanded from supporting individual friends in graduate school, to talking about work-life balance, to suggesting...
institutional policy changes,¹³ but they have always been motivated by something that mattered to me. More often than not, I have found that I am not alone in those perspectives and that others are willing to join and amplify my effort. Start by sharing your own perspectives and also consider joining conversations that have already begun.

Change is never easy. The complexity of this work makes it nearly impossible to chart a positive course that is devoid of setbacks and pitfalls, proceeds at a pace that is not too fast for some or too slow for others, and reaches all perspectives. Nevertheless, I am optimistic: Even imperfect attempts will help us to create a more productive path forward and even small steps will bring us closer to our aspirations. The current state of STEMM professions arose from our past actions, but together we have the power to determine what is possible for our future by daring to be different.

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About the Author
Tricia Serio is a professor of Biochemistry and Molecular Biology and the Dean of the College of Natural Sciences at The University of Massachusetts, Amherst. The opinions expressed in this commentary are her own.

ASCB Member Benefit: One-on-One CV Review

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DEAR LABBY

DEAR LABBY: I’m a midcareer cell biologist at a large research university. Recently, I’ve found myself on some university committees, through which I’ve gotten to meet some of the upper-level administrators at our university—deans and senior people in the central administration. This has made me wonder whether I could have a future in this kind of position. I think this would help me to advance some of the issues I care about that affect my science and my students. I’m wondering if this is something I’d enjoy, and whether I have any aptitude for this kind of career path. Some of my colleagues would see this as going over to the “dark side,” but I’m intrigued. Can you offer any advice on how to explore this new direction?

—Darth Cellius

DEAR DARTH: You’re right that some administrative positions will allow you more influence over issues you care about, and it can be very rewarding to be able to make positive changes that can benefit your colleagues and students more broadly. You’ve already taken a good first step toward learning more by finding your way onto some committees that seem to have interested you. If you have the opportunity, consider also serving on search committees for deanships or other senior executive positions. These committees are time consuming and can be contentious, but they can be a great way to learn more about what these positions involve, as well as developing a network of colleagues who can help you if you aspire to this kind of role.

Having a good mentor can make all the difference. If there is a senior administrator whom you admire, who seems to embody your values, find ways to get to know them better. Tell them of your interest, and ask if you can meet for coffee to talk about what they do and about the career path that took them there. You’ll probably find they’re passionate about what they do, and happy to talk through the pros and cons of their positions. On a practical level, you’ll need to consider whether this is the right time for you to do something like this; it may not be, if it will interfere with getting tenured or promoted or maintaining funding for your students and postdocs.

Leadership training is often available through universities. Some have formal leadership training programs that cover things as strategic planning, financial systems, and soft skills such as negotiation, giving feedback, and managing conflict without the aid of a lightsaber. Others create opportunities

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.

Shedding Light on the Dark Side: How to Become an Administrator
to work closely with a campus leader on a part-time basis in a kind of internship. These temporary positions are called by a variety of names, such as “faculty fellow,” and usually involve working on a special project for a semester or two. They allow you to experience, first-hand, what the position entails and to test the limits of what you can and can’t achieve in these positions. There are also national programs that seek to develop a pool of future leaders. Well-known examples include the HERS Institute, offering leadership development programs for women, and the American Council on Education Fellows Program. Labby has also observed that serving in leadership roles for ASCB, such as serving on ASCB committees, is an excellent way to gain experience working on national issues that you’ll need to understand in a university leadership role.

Finally, for some positions there is a typical career “ladder.” For example, most deans previously served as department chairs; others may have served as associate deans. It’s likely to be hard to move into a deanship without the right background. For other types of positions, serving as a director of a research center or institute may be a good stepping stone. Although a stellar faculty career is not a prerequisite for every position, it is very important for some.

Finally, consider how moving into administration might affect your research career. Some administrators stay active in research or teaching, and finding a good balance helps them be better in their administrative role. Others prefer to focus on their new role. Since you’re not yet sure that administration is right for you, try to keep your options open as you test the waters. Good luck, and remember that our universities need thoughtful leaders who care about basic science.

—Labby
During her PhD program in neuroscience at the University of Virginia, Robin Kleiman hadn’t considered an industry career. “I was pretty happy. I had great mentors and lab mates, and my only real responsibility was to hang out in the lab and learn,” says the Senior Director of Translational Cellular Sciences at Biogen in Cambridge, MA. But if she could go back in time, Kleiman adds, “I would have told myself to take a pharmacology class or two.”

