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About the issue:
ASCB and Molecular Biology of the Cell (MBoC) recognize the profound influence that concepts and technologies from the physical and computational sciences are having on cell biology. This issue will build on the great success of the six issues published since 2014 and will again provide an opportunity for researchers whose work crosses disciplines to reach a wide audience.

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To achieve diversity, equity, and inclusion in society, it is essential to achieve diversity, equity, and inclusion in education. In light of the recent surge of interest in racial equality, it seems right that this, the Education issue of the ASCB Newsletter, has a strong focus on improving diversity in the scientific workforce.

In his guest President’s Column (p. 6), David J. Asai, Senior Director for Science Education at the Howard Hughes Medical Institute, says that there is something about the way we teach science that is driving away members of racial and ethnic minorities. He suggests some education reforms that could help ameliorate the problem.

Similarly, in his Feature article (p. 8), Kenneth Gibbs of the National Institute of General Medical Sciences laments the glacial progress in promoting diversity in science. He discusses how he must “listen, acknowledge, and act” to move forward.

Also in this issue, you can read related articles about 2020 ASCB Inclusivity Award recipient JoAnn Trejo (p. 18); a National Institutes of Health grant to ASCB to enhance diversity in the biomedical academic workforce (p. 20); a program at the University of California, San Diego, to help young scientists who lack the background and support to attend graduate school (p. 37); and strategies to improve mentorship of diverse scientists (p. 48).

In other education news, read about the recipients of the Bruce Alberts Award for Excellence in Science Education (p. 16), ASCB’s virtual Education Meeting (p. 23) and Biotech Course (p. 25), and approaches to designing exams for online courses (p. 44).

And there’s more. As I write this, I am a bit astonished at how much is in this issue. Despite the pandemic, ASCB and its members have been very busy.
prophase

members in the news

Lillian Horin, a doctoral student at Harvard Medical School in the laboratory of Tim Mitchison, was named a 2020 Howard Hughes Medical Institute Gilliam Scholar and will receive $50,000 per year for up to three years.

Angela Wandinger-Ness, the Victor and Ruby Hansen Surface Endowed Professor in Cancer Cell Biology and Clinical Translation and Director of the Fluorescence Microscopy Shared Resource at the University of New Mexico Health Sciences Center, received the 2020 Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring.

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Three R’s for Inclusive Education

By David J. Asai

The lack of racial diversity in science is appalling. Today, the nation is approximately 30% PEERs—Persons Excluded because of Ethnicity or Race—but the scientific workforce is only about 10% PEERs. By failing to include large segments of our nation’s talent pool—a nation that will be “majority-minority” by 2042—we exclude the divergent perspectives that produce the innovation and creativity that drive scientific excellence.

There are some who blame the “leaky pipeline.” The lack of diversity will disappear, they say, if we just do more outreach to middle and high school students. But they are wrong. It’s not for lack of interest that we fail to have greater racial diversity in science. Of the nearly one million students who enter college every year intending to study STEM (Science, Technology, Engineering, and Mathematics), approximately 34% are PEERs. But they who were once over-represented soon become the under-represented. PEERs comprise 34% of the students entering college intending to study STEM, but only 19% of recipients of STEM bachelor’s degrees and 11% of recipients of STEM PhDs. Since 1992 the proportion of students entering college intending to study STEM who are PEERs has tripled, but their poor persistence rate remains unchanged and is half that of non-PEERs.

And there are some who might acknowledge the high initial interest by PEERs in science, but blame the low persistence rates on the lack of preparation and poor math skills of the PEERs. This, too, is inaccurate. When comparing the outcomes of students planning to major in STEM who come to college with similar high school math and science preparation, similar family backgrounds in higher education, and similar family incomes, PEERs leave STEM fields at much greater rates than non-PEERs; however, this disparity is not seen in non-STEM fields that require quantitative skills.

There is something about the way we teach science that is disproportionately driving away the very persons who can contribute the most to diversity in science. Instead of continuing to pursue the failed deficit-based approach of “fixing the student,” it is time for us to exercise our responsibility of making our teaching more inclusive, especially the introductory courses, which is when most students choose to leave STEM. Here are three R’s.

Reimagine the Syllabus
Let us find ways to ask our students what they think, rather than what they know or what they’ve memorized from their massive textbooks. We should tell the tales of discovery, which is often the product of accidental convergences of disconnected observations made by persons from different backgrounds, rather than simply featuring the winners of the Nobel Prize. And let us talk about our mistakes, the sad stories when science was misused to perpetuate racism and social injustice.

Reform Laboratory Courses
Our laboratory courses should be organized opportunities for students to engage in the process of discovery such
as through course-based research experiences, rather than a series of exercises for which the answers are already known. Our goal should be to encourage students to embrace uncertainty, explore curiosity, and evaluate evidence, rather than worry about the correct number of significant figures in their lab reports.

Re-center on Belonging
The introductory course should be when students are encouraged to explore ideas, rather than a time to “weed out” 18-year-olds to protect the sanctity of our discipline. We should assess student learning using clearly articulated competencies, rather than grade on the curve. And we should ensure that course prerequisites prepare students to learn, rather than being arbitrary barriers that exclude students. After all, does introductory biology really require the student to first know calculus?

Two pandemics. One—only a few months old—is the uncontrolled infection by a lethal virus. The second pandemic—many centuries older—is the unabated infliction of lethal racism. We must understand that, just as restaurants and bars are dangerous places because of the virus, so too are our classrooms and laboratories unsafe places for persons of color, where PEERs are compelled to shed their cultural identities and be constantly on guard to survive.

Our nation has spent trillions of dollars to combat the virus, but very little to root out the causes of racism. Our colleges and universities have spent countless hours developing elaborate plans for students to return to our classrooms and laboratories, but very little to create a more inclusive learning environment. It is not surprising then, that when schools re-open, many students are likely to choose not to return and that PEERs will stay away at nearly twice the rate as white students.8,9

When higher education re-opens, our objective should not be to “return to normal” because “normal” was never satisfactory. Instead, we have the opportunity, here and now, to begin to reform science education so that science and science education will be safer places for all students, where they feel that they belong and that we expect them to be successful.

For further discussion of this topic, see the Feature Article by Kenneth Gibbs on p. 8.

References and Footnote

4If we do nothing else, let’s banish the term “pipeline” as a metaphor for the development of students. Unlike a pipeline, students enter and leave from multiple points. Unlike a commodity that flows through a pipeline, students have agency. And unlike an inert pipe, the scientific establishment has the responsibility to interact with the students as they move through the system. See also: Gibbs K (December 17, 2014). Beyond the pipeline: Reframing science’s diversity challenge. Scientific American https://bit.ly/34i10IP.


About the Author
David J. Asai is Senior Director for Science Education at Howard Hughes Medical Institute.
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The need for science to enhance the participation of students and faculty from historically underrepresented minority (URM) backgrounds, and the glacial progress1 our community has made to remedy our historic and present day exclusion,2 have been chronicled for longer than I have been alive. As a Black man who has been involved in the scientific research community for over 20 years, I am exhausted and frustrated that despite countless statements describing a “commitment to diversity,” progress for URM scientists remains slow. I lament the harms I have seen the scientific enterprise inflict on my friends and mentees (often women from the Black, Latinx, and Indigenous communities), all the suffering they have experienced, and the discoveries we have lost as a result. Yet I know that at this moment when national attention is focused on racial inequality, we can in fact make substantive progress on the pressing issues of diversity and racial justice in science if there is the will to do so.

Here, I share thoughts that build from my life in research, my talk at the 2019 ASCB|EMBO Meeting,3 and a recent statement4 to which I contributed on how to address racism within our system.

Diversity: Why It’s Not Enough

While diversity5 is important for producing the highest quality science, it’s not enough. The point of promoting diversity isn’t simply to have differently colored bodies coexisting in the lab, but to ensure everyone can show up and contribute as their full selves. Without a culture of inclusion and equity, diversity can represent another form of oppression and exclusion. Without broader culture change within our discipline, we’ll likely continue to see:

- Black, Latinx, and Indigenous PhD scientists, as well as their White and Asian women peers, reporting significantly less interest in pursuing academic research careers than their White and Asian male colleagues, despite achieving the same or higher levels of research productivity
- The complete decoupling of the PhD talent pool of URM scientists from assistant professor hiring in basic science departments
- Significant underrepresentation of scientists from many Asian backgrounds in leadership positions despite their substantial numerical presence in our workforce

Promoting Diversity and Advancing Racial Equity in the Biomedical Sciences

By Kenneth Gibbs
Promoting diversity without committing to racial justice reinforces the social hierarchies that have marred our society and enterprise for centuries, directly harming scientists from URM and other minority groups, and impairing our entire system, which loses out on their contributions.

**How We Move Forward: Listen, Acknowledge, and Act**

To move forward, the scientific community—especially those who are in positions of power—must listen to those who’ve lived with systemic and racial inequity, acknowledge where we are and how we got here (including our own roles in perpetuating inequity), and then act to make things better.

**Listening means:**
- Taking the time to understand the well-documented ways in which racism and other forms of bias infect our enterprise, and the emotional toll they inflict
- Providing the space for URM trainees and colleagues to share their experiences with racism⁶ (while also recognizing their agency to choose not to relive potentially traumatizing experiences) and what they want from their institutions and colleagues⁷
- Consulting with and learning from the expertise of our social scientist and educational research colleagues who’ve developed robust tools for understanding human and organizational psychology that can equip us on our journey toward progress

Importantly, listening must be done to learn, not to defend ourselves or the perceived meritocracy of our institutions.

**Acknowledging means:**
- Clearly describing where the scientific community stands with respect to racial equity
- Recognizing the multifaceted forms of racism (beyond implicit bias) that we’ve allowed to exist in the research community
- Coming to terms with the realities such as the ones that I experienced as a graduate student, where there were fewer tenured Black faculty in the basic sciences at my institution (i.e., zero) than there were Black U.S. presidents (i.e., one), and what it means that our community has allowed this reality to continue for so long at the “elite” institutions that seed the next generation of scientific leaders
- Interrogating the unique manners in which racism and sexism intersect to harm Black, Latina, and Indigenous women in science.

Listening and acknowledging, especially as it relates to matters of race, can be hard, but it’s necessary to lean into the discomfort if we want science to be better.

When we realize that we—through action or inaction—have failed, and that these failures have harmed those around us, we have a choice. We can lean into these hard truths and do the work of repair, or we can continue to deny the harms we’ve caused, which only metastasizes them. My faith tradition reminds me that acknowledgment—not denial—of wrongdoing begins the path to healing.
Finally, we must act. Talk and internal feelings alone do not bring change. Resource allocation and policy do. At the National Institute of General Medical Sciences (NIGMS), this has meant reworking the expectations and review criteria for our institutional training programs. All our funding announcements now have a strong emphasis on creating safe, supportive, and inclusive institutional cultures; enhancing faculty and student diversity; and training culturally competent mentors. Additionally, NIGMS has allocated new funding to the Maximizing Opportunities for Scientific and Academic Independent Careers (MOSAIC) program to enhance diversity within the academic biomedical research workforce. Early results are promising: the MOSAIC mechanism is providing an on-ramp for early-career scientists (e.g., URM postdocs) that our general career development programs have failed to attract. (Editor’s Note: See p. 20 for information about the MOSAIC grant recently awarded to ASCB.)

When acting locally, we must carefully consider the context and available resources, and then make changes to address the specific challenges in the environment. Specificity is key. Generalized solutions for scientists with identities other than those that have been dominant (e.g., White, heterosexual, able-bodied, middle class, and male) won’t advance racial equity or inclusion within our system. More effective solutions can mean, for example, adapting models to promote success for URM students, or redesigning the faculty hiring and advancement processes to build and equitably evaluate a diverse applicant and faculty pool. As we act, we should collect data to assess whether our initiatives are achieving their goals. Continual action will be necessary, which means guarding the hard-earned gains we’ve made while continuing to develop new strategies to ensure our system becomes what it can and should be—one that welcomes and supports us all.