Not until the end of her postdoc at the University of California, San Francisco, did Kleiman became focused on applied research that would “yield concrete therapeutic approaches for patients.” Bolstered by a positive interview experience at Pfizer, she ventured into uncharted waters. “I became very excited about how much I could learn in a big pharma setting working on large multidisciplinary teams,” she explains.

Building on her training in cellular neurobiology, Kleiman developed in vitro assays to support drug discovery programs. “In vitro assay development in neurons is more complex than other cell types, and my academic experiences gave me a deep appreciation for all the ways that neurons are unique,” she says. Kleiman eventually also contributed her expertise to the faculty at the Boston Children’s Hospital (BCH) to help establish its Translational Neuroscience Center, where she served as Director of Preclinical Research.

“I like to think of my time at BCH as my ‘sabbatical’ back into academia. They wanted to recruit somebody with an industry background to help them think about what sort of infrastructure and relationships were needed to enable translation of the basic research coming from the neuroscience faculty into treatments for their patients,” says Kleiman. “For me, the opportunity to build basic drug discovery capabilities at a world-class academic medical center focused on neurodevelopmental disorders, during an era when many big pharma companies were exiting neuroscience, was an opportunity I could not pass up.”

Kleiman said she was moved by “parents starting foundations to support translational research for disorders that affected their children.” As a parent herself, she says she “felt a responsibility to help these groups ensure that the research that they supported with their fundraising efforts was directed at projects and approaches that would enable industry to develop treatments for their kids.”

Now at Biogen, Kleiman maintains collaborative relationships with BCH. “I don’t think it is an either/or proposition. I still work closely with several academic labs. My skill set is best applied to make medicines that will treat patients with CNS disorders wherever that opportunity is best,” she says.

Because of Biogen’s commitment to “leadership in neuroscience therapeutics and the scientific acumen of the leadership,” she says the company is a good fit for her, even though the pace can be unrelenting. Her current project “using patient iPSC-derived CNS cell types combined with bioengineered microphysiological systems to create predictive disease models” was expected to take a few years to establish. “[But] we can’t just wait until the end of three years to show value for portfolio programs,” Kleiman says. “It is always a juggling act to simultaneously demonstrate impact on the active portfolio while still building new capabilities.… It is a double-edged sword because the urgency of the effort to show impact for patients also represents a part of the role that I enjoy the most.”
upcoming early career meetings

Bay Area Cytoskeleton Symposium  
June 28, 2019  
Palo Alto, CA

2nd Annual Rocky Mountain Membrane Trafficking Meeting (RMMT)  
August 16, 2019  
Denver, CO

Postdoctoral Teaching Toolkit: Scientific Teaching for Diverse Leaders  
August 24, 2019  
San Francisco, CA

Montreal-Area Phase Separation  
September 2019  
Montreal, QC, Canada

Building Bridges between Academia and Industry  
September 2019  
Philadelphia, PA

Florida Translational Cell Biology Symposium  
September 13, 2019  
Gainesville, FL

The Northeast Nuclear Envelope Meeting  
September 20, 2019  
New Haven, CT

Toledo CelluART  
September 27, 2019  
Toledo, OH

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

The next deadline to apply for funds is June 20, 2019. Applicants must be or become members of the ASCB.

For more information visit www.ascb.org and click on “Meetings.”

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Thank you for your support!

Erika Shugart
CEO

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.
To the Editor,

In her feature article “Germline Immortality” (ASCB Newsletter, February 2019, pp.15–16), Yukiko M. Yamashita offers “…speculations...on the mechanism of germ cells’ immortality…”

Immortality, when strictly defined, does not appear to exist in any cell lineage or life form because molecular turnover occurs.

Cells that appear near or at the end of a long lineage, do not contain all, or most, of the molecules that were present in the founding cell. I have shown that cultured normal human cells have a finite capacity for replication, which also has been observed in the normal cells of many animals.

However, germ cells, abnormal cell lines with cancer cell properties like HeLa, and in vivo transplantable cancer cell populations are often stated to be immortal. Nevertheless, as in normal cells, molecular turnover also occurs in these cells. Therefore, cells that appear after, for example, 50 replications in these lineages must contain mostly or entirely molecules that were synthesized after the disappearance of those that composed the founding cell. The property of “sameness” or “identicalness,” where all of the molecules that composed a founding cell also exist in the lineage of their progeny after many replications, is unlikely to occur.

The only aspect of biology that approaches (but does not achieve) immortality is the flow of information.