The challenges the scientific enterprise faces in achieving racial equity are common in many professions, yet I remain confident that we can make real progress if we act to make positive change. Black, Latinx, and Indigenous scientists need what all other scientists need: opportunity, resources, and respect. As we recreate our spaces to be more just, equitable, and inclusive, the result will be enhanced diversity, better science, and ultimately a better society.

References


3www.youtube.com/watch?v=H_zBZwpANAk.


In my experience, few things provoke as consistent a reaction from biologists as the observation that some 40% of Americans believe that humans were created pretty much in their present form in the last 10,000 years. I can’t believe so many people still reject evolution” is a common response, often followed by “What the heck are biology teachers doing?” I understand this reaction—mine would have been much the same six years ago, when I became the executive director of the National Center for Science Education (NCSE). “How hard can this be to fix?” I thought. Well, now I know.

Why do so many people reject evolution? Because some religious groups have taught their followers for years that accepting evolution and believing in God are mutually exclusive. Given a choice between their faith and a hard-to-understand abstract “theory,” many religious people choose faith.

What are biology teachers doing? Well, for the most part, they’re working their tails off with limited resources and often without the training to master and teach a topic that frequently provokes conflict with students, parents, and even colleagues.

And how hard can it be to fix? The answer to that is “plenty hard,” believe me. After all, there are over 50,000 high school biology teachers scattered through 15,000 local school districts in the United States, facing a wide panoply of challenges to which there’s no one-size-fits-all solution.

But there are signs that the dedicated work, over more than a decade, of a great many supporters of accurate evolution education, including ASCB, is paying off. There have been dramatic improvements in the way in which evolution is presented in public high school biology classrooms just over the last 12 years, according to a new rigorous national survey conducted by NCSE in collaboration with Eric Plutzer of Pennsylvania State University.

The survey was designed to replicate a similar national survey that Plutzer and his colleagues conducted in 2007. The earlier survey came on the heels of the landmark Kitzmiller v. Dover decision that declared that the teaching of intelligent design—creationism’s latest manifestation—was an unconstitutional violation of the separation of church and state. The legal battle was won, but the 2007 survey revealed that the situation in the classroom was far from perfect.

The NCSE/Pennsylvania State University survey, conducted in 2019 and discussed in a paper recently published in Evolution: Education and Outreach, shows real, and impressive, progress. In 2007, a bare majority of public high school biology teachers—51%—emphasized the scientific consensus on evolution without giving any credence to creationism in their classrooms. In 2019, more than two-thirds of them—67%—did so.
At the same time, the proportion of teachers who exclusively endorsed creationism dropped from 8.6 to 5.6%. The proportion of teachers who avoided endorsing either evolution or creationism dropped from 18 to 15%. And the proportion of teachers who endorsed both evolution and creationism plunged from 23 to 12%.

Here’s more good news: The average number of hours devoted to general evolution rose from 9.8 in 2007 to 12.4 in 2019. And the average classroom time devoted to human evolution nearly doubled, from 4.1 to 7.7 hours.

What explains these improvements? There are several factors, but one of them may surprise you. State science standards make a modest but significant difference. The Next Generation Science Standards (NGSS), which are based on a National Research Council report and developed by a consortium of more than 20 states, were released in 2013. Currently, 20 states (plus the District of Columbia) have adopted the NGSS and another 24 have developed standards based on the same framework. In the NGSS, evolution is included as one of four disciplinary core ideas for the life sciences and is integrated into life sciences instruction beginning in kindergarten.

The inclusion of evolution in state standards results directly and indirectly. Directly, topics in the standards are harder to avoid: The content of textbooks, statewide tests, and coursework for pre-service and in-service teachers is strongly affected by the content of the standards. Indirectly, when challenged over the teaching of evolution, teachers can point to the standards as requiring them to teach evolution. In communities where evolution is not widely accepted, such a shield is very important to teachers.

There is still a long way to go, to be sure. It is simply not acceptable that a third of U.S. public high school biology teachers continue to present evolution misleadingly!

At NCSE we are working with teacher ambassadors to provide their colleagues with evolution lessons that help students overcome misconceptions—for example, the false dichotomy between religion and science. And we will continue to work with our many supporting organizations, including ASCB, and the thousands of individual scientists who support us as members, to monitor local school boards and state legislatures, advocate for accurate science standards, and catalyze local action when the integrity of science education is threatened.

I’d like to say thank you to the members of ASCB for supporting an organization that supports us. And if you’re also an individual member of NCSE, thank you twice. We could not have achieved so much progress on evolution education without you.

References

About the Author
Ann Reid is the executive director of the National Center for Science Education.
The ASCB Council convened its first-ever entirely virtual meeting in June. Not surprisingly, the impact of COVID-19 on university research labs and other biomedical research institutions and industries around the world dominated much of the conversation on the first day of the Council’s online gathering. During the second day, councilors participated in a diversity, equity, and inclusion workshop facilitated by experts in that field. The Council also discussed Society publications, plans for the annual meeting, honorific awards, the budget, policy, and trends in membership.

The Council meeting began with President Eva Nogales praising the agility of ASCB staff to quickly pivot its activities to produce a variety of valuable online content for members. ASCB CEO Erika Shugart reported on the progress made to various components of the Society’s strategic plan. Shugart also informed the Council that members had approved new bylaws, which go into effect on January 1, 2021.

With the future of in-person gatherings uncertain due to the pandemic, the Council heard from Alison Harris, Director of Meetings, about the options for canceling the in-person meeting in Philadelphia in December and converting programming onto a fully virtual platform. The ultimate outcome of this discussion was the decision by Council to exercise that option, and also to offer free attendance to the meeting for ASCB members.

In light of economic downturns, Mark Leader, ASCB’s Director of Publications, recommended no changes to the author fees for the Society’s two journals, CBE–Life Sciences Education and Molecular Biology of the Cell (MBoC). The Council heard a preliminary report from publishing consultant Raym Crow about a possible new revenue model for MBoC called Subscribe to Open (S2O). Council was enthusiastic about the model, which is designed to make MBoC open access while preserving the subscription revenue ASCB receives from the journal, but decided to delay a vote until Crow’s final report was ready in July. (Council subsequently approved adopting S2O; see p. 22.)

Brian Theil, ASCB’s Director of Membership, reported that Society membership fell by 13% from the same time in 2019. Due to the pandemic, many of the planned membership recruitment campaigns had to be postponed. Although membership dues have not increased in three years, Council agreed to postpone rate increases in light of the many challenges and hardships that universities and faculty members are currently facing. In other news, Theil remarked that use of and engagement on ASCB’s Online Community, which was launched in the summer of 2019, has steadily increased since March. He noted that member usage of digital resources and the new “Ask Me Anything” series have likely contributed to this increase.

The Awards Selection Committee sent a memo to Council regarding the need for a more diverse pool of both nominees and nominators for the E.B. Wilson
Award. The Council acknowledged that the pool of applicants should reflect the diversity of ASCB membership and that nominating may have been hampered because members were dealing with effects of the pandemic. Council decided to extend nominations until July 15.

ASCB welcomed new Director of Finance Uloma Nwauche, who presented the Society’s finance and audit report. The Council approved the audit, which had been reviewed previously by the Finance and Audit Committee.

ASCB’s Director of Public Policy Kevin Wilson reported on the Society’s recent policy activities, which included letters sent to Francis Collins, Director of the National Institutes of Health, and to Congresswoman and Speaker of the House Nancy Pelosi on labor issues stemming from COVID-19. Specifically, Pelosi was asked to include visa extensions of one year for F-1, J-1, and H1-B visas for foreign scientists currently in the United States and working in biomedical research laboratories.

The following day, the ASCB Council and some senior staff members engaged in an intense all-day training that had coincidently been planned in advance of the racial turmoil that had recently erupted in the United States. The training was facilitated by the Kaleidoscope Group, a Chicago-based consulting company that helps organizations develop diversity, equity, and inclusion “solutions that achieve measurable outcomes and sustainable change for results.” The training with the Kaleidoscope facilitators was written into a grant awarded to the ASCB Minorities Affairs Committee (MAC) by the National Institute of General Medical Sciences’ Innovative Programs to Enhance Research Training (IPERT). The training resulted in a variety of near- to long-term actionable items to fulfill the Society’s goals to improve diversity, equity, and inclusion in everything it does. Read more about the outcomes of this training in the blog post at www.ascb.org/society-news/ascb-diversity-inclusion.
The ASCB Council has named the 2020 cohort of Fellows, ASCB members selected for their lifetime achievements in advancing cell biology. Eighteen members were chosen for their outstanding contributions to the field of cell biology and to the community of cell biologists through their service to the Society. The ASCB Fellows program is committed to recognizing the breadth and diversity of the Society’s membership. Toward this end, Fellows are nominated by their peers or through self-nomination, followed by evaluation and selection by a Fellows Nomination Review Committee. The list of selected Fellow nominees is reviewed and approved by the ASCB Council. The ASCB Fellows will be formally recognized at Cell Bio Virtual 2020–An Online ASCB|EMBO Meeting in December.
Zebrafish Outreach Program Nets Organizers the ASCB 2020 Bruce Alberts Award for Excellence in Science Education

By Mary Spiro

The science outreach program BioEYES gives children hands-on experience studying the life cycle and genetics of the shiny, darting zebrafish (*Danio rerio*). Since 2002, BioEYES has shared the wonder of scientific discovery with more than 155,000 children across the United States and as far away as Melbourne, Australia. ASCB is pleased to recognize the creators of BioEYES, Steven Farber of the Carnegie Institution for Science in Baltimore and Jamie Shuda of the University of Pennsylvania (UPenn), with the 2020 Bruce Alberts Award for Excellence in Science Education.

Farber, a developmental biologist at Carnegie who uses zebrafish to study lipid metabolism and genetics, and Shuda, Director of Education and Outreach at UPenn’s Institute for Regenerative Medicine, will present the Bruce Alberts Lecture during Cell Bio Virtual 2020—An Online ASCB|EMBO Meeting in December. The Bruce Alberts Award recognizes “innovative and sustained contributions” to the discipline of life science education. Beyond simply a fun fish-based outreach program, Farber explained that the fundamentals taught through BioEYES are thoroughly grounded in the schools’ existing science curriculums.

“We take their curriculum goals and map it on the animal,” Farber said. “The teachers are excited because the kids are learning what they have to teach, and the kids are excited because they are still having fun.” This formula, developed by Shuda, has been one of the keys to the program’s success and consistent oversubscription, Farber added.

Moreover, BioEYES exploits the rapt attention that naturally curious children give to living creatures.

“There is something really primal about working with a live animal,” Farber added. “You see it in classes all over the world—kids are focused so intently on these critters that they will learn the concepts even better.”

In addition to synchronizing with the science curriculum, Shuda explained that the program allows students to see
themselves as scientists, not just to learn from them or about them. And she said, “BioEYES is designed to reach all students, not just the ones that have an interest in STEM. It provides one, two, and sometimes three weeks of students thinking, implementing, and sharing their skills as scientists.”

During this time, students exercise other skills including writing, analysis, planning, organizing information, and even visual communication. For example, a quick search for BioEYES on YouTube yields one especially entertaining video produced by students on concepts they learned in the program (https://youtu.be/f0EawHHiwx4).

The seed for BioEYES was planted while Farber was on the faculty at Thomas Jefferson University in Philadelphia. Farber had opened up his zebrafish-filled laboratory to university tours, and his demonstrations became so popular for children that he was inundated with requests for visits, which wasn’t easy in a working research laboratory.

“It’s a humbling experience to try to wrangle a group of middle-schoolers,” Farber said. It was clear he needed help from someone well-versed in education, especially if he planned to bring the zebrafish experience into classrooms. A chance encounter with the dean of medicine resulted in the needed funds to hire that person. Around the same time, Shuda was finishing up graduate school.

“I was teaching in a third-grade inner-city [Philadelphia] classroom,” said Shuda. “I saw how students lit up when we reached science time, but I didn’t have any resources or real training on how best to teach the subject. The classroom was overcrowded and under-resourced, but the students were amazing. They deserved to have real science experiences and I wanted to give it to them. I knew our education system needed more science support.”

Farber trusted the judgment of his son Elias, who was about seven years old at the time, to help him select the educator to run BioEYES.

“I came to his office and was interviewed by Steve and his son,” Shuda said. “I asked Steve questions about pedagogy and curriculum, and he showed me the amazing research being done with zebrafish. It was clear we shared the same goal—to provide all students the opportunity to be scientists. In our first year, I drove around with fish and water in my car—which flooded at one point—and asked city teachers to allow me to work with them and their students. Teachers have always been at the center of BioEYES. I would continuously ask for suggestions and feedback. Some of our first teachers are still with us, and one has since retired from teaching but works part-time for BioEYES!”

However, even after 18 years of success, Shuda said that finding funding for BioEYES is still a struggle, although they continue to expand their partnerships.

“The demand for BioEYES globally far exceeds the amount of support we can raise in a given year,” said Shuda. “We are happy to be part of two academic institutions that want to invest in community engagement and outreach, but I am always focused on how to make the greatest impact with limited funds.”

Going forward, the BioEYES team will be developing accountable and measurable ways “to do our part in promoting social justice within our communities and schools. We want to openly share and report on our work and are excited to build off the work about pigmentation and inheritance we already teach in BioEYES,” Shuda said. They have also developed virtual versions of the BioEYES modules with opportunities for online interactions with the team so that they can continue helping students learn in the upcoming school year, with or without traditional classroom settings.
JoAnn Trejo Selected for 2020 ASCB Prize for Excellence in Inclusivity

By Mary Spiro

JoAnn Trejo calls herself a problem solver. “I was born with a natural curiosity, always wondering how things work. I like to fix things—I like problem solving. This is the essence of science, trying to solve problems,” Trejo said.

These problem-solving skills have no doubt helped her become an accomplished and well-respected scientist, but they have also given her the tools to be a creative advocate for diversity, equity, and inclusion in the scientific community. The ASCB has named JoAnn Trejo as the 2020 recipient of the Prize for Excellence in Inclusivity.

Trejo is a professor of Pharmacology and Assistant Vice Chancellor for Health Sciences Faculty Affairs at the University of California, San Diego (UCSD) where she has made significant contributions to the understanding of cell signaling by protease-activated G protein–coupled receptors. She has published widely on the regulation of cell signaling in vascular endothelial cells and breast cancer. Trejo has also served on the councils of both the ASCB and the American Society for Biochemistry and Molecular Biology, has chaired Gordon Research Conferences, and served on numerous review panels for the National Institutes of Health (NIH) and Howard Hughes Medical Institute (HHMI), and currently serves on the National Cancer Institute Board of Scientific Counselors for Basic Sciences. In 2017, ASCB named her as the winner of the E.E. Just Award.

Trejo understands that good role models and mentoring, whether formal or informal, are critical to individual success; she has dedicated herself to creating these opportunities for others. At UCSD, now Trejo directs the NIH/National Institute of General Medical Sciences Institutional Research and Academic Career Development Award (IRACDA) Postdoctoral Training Program, which aims to enhance diversity in academia. According to Trejo, the IRACDA at UCSD in its 18th year of funding, has trained 103 postdocs, 66% of whom are underrepresented minorities (URM) and 64% of whom are women. Of the total URMs, 60% have obtained tenure-track faculty positions at academic institutions—36% at R1 research-intensive institutions. Also under her leadership, the UCSD Health Sciences Office of Faculty Affairs received the 2017 Hispanic Center of Excellence Award funded by the Health Resources and Services Administration; a 2019 Program to Increase Diversity Among Individuals Engaged in Health-Related Research (aka, PRIDE) award funded by NIH’s National Heart, Lung, and Blood Institute for faculty development; and a recent award from the National Institute of Neurological Disorders and Stroke Advancement for Underrepresented Neuroscientists for Change (LAUNCH) faculty development program.
“I have many role models,” said Trejo, who is the youngest of five children from a migrant farm worker, single-parent home. “I grew up in a household with very strong, independent women—my grandmother, mother, aunts, and older sister. In education and science, the most important role models were teachers and research mentors. I was very fortunate to cross paths with great mentors who nurtured my development as a scientist, treated me like a peer, and did not see my gender or ethnic/racial background as a deficit.”

Diversity and inclusivity, Trejo said, are also fundamental to the advancement of science itself.

“Inclusivity is critical for modern day team science,” Trejo said. “Inclusivity is built by cultivating a culture that values all people and perspectives. I promote inclusivity in the lab through organizational structure and team science. Outside of the lab, I plan team-building activities and events that are meaningful and inclusive of all team members.”

To that end, Trejo’s mentoring activities have facilitated a large cohort of trainees throughout the talent pipeline. Vivian Reznik, professor of Pediatrics and Family Medicine and Public Health at UCSD, wrote of how Trejo has directly mentored trainees at all levels—41 undergraduate students, 15 graduate students, and 21 postdoctoral scholars—as well as numerous research and clinical junior faculty at UCSD Health Sciences. Of her postdocs, so far several have transitioned to academic positions—two professors, one associate professor, and four assistant professors.

“I have worked with Dr. Trejo in the Office of Faculty Affairs and have watched her devotion and perseverance, matched with her enormous enthusiasm and focus, lead to institutional change as well as slowly changing the face of academic medicine,” Reznik said. “Her body of work embracing mentoring at its core is recognized locally and nationally, and her influence and impact will only increase over time.”

Trejo is not only respected, but admired, by her colleagues.

“What I have loved about JoAnn is that she is able to be a very serious researcher…and still be so active and incredibly successful in diversity at many levels,” wrote Maggie Werner-Washburn of the University of New Mexico in a letter supporting Trejo’s nomination. “The rubber hits the road in broad swaths with JoAnn. Her directness, intentional organization, brilliance, and love of science and people are unequaled. Her abilities to have thoughtful conversations at the drop of a hat on science, education, business, the future of academia, or Mexican food are unparalleled.”

Despite these remarkable achievements, Trejo sees challenges ahead for attaining true inclusivity in the STEM fields.

“Race/ethnicity, gender, and sexual orientation are complex issues that impact the daily lives of our trainees both inside and outside of the work environment,” Trejo said. “The greatest challenge in promoting inclusivity in STEM is that many research mentors believe that discussions of how race/ethnicity, gender, and sexual orientation impact success do not belong in science and are often ignored. I also believe that many research mentors are ill equipped to have informed discussions around these complex issues with their peers and trainees.”

The Prize for Excellence in Inclusivity, funded by HHMI, comes with a $5,000 cash award. Trejo plans to use the funds for outreach events in the Barrio Logan and Sherman Heights communities of San Diego and to help enhance the success of underrepresented undergraduates and graduate students.

Be sure to watch for a profile video about JoAnn Trejo premiering during Cell Bio Virtual 2020—An Online ASCB|EMBO Meeting and for her essay to be featured in a future issue of Molecular Biology of the Cell.
ASCB was awarded a first-of-its-kind National Institutes of Health (NIH) grant to enhance diversity in the academic biomedical workforce. The grant is from the Maximizing Opportunities for Scientific and Academic Independent Careers (MOSAIC) program, a new part of NIH’s efforts to enhance diversity within the academic biomedical research workforce that is designed to facilitate the transition and success of promising postdoctoral researchers from diverse backgrounds into independent faculty careers in research-intensive institutions.

ASCB’s MOSAIC Program (aka AMP) provides $1.32 million over five years to create skills development workshops, mentor training opportunities, and institutional culture-change initiatives at universities. AMP will be under the leadership of two Co-PIs, ASCB CEO Erika Shugart and ASCB Director of Professional Development Ashanti Edwards. AMP will also be co-directed by Mary Munson, professor at the University of Massachusetts Medical School and chair of ASCB’s Women in Cell Biology Committee, and Michael Boyce, associate professor at the Duke University School of Medicine and co-chair of the Society’s Minorities Affairs Committee.

“We expect that AMP will improve our scholars’ success as tenure-track research faculty,” said Edwards. “Our mentor training and institutional change initiatives will also benefit additional postdoctoral fellows, beyond our direct participants, extending AMP’s impact across the nation. We anticipate that the successful completion of AMP will advance diversity across the U.S. academic biomedical workforce.”

Postdoctoral fellows who are recipients of MOSAIC K99 grants will be matched to ASCB by NIH to become AMP Scholars. Goals of the program include helping AMP Scholars to:

- Identify their strengths and develop a plan to enhance them through professional development and networking
- Develop new skills through in-person and online training sessions
- Expand and strengthen their support network through cohort-based peer groups and mentoring

“We will tailor the program to the individual cohort to help them build and enhance their skills,” said Shugart. “AMP Scholars also will develop a valuable network of peers and mentors who will become critical to their job and success as a faculty member.”

The first cohort of AMP Scholars will begin in the summer of 2021. More details and instructions on how to apply can be found at www.ascb.org/career-development/2021-amp.

MOSAIC awards were also given to the American Society for Biochemistry and Molecular Biology and the Association of American Medical Colleges, according to the National Institute of General Medical Sciences, which oversees the program.
ASCB Receives Grant to Develop Tools for Curation of Scientific Literature

By W. Mark Leader

ASCB has received a grant to create new tools that will allow readers to quickly appreciate the significance of published scientific work. Funds from the Wellcome Trust/HHMI Learned Society Curation Award will be used to develop digital badges to highlight an article’s contributions in a number of categories as well as to provide readers with concise statements of a work’s significance. An article may be badged for contributions such as presenting a new concept, a technical advance, or a translational advance; being broadly relevant; or serving as a teaching resource.

“The advent of preprints, the rapid expansion of journals and peer-reviewed publications, and the movement away from journal names as a proxy for impact are challenging the ability of authors, readers, and evaluators to assess the impact of scholarly works,” wrote MBoC Editor-in-Chief Matthew Welch in the ASCB’s grant applications. “The projects outlined in the grant proposal are designed to leverage the expertise of the ASCB community to help address this problem.”

Badges and significance statements will be attached to selected Molecular Biology of the Cell (MBoC) articles, but an important goal of the project will be to apply these tools to preprints as well. Welch will assemble an editorial board of early-career scientists who will curate preprints by assessing their contributions to the field and applying the appropriate badges and significance statements. “We are excited to implement these innovations to help readers appreciate the impact of work published in MBoC and posted on preprint servers,” says Welch. “It’s particularly exciting to involve and engage a new group of early-career editors in these editorial and curatorial experiments.”

As digital objects, the badges and significance statements will not be embedded in an article, but can be attached to the article wherever it is mentioned, e.g., on its abstract or in a table of contents. ASCB will be collaborating with Cold Spring Harbor Laboratory, operator of the preprint server bioRxiv, to create a mechanism to place the objects on preprints.

ASCB is searching for a half-time Curation Manager to coordinate these efforts as well as to track the digital objects and ensure their correct placement on articles and preprints. The job description is posted at www.ascb.org/about-ascb/work-with-the-ascb.
Innovative Subscription Model May Make *MBoC* Open Access

**By W. Mark Leader**

ASCB will offer library subscribers a financial incentive to allow *Molecular Biology of the Cell (MBoC)* to become open access in 2021. Under a new subscription model, known as Subscribe to Open (S2O), existing institutional subscribers will receive a 5% discount off the regular subscription price if they agree to participate. If all existing subscribers participate in S2O by early in 2021, the journal’s 2021 content will become completely open access. If the plan is successful, the offer will be repeated annually.