Most of our cells present today were formed no more than a few years ago. Some were formed a few minutes, or fractions of a second, ago. We do not know of any dividing or nondividing cells whose constitutive molecules have been proven to have been present at birth and to have survived to old age. A 20-fold increase in our weight from birth to adulthood clearly results in the presence mostly of cells far younger than those present at birth. After about 20 population doublings most atoms and molecules in a founding cell have vanished from dilution, reuse of parts in other molecules, or disposal as waste. A cogent question becomes: If most of our cells, or their component molecules, turn over in only a few years then what is celebrated on our birthdays? This is another reason why the determination of biological age (and birthdays) is so elusive.

The molecular turnover of DNA, even in gametes and their precursors, is why immortality does not occur (despite the common belief in Weismann’s claim of the continuity or immortality of the germ plasm).

However, information coded in DNA or RNA comes closest to conforming to a strict definition of immortality. DNA is resynthesized with new molecules at each round of division, but in doing so the coded information flows on despite the continuous replacement of new constituent molecules. Although the physical presence of the same molecules does not occur after each round of DNA replication, the information coded in the structure is maintained.

The information that is passed on at each round of replication comes closest to meeting a strict definition of immortality but with one critical exception. That is, the essential occurrence of mutations in DNA that must exist to drive evolutionary changes. The mutated sequences are not constituents of the founding molecules so “sameness” is not maintained. Thus, the DNA or RNA of a species comes closest, but does not succeed, in becoming an example of immortality in biological molecules.

The mortality of all life forms appears to be universal.

Sincerely,

Leonard Hayflick
The University of California, San Francisco
Response to Hayflick

I appreciate the intriguing comments from Leonard Hayflick regarding my essay on germline immortality. He states, “Immortality, when strictly defined, does not appear to exist in any cell lineage or life form because molecular turnover occurs.”

However, I would like to note that the term “immortality” is specifically reserved to describe a (conceptual) state of living objects: As can be found in any dictionary, the definition of immortality is “the ability to live forever.” Accordingly, a plastic bottle or a Barbie doll, which does not (noticeably) turn over its compositional molecules, is not called immortal. Molecular turnover is the fundamental nature of life. Any objects that do not turn over their molecules are not defined as life in the first place, and thus the definition of immortality cannot be applied. Accordingly, Hayflick’s argument of lack of immortality in any living organisms due to molecular turn over seems to be internally conflcted.

With that said, one has a freedom to deny the concept of immortality based on universal molecular turnover in all living objects. However, as a biologist, I am fascinated by the remarkable ability of all living forms to preserve certain information (which translates into their morphology, behavior, and physiology etc.) despite constant molecular turnover. The extremity of this is the preservation of information from one generation to the next through the germline, which I would like to define as “immortality.” I believe that usage is closer to the dictionary definition of immortality than the lack of molecular turnover. I would like to note that both of us seem to agree that information is transmitted through DNA replication for many (cellular and organismal) generations: from there, denying immortality due to the molecular turnover vs. seeing immortality in informational flow seems to separate us from one another.

Yukiko Yamashita
University of Michigan, Ann Arbor

Dear Editor/Dear Labby,

One of the highlights of my monthly schedule is receiving the ACSB Newsletter with your “Dear Labby” column. It never fails to interest, inform, and even inspire me. While I rarely experience the issues you describe, your April 2019 response to “Eager but Naive” speaks to my directions in research and teaching. Everything you mention has value. Specifically, the reference to “bullet points” adds to the “six questions” method I would like to share as an approach for reading, reviewing, or writing a research paper. Answer these questions and you have your sentence outline to amplify.

1. What is the question asked in the paper?
2. Why is it important?
3. What is the experimental design to get an answer?
4. What results were obtained?
5. How are these results interpreted? Alternatively, what is the answer to the question raised in 1?
6. What is the next step?

Sincerely,

John Merriam
Department of Molecular Cell and Developmental Biology, University of California, Los Angeles
Enjoy Yourself!

Let's face it, you're not in this for the money, the fame, the fabulous outfits, or the great hours. You're in this because you love science, and working in science makes you happy. Therefore, make sure you pause every now and again and take a moment to enjoy what you're doing. After all, this is a huge step! You are now a professional scientist, and you get to learn new, cutting-edge techniques that will allow you to tackle fascinating questions and make the world a better place. Enjoy it.

—Gaia Cantelli, Duke University

Exploit Your Strengths

While it's important to focus on your weaknesses, exploiting your strengths can be a great way to ease yourself into postdoc life. As a senior PhD student, you were presumably an absolute pro at a few techniques. Can you incorporate them into your postdoc work in a useful way? This can be a good way to show your new lab what you can do, contribute to their research, and ease yourself back into the swing of things. In fact, you might be able to bring new techniques into your lab, thus giving back to all those patient people who are taking time out of their busy schedules to help you.

Having to learn something new will actually be a strength rather than a weakness in the long term.

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