The purpose of the plan is to make *MBoC* an open access journal while preserving some of the subscription revenue ASCB now collects. In effect, existing library subscribers will be partially subsidizing universal access, but they are motivated to do so by the discount and because subscribing, either conventionally or under S2O terms, is the only way they can guarantee access to *MBoC* for their users. *MBoC* is one of the first research journals to experiment with the model.

“ASCB has a long history of innovation in publishing, and offering free access to *MBoC* has been one of the Society’s goals,” said ASCB President Eva Nogales. “But it’s very important that we maintain the revenue stream from library subscriptions because it allows us to fund important activities like public policy efforts and professional development programs.” *MBoC* content is already free to all readers after a two-month embargo period, and ASCB was the first publisher to allow the full content of its journal to be hosted on PubMed Central.

“I’m very excited that ASCB has launched this bold strategy to open access to *MBoC* content,” said Welch. “I hope this innovative experiment will lead to a sustainable path to open access, benefitting *MBoC* authors, readers, and subscribers.”

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**Are You Getting ASCB Pathways?**

You should be regularly receiving our monthly email update, ASCB Pathways—alerting you to the latest ASCB happenings and Annual Meeting updates, as well as the ASCB Newsbrief. If you aren’t seeing the e-newsletters in your inbox, please log in to your Member Profile on the ASCB website to update your communications preferences and make sure you are opted-in to receive emails. If you are already opted-in, check your spam filter, and/or contact your system administrator to whitelist *ascb.org.*
ASCB Holds Successful Virtual Education Meeting

By Thea Clarke

On May 30 ASCB held its first-ever virtual meeting for educators. Originally scheduled as a regional, in-person event at Soka University of America in Aliso Viejo, CA, it was switched to an online event as a result of the COVID-19 pandemic.

The meeting featured two plenary talks, four workshops, and several lunch discussion groups. About 122 educators around the United States participated. Although the meeting was not recorded in its entirety, presenter slides are available to view at https://bit.ly/3eSM8mr.

The virtual format was popular with attendees, many of whom said they would have been unable to attend in person, and the ASCB Education Committee will take this into consideration when it plans additional meetings in the future.

ASCB thanks the 2020 meeting organizers—Susan Walsh, Soka University of America; Andrea Nicholas, University of California, Irvine; and Joel Abraham, California State University Fullerton—and meeting sponsors SimBio and miniPCR.

ASCB Congratulates Seven New Public Engagement Grant Recipients

By Mary Spiro

Outreach programs to foster an appreciation for science are often part of afterschool programs or found at large public gatherings. But several of the seven recipients of the ASCB 2020 Public Engagement Grants have created programs that share the wonder of science with vulnerable populations, such as people experiencing homelessness, the incarcerated, or refugees.

ASCB Public Engagement Grants, supported by Science Sandbox, an initiative of the Simons Foundation, give grantees up to $35,000 to bring their bold ideas to life (or sometimes to bring an existing one to the next level).

Science Sandbox is dedicated to engaging everyone with the process of science. Funds pay for materials, supplies, marketing, and salaries for projects slated to begin the second half of 2020. However, because of COVID-19, each project was either designed to be virtual, or to have a virtual component, in case they cannot be done face-to-face.

“The review committee was really pleased with the quality of these public engagement proposals,” said ASCB CEO Erika Shugart. “ASCB is thrilled to be able to continue this program for a second round through the generous support of Science Sandbox.”
The 2020 ASCB Public Engagement Grant Awardees include:

**Savannah Cook** is a project coordinator for Summer High School and Pathways Internships at Fred Hutchinson Cancer Research Center in Seattle, WA. Cook leads the Kinase Kids Science Club, which engages children experiencing homelessness with science education activities at Mary’s Place shelters and lab-based experiences at the Fred Hutchinson Cancer Research Center.

**Brooke Danielsson**, a doctoral student in the department of Biomedical Engineering at Virginia Commonwealth University, has a project called Engineering Practices in Color (EPIC), an after-school STEM outreach for seventh- and eighth-grade dyslexic students with a curriculum that explores STEM using sensory-based activities and engineering design processes.

**Rafael Garcia-Mata**, an associate professor in the Department of Biological Sciences, University of Toledo, will be expanding a project involving cyber-enabled instrumentation. He will work with middle and high school students and homeschoolers in Ohio and Michigan to remotely control an electron confocal microscope at the University of Toledo to study science.

**Rogelio Hernandez-Lopez** is a postdoctoral fellow in the Department of Cellular and Molecular Pharmacology at the University of California, San Francisco. His project is Science Clubs International (Clubes de Ciencia). During the 2020/2021 school year, Science Clubs will offer hands-on STEM workshops taught by grad students and postdocs in Spanish and Portuguese for high schoolers and undergrads in Latin America.

**Janet Iwasa** is an assistant professor in the Biochemistry Department at the University of Utah. Her project is Finding a Refuge in Visualization. The project partners with an after school program for minority/refugee students to teach, create, and showcase scientific visualizations.

**Beverly Naigles** is a doctoral student in biology at the University of California, San Diego. Her project involves graduate students teaching science to adults incarcerated in San Diego county jails, to increase science literacy and humanize science as well as to develop cultural competency of future STEM leaders.

**Anusha Naganathan** is a research associate in the Department of Biology at the University of Rochester, as well as an instructor for the Rochester Education Justice Initiative. Her project is University of Rochester Science Stories, which will bring the experience of scientific experimentation to students at Groveland Correctional Facility in western New York.
When the pandemic compelled ASCB to merge its two in-person summer biotech courses into one Virtual Biotech Course, the organizers expected that the 45 attendees would learn a lot and enjoy themselves during the five days from July 13–17. Judging from the enthusiastic participation and comments received, the superb presenters and panelists knocked it out of the park.

As always, Steve Casper, Keck Graduate Institute, kicked off the week of intensive learning with an interactive lecture on the commercialization of science, introducing the attendees to key business concepts as he shared a case study with them. That set the stage for what followed.

Next up was ASCB’s very own Harvey Lodish, whose presentation prompted research assistant Mengyao Niu to sum up what many felt: “Dr. Lodish’s personal story is very inspiring.” In his remarks, Lodish discussed how he thrives, with many other colleagues, in straddling the space between academia and industry. Most U.S. research universities have policies in place that encourage faculty to become entrepreneurs, Lodish noted, some by offering faculty one day a week to spend on outside professional activities. As a result, many such faculty have developed new technologies that are the foundation of successful companies developing new therapies to treat diseases. He also discussed rare disease research, one of his passions. Lodish wrapped up with a discussion of two of his newest companies, Carmine Therapeutics and Tevard, both of which are staffed by his former postdocs and are being funded by major pharmaceutical companies.
But besides inspiration, attendees needed practical insights to help them get a leg up in the job market. On Tuesday, that’s what Randy Ribaudo and Larry Petcovik from SciPhD offered in their professional development workshop. Their session covered such topics as where one can work; what kinds of jobs are available; what salary to expect; job qualifications and necessary skill sets; how to build your network and take advantage of LinkedIn contacts; informational interviews; and resources for preparing for interviews. “Every sentence was of importance,” said Klaus Becker in a chat comment.

By Wednesday, attendees were well prepared for a boot camp on entrepreneurship. Divided into small groups, they jumped right in: reading a primary science article, identifying a commercial biotech opportunity from the article, and then making a five-minute pitch for a firm to potentially commercialize the opportunity. The team exercise involved identifying a founding idea and value proposition for a biotech company and then performing market research, determining market size, and investigating technical milestones. After a couple of hours working in breakout rooms, the groups made their pitches for the final hour of the day. Participants chose the winning team through a Zoom poll.

Thursday consisted of two panels: The first was on industry vs. academic career paths. As expected, participants asked the panelists lots of questions: Is a postdoc necessary? How about an MBA? What personalities do better in academia vs. industry? How’s work–life balance in biotech or startups compared with academia? Generally the advice was: There’s not just one career path and you should be prepared for change and will continue to have choices along the way. It’s impossible to know if you’re making the right decision in taking a particular job, but do the experiment, and if it doesn’t work try something else—advice scientists could readily understand. Then you make a new decision and change again. The panelists also suggested getting experience in a large company to build a network and learn from other smart people before going to a startup. They also noted that interviewers will be looking for intangible soft skills, so it’s important to build up those skills.

The second panel discussed the implications of COVID-19 on innovation. Bottom line: It’s having a very uneven effect on companies, but the consensus was that there are still plenty of job postings in biotech. Panelists all stressed the urgent need for clear science communications both during the pandemic and going forward.

Affirming and expanding upon what the professional panelists had to say, on the last day attendees heard two presentations that led Jyoti Thapaliya, a postdoc from Hunter College, to comment, “These are essentially teachings for life.” First, Denise Dunlap, Manning School of Business, gave a lecture on the importance of social networks. She was followed by Judy Heyboer, an executive coach in the Silicon Valley area formerly in human resources at Genentech, who offered pragmatic advice for success. Heyboer discussed what it takes to succeed in the corporate world and how to get there, including advice such as: Do what you love/love what you do. Find a work culture that works for you. The team is far more important than the individual in business. And the ability to work with people is more important than the ability to succeed technically.

The course wrapped up with a virtual happy hour and breakout rooms where people discovered what they had in common. Although, not surprisingly, most attendees would have preferred to meet in person, the intellectually stimulating Virtual Biotech Course nevertheless more than satisfied their expectations.

ASCB is grateful to the 2020 course sponsors: Biogen, University of Massachusetts Medical School, and the Center for Advancing Point of Care Technologies.
Shigeki Watanabe, associate professor in the Department of Cell Biology at Johns Hopkins School of Medicine, recently received a 2020 Johns Hopkins Catalyst Award, which provides $75,000 to support research over the next year. Watanabe’s lab studies the rapid morphological and molecular changes of neurons to better understand the mechanisms of synaptic transmission and plasticity, as well as the pathogenesis of neurodegenerative disorders.

“[Neurotransmitter] release occurs on a millisecond time scale and can’t be easily captured on video,” Watanabe explained. “My colleagues and I have developed a ‘zap-and-freeze’ approach that can capture images of membrane dynamics over these millisecond time scales”.

From this method, the Watanabe lab creates a “flipbook” of the time series during neuronal communication. The sequence helps to visualize the moments when synaptic vesicles fuse with the membrane to release neurotransmitter and when these vesicle membranes are recycled at synapses. Watanabe is trying to find out how these processes are regulated by proteins and signaling lipids.

In the proposed research, Watanabe and his colleagues will follow up on their recent discovery that neurotransmitter released at different intervals activates specific types of receptors.

“In the mammalian central nervous system, glutamate is the major excitatory neurotransmitter,” Watanabe said. “There are several types of receptors that receive this signal, including AMPA-type and NMDA-type glutamate receptors. These two types of receptors are important for synaptic plasticity: AMPA receptors determine the strength of synaptic signaling, while NMDA receptors serve as a switch for the plasticity. The properties of these receptors are quite different, but in both cases, the affinity to glutamate is rather low so as to keep the signaling transient. Thus, where glutamate is released relative to the receptors is thought to be important for how signals are transmitted at synapses.”

To better observe the timing and location of synaptic vesicle exocytosis relative to glutamate...
receptors, the Watanabe lab developed a method that uses a high affinity of polyhistidine for nickel to label receptors in hippocampal mouse neurons with gold particles. For each experimental scenario, neuronal cultures were stimulated once and high-pressure frozen at different time points after stimulation. About 100 images were collected with electron microscopy and analyzed.

“The results from these experiments indicated that AMPA receptors are localized toward the edge of postsynaptic receptive field, while the NMDA receptors are distributed toward the center,” he said. “Intriguingly, glutamate is first released near AMPA receptors and then near NMDA receptors following an action potential. Computer modeling suggests that this temporal and spatial organization of release sites and receptors allows a better activation of NMDA receptors. Thus, this organization may have implications for the induction mechanism of synaptic plasticity.”

In its current research, the Watanabe lab is aiming to reveal the molecular players that organize the release sites to the receptors using novel cryo-electron microscopy approaches.

Watanabe added that preliminary data for this research was gathered from a Neurobiology course that he teaches each summer at the University of Chicago’s Marine Biological Laboratory at Woods Hole, MA.

“The course is organized around extensive hands-on experimental sections with students,” Watanabe said. “The results described above were started as course projects and carried on in my lab. The students in the course collected preliminary data and made it to the author list in a paper currently in press and also another paper in revision.”
Highlights from

MBoC
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www.molbiolcell.org

Be sure to check out the Fourth Annual Special Issue on Forces on and within Cells

www.molbiolcell.org/toc/mboc/31/16

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

- **BAF facilitates interphase nuclear membrane repair through recruitment of nuclear transmembrane proteins**
  Alexandra M. Young, Amanda L. Gunn, and Emily M. Hatch (July 15, 2020)
  Nuclear membrane rupture occurs during interphase in a variety of cell contexts, but how the membrane repairs remains poorly understood. Here we show that the nuclear envelope (NE) protein barrier-to-autointegration factor facilitates membrane repair by recruiting transmembrane NE proteins to rupture sites.

- **Roles of Mso1 and the SM protein Sec1 in efficient vesicle fusion during fission yeast cytokinesis**
  Kenneth S. Gerien, Sha Zhang, Alexandra C. Russell, Yi-Hua Zhu, Vedud Purde, and Jian-Qiu Wu (July 15, 2020)
  Mso1 and the SM protein Sec1 aid in the efficient fusion of vesicles at the division site in fission yeast, which is important for proper contractile-ring constriction and plasma-membrane closure during cytokinesis.

- **A hybrid stochastic–deterministic mechanochemical model of cell polarization**
  Calina Copos and Alex Mogilner
  At the onset of cell locomotion, cells break symmetry to form well-defined cell fronts and rears through the process of cellular polarization. Using an in silico approach, we have identified one of the simplest quantitative frameworks as a possible mechanochemical mechanism for spontaneous cell polarization.
Invest in the Future of Science

In 2019 your generous, tax-deductible donations helped provide the following grants:

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

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

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

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The PALM Network Grant

As a PALM Fellow you will...

Cultivate an active learning practice through mentorship in lecture classes in which undergraduate students are engaged in their own learning.

2020 Deadline: Oct. 30

PALM is funded by NSF Research Coordination Network in Undergraduate Biology Education grant #1624200.

For more information and find out how you can find or be a mentor visit palmnetwork.org
The COVID-19 pandemic has forced scientific societies, including ASCB, to reimagine what a scientific meeting looks like. With the in-person 2020 ASCB|EMBO meeting canceled, ASCB staff are planning an engaging Cell Bio Virtual 2020 meeting that will bring together cell biologists from around the world to connect and share knowledge with each other.

Registration to Cell Bio Virtual 2020 is now open at ascb.org. It’s free to all ASCB and EMBO community members.

The pandemic pivot to a virtual meeting from December 2–16, 2020, offers some exciting opportunities. The meeting will be structured this way:

- **Education and Professional Development sessions** will be held December 2–4 from 10:30 am–4:00 pm EST.
- **Scientific sessions** will be held December 7–11 from 10:00 am–5:00 pm EST and will include the Keynote, Symposia, Minsymposia, Special Interest Subgroups, Special COVID-19 Lecture, Workshops, and Award Lectures.
- **Poster sessions** will be held December 14–16 from 11:00 am–2:15 pm EST.
- **Exhibitor Tech Talks** will be scheduled as well.

There will still be opportunities for participants to present their research as posters. Poster presenters will upload dynamic videos to accompany their posters. Each presenter will also be assigned to a live interactive poster session discussion time slot. The final abstract deadline is October 7. While free registration is now open to all ASCB and EMBO community members, a nominal fee will be charged for abstract submissions.

Applications also are now open at ascb.org to those interested in leading a Roundtable Discussion on a topic of their choice. These will be virtual, informal networking opportunities. Apply by October 7.
Introducing Cell Bio 2020 Virtual—an Online ASCB|EMBO Meeting

A Meeting for You. Designed by You.

New meeting name. Same great science. Exciting changes are planned for the reinvented ASCB|EMBO meeting.

Cutting-edge science is the core of the cell biology community, and Cell Bio Virtual 2020 is the place to learn from and collaborate with stellar researchers in the field. ASCB prioritizes inclusivity and diversity in science as reflected in the meeting’s hot topics and engaging programming. To enhance our inclusive environment, we look to you, our members—as presenters, organizers, and attendees from every career level, research area, and institution—as leaders to create and plan content that best suits the meeting you want to attend. This is a meeting designed by you.

Want to be a part of designing the 2020 program?
Check out this opportunity:

ROUNDTABLE DISCUSSION LEADER
Application Deadline: October 7

These informal sessions focus on hot topics within the scientific community. Attendees can take a break in between the scientific sessions, grab a snack, and join a virtual topic “table” to network with peers. Table leaders are responsible for facilitating the topic discussions.

ARCHAIC GENOMICS
Svante Pääbo

Director, Max Planck Institute of Evolutionary Anthropology, Leipzig, Germany
Okinawa Institute of Science and Technology, Onna-son, Japan

Svante Pääbo is known as one of the founders of paleogenetics. Pääbo and his team developed a technique of isolating and sequencing the DNA of creatures long extinct, using a variety of fragile, ancient source material from Homo sapiens and other human species.

IMPORTANT DATES AND DEADLINES
Oct. 1 Early Registration Deadline
Oct. 7 Final Abstract Submission (for poster presentation)
Oct. 21 Virtual 2020 Inclusivity Grant Deadline
Oct. 30 Childcare Grant Deadline
Nov. 19 Registration Cancellation Deadline
Four Essential Elements That Improve Graduate Training

By Adriana Bankston

Graduate school can be a stressful time for many reasons. Some of these reasons may include pressures to have experiments work, publish papers, and graduate within a certain time frame, as well as find a job after graduation. Focusing on some of these issues may come at the expense of training. This situation may manifest itself in intense pressure to publish quickly and obtain independent funding, both important for academic career success.

The result can be neglect of elements necessary to develop “whole scientists,” such as training and mentoring, career development, learning research integrity best practices, as well as mental health and well-being. Although these elements are essential to training graduate students, they are not currently integrated into their education in a systematic fashion. This discrepancy may be due to variability of training styles among advisors within an institution, or programs that differ among institutions across the country. Lack of financial resources for some smaller institutions may also play a role in diminished access to and availability of appropriate training. Integrating these elements into graduate training would ensure necessary attention and accountability for these elements in graduate education.

Training and Mentoring

While some institutions have made efforts to address these issues, it is necessary to demonstrate the efficacy of solutions meant to ensure the professional success of graduate students beyond their research training. This can be achieved by collecting nationwide institutional data on career tracking for PhDs, as well as data on particular aspects of graduate training and mentoring across institutions. Making these types of data openly available would enable sharing of best practices across U.S. institutions. This practice would also increase the accountability of advisors and institutions to provide more well-rounded training for their graduate students. If more details on the quality of training at a particular institution were also freely available, future generations of students could use this information to make decisions about where to pursue their graduate work.

By virtue of their role, advisors can be useful resources for the professional development of their graduate students. At the same time, advisors must be held accountable for training their graduate students. This may involve requiring a certain number of hours dedicated to training graduate students in skills that are not bench related, as well as discussing aspects of mental health and well-being that are necessary for them to succeed. Institutions should therefore also have programs to educate advisors on existing resources they can use to point graduate students in the right direction.
One way to ensure accountability of advisors in training their graduate students is to institute consequences linked to their own career success. It would be beneficial for accountability to extend across multiple levels of the institution, from the department to the institution as a whole. Outside factors can also influence the institutional level of accountability for training graduate students. One way to ensure that this training occurs is to link it to funding sources. As such, funding agencies should make their research dollars for laboratories contingent upon this training happening. This may occur via metrics designed by funding agencies to assess whether and how training and mentoring are taking place on an individual basis. On a larger scale, these metrics may become standards upon which funding is contingent on a national level across institutions.

Another way to ensure advisor accountability for training graduate students is to link it to their ability to obtain tenure. Advisors would take such training more seriously if it affected their own ability to climb up the career ladder. Publishing transparent data on graduate student training and mentoring would also affect the reputation of the institution as a whole. Well-performing institutions would therefore attract top graduate students, who would thrive in the system, and their advisors’ careers would also advance.

**Career Development**

Career development is also currently not integrated formally into graduate student training. While many institutions offer programs exposing graduate students to various career options, other tools such as an alumni network and career workshops (especially for institutions with less funding or fewer resources) are necessary to properly train graduate students to succeed in society. Institutions should therefore increase transparency around career outcomes for their PhDs by making these data openly available. Data transparency in career outcomes should occur both at the level of each individual advisor and the institution as a whole, with career data for graduates from each laboratory. These data should then be aggregated in a centralized website that allows for easy comparison of career outcomes for graduate students across U.S. institutions. While some institutions have released such data, comparisons nationwide are still difficult to make.

In addition, resources to help graduate students explore career options, as well as access to an alumni network, should be available across all institutions. Centralizing this information into one database would also allow undergraduate students to consider graduate school options based on the types of careers for which each institution prepares its graduates, and which university is stronger in a particular area. For example, universities with close collaborations with biotech companies may be a better option for those wanting to go into industry after graduation, whereas others may focus more on basic science or education careers.

**Research Integrity**

Research integrity training and positive research practices are being implemented by more institutions in the form of various mandatory workshops. However, research practices still vary widely among laboratories at the same institution, or among institutions. These disparities include ways in which advisors train students to perform experiments, ways in which they record and store this information, and ways in which they interpret data. Courses on best practices in this area, which could be implemented across institutions, would allow for greater
standardization of the research system as a whole. In addition, statistical training implemented nationally would also help with publishing research of high integrity, as well as in reducing the number of publications with falsified data that may be retracted, endangering the future careers of graduate students who are relying on these data for their own projects.

Mental Health and Well-being

Mental health and well-being are also critical to ensure a successful experience for graduate students during their training, as well as helping in their transitions after graduation. As graduate school imposes many stresses on graduate students, every campus needs to ensure that mechanisms are in place to prioritize work–life balance and to enable access to mental health resources. This includes accessibility to counselors, as well as quick access to other resources for specific mental disorders. Although some institutions offer counseling services, we still have a long way to go in prioritizing mental health at the graduate education level. Advisors themselves may need access to mental health resources.

In conclusion, graduate training needs to incorporate several aspects of training that are less tangible than the number of publications and grants a laboratory produces. Doing so will ensure a more vibrant and productive research enterprise where everyone can thrive and will produce a workforce better able to tackle societal challenges.

This post represents the writer’s personal views and not the views of the University of California.

About the Author
Adriana Bankston is a Principal Legislative Analyst in the University of California Office of Federal Governmental Relations.

Volunteer to Review CVs

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

How Establishing a Postbaccalaureate Research Education Program Can Address Your Mid-Life Crisis

By Daniel A. Starr

The mid-life crisis is a rite of passage for privileged white men. The classic response is to buy a red sports car. Or, more fittingly for this audience, a new super-resolution microscope. Yet material responses to a mid-life crisis rarely address the underlying issues contributing to the crisis in the first place. Inevitably, someone down the hall gets a cooler, fancier microscope, and your crisis rushes back to the forefront. I took a more nontraditional approach for my mid-life crisis. I wrote a proposal for a new training program, which turned into the most rewarding experience of my career.

I am the very definition of privileged. I am a white, straight male who grew up in upper-middle class suburbia with educated parents. I never had to worry about where my next meal would come from or where I’d sleep at night, and I have never directly experienced racism or sexism. By hiding in the ivory tower of academia my whole life, I have successfully avoided the real world. My mid-life crisis involved admitting and accepting that I am a successful academic and scientist,
in large part due to the privilege into which I was born. I have therefore dedicated substantial efforts in the second half of my professional career to help provide some small amount of privilege to young scientists who often lack the background and support to attend graduate school.

I am proud to be a professor at the University of California, Davis (UC Davis), one of the top ten public universities in the country. UC Davis is a diverse institution in a diverse state. We are working toward a federal designation as a Hispanic-Serving Institution and our undergraduate student body is made of ~40% first-generation college students. However, we have a lot of work to do to ensure all students have equal opportunities. Many UC Davis students have to work close to full time to pay their bills. These students lack the time and support to dedicate 15 hours per week as a volunteer researcher to gain valuable lab experience necessary for admittance to graduate programs. The problem is even more apparent at regional universities where there are limited research opportunities. Thus, students lacking privilege struggle to get accepted into graduate school where admissions are largely based on research experiences. This is a major loss to science. Scientists from nontraditional backgrounds are intelligent, industrious, and bring innovative ideas and new approaches to science. We need to patch the pipeline to provide this vulnerable population of young scientists with great potential an opportunity to succeed in graduate programs.

The National Institute of General Medical Sciences (NIGMS) at the National Institutes of Health (NIH) currently funds 36 PREP (Postbaccalaureate Research Education Program) programs (www.nigms.nih.gov/training/PREP). The PREP mission is to keep recent postbaccalaureate scholars from diverse and disadvantaged backgrounds in the biomedical science pipeline. Its ultimate goal is to increase diversity at the highest levels of biomedical research. NIH provides funds for about 200 PREP scholars annually to focus on a year of laboratory research, coupled with career development and training in professional skills. This year of valuable experience greatly increases the odds of both getting into PhD programs and the chances of successful completion of PhDs in the biomedical sciences. There are many more qualified candidates for PREP than there are national slots at present. Moreover, there are many excellent institutions (perhaps your own?) that could easily host an excellent PREP program. It just takes one person (you!) to get the ball rolling at your institution.

We designed PREP@UCD (https://prep.ucdavis.edu) with three objectives. First, we aim to provide a research and mentoring environment where PREP@UCD scholars can self-identify as scientists. Most incoming PREP scholars lack self-confidence and consider themselves students, not scientists. We focus our activities on helping our scholars realize their potential and the unique contributions they can make to science. Second, we train the scholars in experimental skills needed for them to succeed in graduate school and a career in biomedical research. Most of our incoming PREP scholars have limited experiences in the lab.
Usually the scholars had to spend considerable time working to pay tuition or help their families. Since laboratory experience is the most trusted criterion for admission into graduate school, PREP provides this vulnerable population with a critical opportunity to immerse themselves in research for a year. Third, we strive to empower PREP@UCD scholars with strong professional skills. We focus on reading primary literature, time management, communicating science, critical thinking, and writing statements of purpose and research proposals.

We offer a variety of activities for the PREP@UCD scholars. Each scholar is matched based on interest and mentoring styles with an NIH-funded faculty mentor in whose lab they spend 75% effort (approximately 30 hours per week) performing research. Scholars are paid as employees (over $30,000 for the year plus full benefits), which allows them to focus on research. In addition, each scholar commits 25% effort toward career development activities. In the summer at the start of the program, faculty present a “Future of Biology” journal club that exposes the scholars to primary literature and cutting-edge techniques. Scholars also participate in a series of workshops designed to help with time management, how to give a three-minute “elevator” talk, and rigor and reproducibility. In the fall quarter, they participate in a three-credit course focused on science communication that we designed and teach specifically for PREP scholars. Activities include spending six weeks writing and peer reviewing proposals for NSF Graduate Research Fellowships, attending a departmental retreat near Lake Tahoe, preparing abstracts and posters to present at the national Annual Biomedical Research Conference for Minority Students, applying to graduate school, and a mock interview.

In the winter quarter, the scholars visit universities to interview for graduate school, learn how to give a chalk talk on their research, and take an upper level or graduate course at UC Davis. In the spring quarter, they take an additional course, present a journal club, and end the year with a formal research presentation. Throughout the year, we meet weekly with the cohort to discuss anything on their minds. In sum, the scholars are provided a plethora of activities designed to help them succeed as biomedical scientists.

In our first three years, PREP@UCD has sponsored a total of 14 scholars. They held bachelor’s degrees from small liberal arts colleges (4), regional universities (4), or R1 institutions (6). Six of the scholars came from outside California, as far away as Baltimore, New York, and Puerto Rico. Many of the scholars had applied to graduate school the year before but didn’t get in. Others lacked the self-confidence or laboratory experiences to even apply.

Our program works. Twelve of our 14 scholars obtained admissions to excellent biomedical PhD programs including UC Davis (5); the University of California at San Francisco (2), Los Angeles, and Irvine; Baylor College of Medicine; Scripps Research Institution; and Johns Hopkins University. Moreover, four of these scholars received National Science Foundation Graduate Research Fellowships to fund three years of their graduate training while four others received honorable mentions. The other two scholars are still pursuing careers in science. Thus, PREP@UCD helped move vulnerable scientists past a major leak in the pipeline and provided them with a foundation to excel in graduate school. Watching PREP scholars move on and succeed as scientists will keep me full of pride for years to come.

It takes a community to run PREP@UCD. I am indebted to Carole Hom, who serves as the academic coordinator and is an active partner in every aspect of the program. We also have an outstanding group of about 40 faculty and dozens of graduate students and postdocs who help mentor our PREP scholars. We thank many administrators, including the deans of seven colleges at UC Davis (most significantly, ASCB Fellow and Dean Mark Winey of the College of Biological
Sciences), for funds and support. Most importantly, we thank the NIGMS at the NIH and taxpayers across America for the major support of this program.

Five years after my mid-life crisis, our PREP training program is thriving. In spite of all the time and hard work, I have discovered that running a training program to help others is far more rewarding than a fancy microscope. I am now happy to be privileged. Not the type of privilege that I was born into, but a more rewarding privilege. I am privileged to be able to work closely with the PREP Scholars. I am privileged to watch them develop and grow. I encourage other professors to spend less effort directed toward glossy manuscripts, big grants, and awards. Instead, spend a significant part of your focus on helping those who lack the privilege from which you so benefited.

In simpler terms, pay it forward. I have found my efforts at paying my privilege forward to be fulfilling. In fact, running PREP@UC Davis has been the single most rewarding experience of my scientific career.

About the Author
Daniel A. Starr is professor of Molecular Cellular Biology at the University of California, Davis.
In the most recent chapter of the Trump administration’s anti-immigration campaign, U.S. Immigration and Customs Enforcement (ICE) tried to make a change in immigration policy that would have forced thousands of international students to leave the country if their university opted to hold all virtual classes this fall. Strong grassroots advocacy, several lawsuits, and an amendment to the 2021 ICE funding bill have forced ICE to roll back the policy change.

In March, as classrooms, labs, and businesses were closing around the world, the Student and Exchange Visitor Program (SEVP) at ICE issued a temporary policy that allowed nonimmigrant students in the United States to take more online courses during the spring semester than normally allowed. This policy allowed international students to maintain their nonimmigrant status during the COVID-19 shutdown. However, on July 6, with schools and businesses still closed and COVID-19 infections spiking around the country, ICE issued changes to the policy. The new policy prohibited international students from taking a full load of virtual classes and remaining in the United States.

The reaction to the proposed policy change was swift. A grassroots effort started on Twitter with the hashtag #StudentBan. Harvard University and the Massachusetts Institute of Technology (MIT) filed a lawsuit and universities across the nation followed their lead. In addition, 17 states and the District of Columbia also sued. On the morning the Harvard/MIT lawsuit trial was to begin, ICE agreed to back down and not implement the new policy for those international students already in the United States.

At the same time the lawsuits were in the courts, the ASCB contacted science-friendly members of the House Appropriations Committee alerting them to the issue and urging them to offer an amendment prohibiting ICE from implementing the policy. During a meeting of the House Appropriations Committee to approve FY21 funding for the Department of Homeland Security, which includes ICE, Representative Lucille Roybal-Allard (D-CA) and Representative Mark Pocan (D-WI) introduced an amendment to prohibit funds from the FY21 budget from being used to implement
columns

the new ICE policy. The amendment was unanimously approved by the full House Appropriations Committee.

While the ICE agreement with Harvard solves the immediate problem, it does not protect those international students planning to attend U.S. universities in the fall. There are already news reports that ICE is barring foreign students from entering the United States for the start of the fall semester. The funding amendment covers both students already in the United States and those entering in the future. However, it still has a number of legislative hurdles to get over, including lack of support for the whole bill because of political issues associated with funding the Department of Homeland Security, such as funding for the U.S.–Mexico wall.

The reasons for the initial policy change are unclear. It’s possible it was done in the hope that it would force universities to open as part of the administration’s effort to open all schools as a sign the COVID-19 emergency was over. It may also be part of the larger effort by the Trump White House to shrink the number of international students in the United States. Others believe that it is another attack on both science and the university community.

Despite the uncertainty about a reason for the proposed change, its repercussions were clear. If allowed to remain in place, students from around the world would be forced to leave the United States with uncertainty about being able to return. International COVID-19 travel bans prohibiting travel from the United States would have left students in limbo, unable to return to their home nations but not able to stay in the United States. In addition, universities around the country would face significant financial harm.
In early July, the House Budget Committee, whose role is to oversee the entire budget process and watch federal spending from a 30,000-foot view, held a virtual hearing looking at the role federal support for research and development can play in ameliorating three crises—systemic inequality, the COVID-19 pandemic, and the current economic downturn—facing the United States. Witnesses at the hearing were Sudip Parikh, CEO of the American Association for the Advancement of Science (AAAS); Paul Romer, a professor at New York University and co-recipient of the 2018 Nobel Memorial Prize in Economic Sciences; Deborah Wince-Smith, president and CEO of the Council on Competitiveness; and Willy Shih, Professor of Management Practice at Harvard Business School.

While this does not sound like a riveting hearing, the discussion had important news for the basic research community in the United States. In comments opening the hearing, committee chair Representative John Yarmuth (D-KY) said, “Experts have stressed the importance of aggressive, responsible, and strategic investments to our recovery from COVID-19 and the economic fallout. Aside from the obvious—like developing vaccines and treatments for COVID-19—federal R&D investments would also help spur an inclusive recovery, boost regional economies, and put Americans back to work.”

Both the witnesses and the committee members all acknowledged the important role federally funded research will play in returning the U.S. economy to what it was the day before the nation stopped. AAAS’s Parikh suggested that science and engineering, along with being important tools for solving the pandemic, can also address other national problems, such as climate change, and provide an evidence base for the future policy decision making that will be necessary to restart the national economy.

The universal recognition that federally funded basic research has an important role to play in the revival of the U.S. economy should serve as a comforting note to the science community.

To read witness testimony and watch the hearing, go to https://bit.ly/3iFQPBG.

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The Newsletter Welcomes Letters to the Editor

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

While I have taught introductory cell and molecular biology for many years, this fall will be the first time I teach this course online, due to COVID-19. I am particularly concerned about how to format my exams. I usually give three during the semester and one final. I have always used a mix of multiple choice and short answer questions and have developed an excellent bank of questions I can pull from over the years. However, online, I’m worried that students might look up the answers online or communicate with others in the class. I want all my students to learn and worry about them cheating. What is the best way to assess student learning in an online environment?

—Exasperated about Exams

Dear Exasperated about Exams,

Thanks for your timely question. So many instructors are grappling with how best to “summatively assess” student learning in our classes this fall, whether we do it through quizzes, exams, projects, presentations, or other assessments. Many of us had a crash course experience with online instruction in the spring but this time we get to plan our courses with a bit more time and care.

It is clear from your letter that you want to support your students and assess their learning but you also have concerns about cheating. Has cheating been an issue in your class before, or is this just a fear of the faculty? We encourage you to think about where these concerns are coming from and whether you have evidence for them. The concern about cheating often leads quickly to a student deficit model—one in which some students who are lacking are considered lazy or unmotivated. You might consider ways to assess learning that allow students to utilize the resources at their disposal. In other words, how can you as the instructor create an online learning environment and testing situation that will incentivize students to study, prepare, and show their knowledge on your exam. That’s ultimately the goal, isn’t it?

To start, consider backward design principles as you think about assessing student learning online. What are the most important learning outcomes in your course? Ideally, these outcomes include at least some higher-order thinking skills that are difficult to test with easily searchable questions. You might start by considering your bank of questions from past exams and sort those questions into those that are easily searchable and those that require more complex thinking. This may help you in the upcoming term but may even have long-term benefits as you weed out questions that do not directly align with your learning outcomes.
One important thing to remember is that you cannot just make the assessment questions more complex without giving students practice answering more complex questions before they get to the exam. In other words, at least some questions asked on quizzes or assignments or during class should be similarly complex.¹

An example of outcome-aligned teaching can be seen in the Four Dimensional Ecology Education or 4DEE framework, adopted by the Ecological Society of America in 2018 (https://www.esa.org/4DEE). This framework challenges educators to include core ecological concepts, ecology practices, human–environment interactions, and cross-cutting themes of biology throughout the curriculum, including assessments. While the details and specific dimensions of an assessment might vary for cell and molecular biology, the same principles can be applied. Prevost et al. offer an example of learning outcome and assessment.²

With regard to exam structures, let’s consider the options. The suggestions below come primarily from the March 2020 CBE—Life Sciences Education (LSE) webinar with experts from around the country, Online with LSE: Transitioning to Online Instruction (www.ascb.org/ascb-meetings/online-with-lse-transitioning-to-online-instruction). As the panelists point out numerous times, there is no one-size-fits-all answer to how you should do your online assessments. That said, here are some considerations:

**High stakes vs. lower stakes?** Many students face anxiety as we transition to online learning. Would it be possible in your course to have more lower-stakes test opportunities for students, such as more frequent, shorter tests that are each worth fewer points, rather than a few high-stakes opportunities? This may help with student anxiety and also give you more feedback about how students are doing in your course.

**Exams vs. presentations or projects?** Is a high-stakes exam necessary to meet your learning outcomes? Would a project or presentation be more aligned with your key learning outcomes? Is an individual or group project feasible with your class size? If so, consider switching to a presentation or project. Be sure to give students a rubric in advance so they are aware of expectations for the assignment and for grading. This will help lower the stakes for the project and help improve the quality of student work.³

**Timed vs. untimed?** There are certainly benefits to using both timed and untimed exams. An untimed exam gives students the opportunity to reflect on course material and draw connections. A timed exam can help to incentivize the kind of preparation that is more similar to an in-class exam. If you do use a timed exam, consider using explicit instructions to students that they should study in advance and organize their notes prior to the start of the exam. Let students know that if they are not prepared in advance, they will not have time or the ability to Google and learn the material during the exam.

Another important point discussed in the LSE webinar is that it would help lower the stakes to give students practice with lower-stakes, timed assessments. Perhaps consider one or more short quizzes that students take to practice using this format and the software you plan on using. Regardless of whether the exams you give are timed or untimed, consider making them “open note” and allowing the use of online resources. Done well, this approach can help students develop their skills in gathering and making sense of information rather than simply memorizing and regurgitating facts that are easy to find in a search.

If your exams cannot be open notes or open Internet, you can consider using a proctoring service, if that is available at your institution. These can be expensive and can cause technical issues, especially for students with spotty internet service or older devices.

**Individual vs. group?** While they may not be suitable for all teaching contexts, group
exams may allow you to use collaboration among your students to promote their learning. In one study of group exams with open-ended questions, Cooke, et al. showed that there can be benefits to students' long-term retention of course material. Breakout groups could be used to allow groups to interact during the exam, or groups could meet offline, using group messaging or other communication tools, to collaborate.

When considering these various options for exams or other summative assessments, I encourage you to remember that:

- You can try something and then change it if it does not work;
- There is no single right way to give exams in an online course. Rather you will try things and refine based on what is working for your course, your students, and your institution;
- Rethinking how students are assessed could be an opportunity to realign your exams with your learning outcomes, and to encourage students to move beyond lower-order memorization toward a deeper and more connected understanding of the biology they learn in your class.

Regardless of the type of assessment you choose, be kind to yourself and your students in this time of uncertainty. Remember that even if you could give your assessments in person this semester, it would look drastically different than it ever has before with masked students and spiking anxiety every time someone coughs. We are experiencing an abnormal era but we hope you can make the most of it in support of student learning.

—The Education Committee

References

ASCB Member Benefit: One-on-One CV Review

Need some help with a cover letter, CV, resume, statement of teaching philosophy, or other document for the next step in your career? Members of the ASCB are willing to help. Just fill out a short form (www.ascb.org/cvreview), and we’ll put you in touch with a reviewer. Then the two of you can decide which digital collaboration tool to use (email, Google Docs, Skype, Wikispaces, etc.). You must be a current ASCB member to take advantage of this service.
ASCB’s education journal, CBE—Life Sciences Education (LSE), is your source for
- Tried and tested ideas for improving your teaching and mentoring
- Data-driven strategies for improving students’ learning, development, and success
- Evidence-based approaches for engaging students and overcoming everyday teaching challenges
- Valid and reliable assessment tools

Here are some highlights from the September 1, 2020, issue:

Attention Matters: How Orchestrating Attention May Relate to Classroom Learning
Arielle S. Keller, Ido Davidesco, and Kimberly D. Tanner

Transfer: A Review for Biology and the Life Sciences
Althea N. Kaminske, Carolina E. Kuepper-Tetzel, Cynthia L. Nebel, Megan A. Sumeracki, and Sean P. Ryan

Learning Analytics to Assess Beliefs about Science: Evolution of Expertise as Seen through Biological Inquiry
Melanie E. Peffer, Niloofar Ramezani, David Quigley, Emily Royse, and Chloe Bruce

Optimizing the Efficacy of Learning Objectives through Pretests
Faria Sana, Noah D. Forrin, Mrinalini Sharma, Tamara Dubljevic, Peter Ho, Ezza Jalil, and Joseph A. Kim

Using Framing as a Lens to Understand Context Effects on Expert Reasoning
Tara Slominski, Andrew Fugleberg, Warren M. Christensen, John B. Buncher, and Jennifer L. Momsen


New to education research? Explore the Anatomy of an Education Research Study at http://www.ascb.org/annotations and learn about the design, conduct, interpretation, and presentation of education research.

Stay up to date with all that LSE has to offer by following us on Twitter @CBE_Lifescied.
Mentorship is a keystone of scientific training and career development. Successful mentors can help identify a mentee’s strengths and areas for growth, guide and support them through challenges, promote their careers, aid in building networks, and serve as role models. Excellent mentorship should also include psychosocial support centered on the mentees’ unique values, identities, and lived experiences.

This is particularly true for life experiences that may have profound effects on a mentee’s career and may include experiencing racist, sexist, and anti-LGBT+ bias; feelings of isolation or pressure to assimilate due to underrepresentation; lack of familiarity with cultural norms due to first-generation higher education status or being a foreigner; challenges arising from disability; and many more.

How do mentees ensure that they are getting the best mentoring, and how can mentors do a better job of helping mentees reach their scientific and professional goals? Effective mentor–mentee relationships do not have to arise by coincidence; mentors can acquire skills through self-reflection and intentional, evidence-based education, and mentees can seek out and construct mentoring relationships tailored to their own highly individual needs. In particular, there are inherent challenges that different racial, socioeconomic, gender identity, sexual orientation, and cultural backgrounds can pose for mentoring relationships. In this article, we will share resources on effective mentoring approaches for diverse scientists.

We asked three tenure-track faculty who are women of color at a mid-sized regional university about what made their best mentorship experiences positive:

“Someone who could share my excitement.”
“Sharing how a challenge or problem was navigated.”
“I looked for someone who I thought treated people with respect.”
“I was treated like a lab member—so I thought, maybe I can contribute to science.”
“As much as I want to say that it’s the science that has the big impact [for early career undergraduates], I think it’s the building the social contact that has the big impact.”

Recognizing Privilege and Diving into the Discomfort Zone

American scientific spaces have historically been populated by mentors and mentees with generally homogeneous backgrounds, which has solidified a scientific culture biased toward White, male, heterosexual, continuing generation, upper-middle class individuals. As a starting point for successful mentoring across differences, mentors and mentees should reflect on how their socioeconomic, racial, and educational backgrounds and other elements of their culture or identity may vary greatly from each other. For example, between us, our (the authors’) identities include being White, continuing-generation in higher education, Jewish,
immigrant, parents, cis-gendered, heterosexual women.

How can mentors overcome ongoing differences and biases to support mentees? How can mentors from dominant populations ensure that mentees do not feel that they need to hide the burden of racism or bias, or that they need to assimilate into the normative STEM culture? And how can mentors help ensure that the responsibility of “diversity work” does not disproportionately burden mentees from marginalized populations? These questions are by no means unique to cell biology; below, we provide some examples of actions that mentors can take:

**Self-reflect and engage** in the uncomfortable task of unpacking their own position, identity, and privileges. By sharing these reflections, mentors signal their willingness to engage in discussions that may otherwise seem unapproachable.

**Listen actively** to mentees and engage thoughtfully in difficult one-on-one conversations about the realities of inequity in science and society. This is particularly important because of the personal toll that assimilation, identity conflicts, and increased cognitive load takes on mentees from minoritized backgrounds, even while they are trying to balance their psychological and academic performance.4,5

**Ensure that their research environments are inclusive.** Mentor–mentee relationships often exist within the context of a lab group, and mentors shoulder the responsibility for setting the group’s tone and culture. Mentors should facilitate conversations on bias with the entire group (or arrange for an outside facilitator if they are uncomfortable leading these discussions), and implement group-wide efforts to raise awareness of and take action against individual, systemic, and institutional racism and inequity.4

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**Multiple Modes of Mentorship**

**Fill the Mentor Map**

Effective mentorship practices can be learned, but because every mentoring relationship is unique, no one experience can serve as a blueprint for all others.1 It is therefore particularly useful to find resources that can help guide mentors and mentees according to their individual styles and needs (see Resources box on p. 51). Mentoring has traditionally followed a model of one-directional, non-reciprocal pairings, where a mentor provides a mentee with guidance and advice. However, research into the underpinnings of successful mentorship shows that reciprocal communication ensures that the goals of mentors and mentees are met. Further, mentorship can go beyond a dyad (one-to-one), and can be triadic (dual-mentor, for example), collective (multiple mentees and mentors), and networked (multiple mentors to fill diverse needs).

Two ways to make mentoring dialogues more concrete are:

1. **Individual Development Plans (IDPs),** which allow documented, structured planning and clear communication between the mentor and mentee regarding career development goals, and also set benchmarks and ensure accountability

2. **Mentoring agreements or compacts,** which are written documents that describe what mentors and mentees each expect out of a relationship (both in terms of responsibilities and boundaries), and should be developed through honest self-reflection on the part of mentors and mentees

By regularly reflecting on whether goals in an IDP and/or mentoring agreement have been attained or if they have shifted, and revising the document accordingly, mentors and mentees will be more able to honestly adjust expectations throughout the relationship.1,6

Mentees often have additional needs that can be filled by co-mentors, outside mentors who are not directly involved in the mentee’s research, or by mentoring between peers. In moving away from a single, dyadic model of mentorship, a useful exercise is to build out a mentor map (see Resources box) to concretely display
the network of mentors and mentees a single person relies on; discovering the gaps in a mentor map can direct individuals to think critically about areas of support that they may not have recognized they were missing.2

Here are some examples of experiences people have had with mentorship networks:

I would say that creating a peer mentor network has been the most impactful for me. Being a postdoc can be isolating and being a Black female postdoc exacerbates that feeling. As a Hanna Gray Fellow, I now have a peer mentoring network of outstanding young URM scientists that I identify with and can use as a support system.

—HHMI Hanna Gray Fellow

We have regular meetings—every two weeks or every month. These are really helpful....The most successful elements: a little time checking in, set some goals, hold each other accountable—gently....[T]here’s a shared experience, because we’re at the same level, the struggle is normalized.... The normalization of struggles is so hard. People are open about the papers and the grants, but not about how hard it is.

—Primarily Undergraduate Institution (PUI) assistant professor, on peer mentoring for early career PUI faculty

Mentees can fill the positions on their mentor map independently or with help from a current mentor, or using programs such as the ASCB’s Mentor Match portal, the National Research Mentoring Network, and reaching out to contacts via LinkedIn or Twitter. Trainees can also take advantage of relevant mentorship programming at annual meetings, including meetings of ASCB|EMBO and the Society for Advancement of Chicanos/Hispanics and Native Americans in Science and the Annual Biomedical Research Conference for Minority Students, to name a very few. At the ASCB|EMBO meeting, for example, the ASCB Minorities Affairs Committee pairs mentees with mentors and sponsors the ASCB Mentoring Keynote address. Peer networks (local or online; see Resources box) are another extremely valuable form of mentorship, and provide a forum where scientists can support, advise, and hold each other accountable to goals. For mentees whose identities are underrepresented in their scientific communities, a mentoring network that includes role models or peers with similar experiences and challenges can be invaluable for a sense of belonging and to share stories and strategies.

Formal cohort programs often couple the benefits of peer groups with research funding (which provides critical breathing room and resources for career development) and professional skills workshops. They also provide expanded networks of mentors including peers and highly invested program directors.

A few examples of cohort programs:

- Meyerhoff Scholars Program (University of Maryland, Baltimore County) undergraduate program
- HHMI’s Gilliam Fellow predoctoral and Hanna Gray Fellow postdoctoral programs
- National Institutes of Health (NIH)-funded Institutional Research and Academic Career Development Awards (IRACDA) postdoctoral programs
- NIH Innovative Programs to Enhance Research Training (IPERT); www.ascb.org/careers/nigms-ipert-funding
- National Institute of General Medical Sciences Maximizing Opportunities for Scientific and Academic Independent Careers (MOSAIC) K99/R00 postdoc-to-faculty transition award, including a recent award to ASCB to create cell biology–focused cohorts (see p. 20)
Here is one view of the value of cohort programs:

The fellowship is so much more than financial support, honor, and even their career development. With it comes a camaraderie, connectedness, and a sense of belonging and being a part of something, which strengthens their identity and self-confidence.

—HHMI Gilliam Fellow mentor

Finally, most mentoring relationships will reach a logical end, either because the mentor is unable or unwilling to provide the support the mentee needs, or because the mentor’s expertise and advice is no longer a good match for the mentee’s career needs. This is natural: The end of a mentoring relationship may simply be an agreement to end a dedicated and intentional engagement and the beginning of a friendship or working relationship between colleagues, and it may be the time for the mentor to move on to the position of sponsor for their former mentee.

Acknowledgments
We thank Suzanne R. Lee, Shawn M. Arellano, and Adrienne M. Wang of Western Washington University; Chantell Evans of the Perelman School of Medicine, University of Pennsylvania; Diane Barber of the University of California, San Francisco; and many others for providing their thoughts on their mentoring and mentorship. We also thank Maria Lund Dahlberg (National Academies of Science, Engineering and Medicine) for her critical reading of early drafts.

References


Resources

Resources for effective mentoring

• The National Academies of Sciences, Engineering, and Medicine report The Science of Mentorship in STEMM and associated Online Guide.
• National Research Mentoring Network (NRMN), www.nrmn.net
• National Center for Faculty Development and Diversity (NCFDD), www.facultydiversity.org
• Entering Mentoring (W. H. Freeman, 2015): guidance, talking points, and action items for mentors and mentees regarding expectations, goals, limits, feedback, support, and ending a mentoring relationship in a research setting.
• Entering Research (Macmillan Learning, 2020): Helps mentees play active roles in their own mentorship (i.e., “mentoring up”).
• Mentor Maps (a good one is produced by NCFDD, and there are many available on the Internet).

Resources for challenging power dynamics and discussions on race and racism

• Culturally Aware Mentoring training from NRMN and the Center for Improvement of Mentored Experiences in Research
• ”Ten simple rules for building an anti-racist lab” Technology, Engineering, and Mathematics (STEM)
• #shutdownSTEM project: a resource of action items to combat racism in STEM. shutdownSTEM.org

Some online peer groups

• Slack channels including #gradstudentslack, #futurePISlack, #newPISlack
• Social media tags #VanguardSTEM, #DiverseDoubleDocs, #BlackandSTEM

About the Authors
Avital Rodal, an associate professor of Biology at Brandeis University, is an associate on the ASCB Women in Cell Biology Committee. Lina Dahlberg, an associate professor of Biology at Western Washington University, is a member of the ASCB Minorities Affairs Committee.
DEAR LABBY:

Thank you for your very helpful advice on how to navigate the complicated scheduling required to do bench science in the time of COVID-19 (see the Dear Labby column in the June ASCB Newsletter). As a postdoc with both a preschool and school-age child, it feels like I am faced with impossible choices. I could compromise my children’s safety by putting them in a much-less-than-ideal childcare situation, or postpone my return to the lab, thereby endangering my career. My institution has made returning to work voluntary, and has encouraged PIs to provide flexible work arrangements. Without childcare, I need to stay at home and therefore get left behind. Our local childcare facility is giving priority to essential workers (including research scientists) but is operating at reduced capacity. Besides, between questions about the quality of the limited childcare available (I shopped for months to find the perfect program for my children!), the restrictions that may be involved (preschoolers maintaining a six-foot distance? Have you ever met a preschooler?), and the fear that my family may contract COVID, I don’t see how I can send my children there. My spouse is a true partner in childcare but has a job that requires working Monday–Friday onsite without the option of working from home. We have no family members in the area to help us. Any suggestions would be welcome.

—Trapped by COVID

DEAR TRAPPED BY COVID: These are incredibly challenging times and you are in a crucial phase of your career. And you are a parent. Labby has some suggestions but none of them will return you to what now looks like an easier time last fall. Please know that this too shall pass, and that your PI, institutions, and funding bodies are taking seriously the toll of this pandemic on parents and young investigators: You are very important and they have your back.

But in the meantime, let’s take a deep breath and Labby will share some creative solutions learned from others. Remember you are a person who is really good at solving problems; otherwise you wouldn’t be a scientist and wouldn’t have earned your PhD.

Here are some thoughts on how you might adapt and remain productive.

Try to develop a flexible work schedule both in the lab and at home. Since your spouse can be home on the weekend and probably the evenings, see if you can arrange your lab work during those hours. Labby learned that some labs post a “help-me” spreadsheet so that even though people may be coming in for one-third the hours, there are clear instructions for what help each person needs to move things along.

What about home time? How do you manage to get time to read, write, think? Right now, do what you need to do, which may mean temporarily abandoning your previous restrictions on kids’ screen time and allowing more time with programs that are creative and educational.
When life returns to normal, the outdoors, museums, and people will successfully compete with the screen for your kids’ attention.

You may want to explore daycare and babysitting alternatives. Establish a family bubble or “quaranteam” with another family whose COVID safety measures match your own and with whom you can trade coverage or share the expense of an in-home caregiver. Labby’s institution invited PIs to contribute to a fund that can help postdoc parents absorb unexpected expenses. Also maybe there are undergrad and grad students in your community who could organize a volunteer babysitting service like COVIDsitters staffed by volunteer sitters at University of Minnesota Medical Schools (www.mncovidsitters.org).

Finally even family members who live far away can babysit via FaceTime. Many kids are just happy hanging out with a grandparent, listening to stories, showing them the projects they’ve been working on, maybe putting on a puppet show, etc.

You may want to join a peer support group on social media; there are several such groups for academic parents. There you can find people with whom to share your own challenges and ideas. Labby found an article that was very helpful in thinking about different solutions for a new time when there are no right answers, only ways to make the best decision for you: https://bit.ly/3l97PSX.

The solutions you find now will be helpful in the long term, since Labby doesn’t see the United States addressing our need for adequate childcare in the near future.

Finally, this is a good time to revisit your career timeline (i.e., revisit your Individual Development Plan). Labby has heard that the University of California system negotiated a one-year extension of postdocs contracts. This could diminish the pressure to complete that major project and to start your job search. You can approach your PI with a plan for how another year would move forward the lab’s research and also allow you to contribute with less stress.

—Labby
Susan Walsh never set out to become an educator. Now this associate professor of Molecular/Cell Biology is designing the science curriculum from the ground up at Soka University of America (SUA) in Aliso Viejo, CA, where she is Director of the Life Sciences Concentration. Recently, Walsh helped organize ASCB’s Regional Educator Meeting “Teaching Tomorrow’s Scientists,” which, amid pandemic shutdowns, had to quickly shift online. She answered a few questions for ASCB.

**Why did you decide to become a scientist and cell biology educator?**

I didn’t anticipate that teaching would be my path. I did some teaching assistant work setting up laboratories and provoking discussion during my time as an undergraduate at a women’s small liberal arts college, but I didn’t even have a mentoring relationship during graduate school. When I was a postdoc, it was becoming clear that I did not want the research path. My professor, Arlene Russell, encouraged me to apply for visiting cell biology positions at small liberal arts schools, and I was lucky enough to secure one at Rollins College in Winter Park, FL, where I really learned to teach. Now I’m on a bigger adventure, working with my new colleagues trying to build a science curriculum from scratch at SUA.

**What was it like to design the Teaching Tomorrow’s Scientists Regional Meeting and suddenly having to shift gears to put that online?**

Southern California not only has a lot of higher education institutions, but a diversity of institutions—from R1 to liberal arts to community colleges, so I was lucky to get Joel Abraham from California State University, Fullerton, and Andrea Nicholas from the University of California, Irvine, to help connect me to people and organizations out here. As the deadline for abstracts was coming due, the pandemic and the shutdowns hit, and we knew we couldn’t safely allow people to meet in person. Thea Clarke (ASCB’s Director of Communications and Education) shepherded us through everything, and we managed to reformat the meeting to still include our plenary speakers, four workshops, and some breakout discussion rooms. I don’t think it went perfectly, but I think many people, ourselves included, were pleased at how beneficial it was.

**What do you think are important trends in life science education?**

CUREs (Course-based Undergraduate Research Experiences)! I think that Vision and Change has been out for long enough that many biology educators know about it and have been working to implement it, so we have the experiences and data to start talking about how well this is going. The biggest challenge for me is that if you are truly doing original research with novice hands, sometimes things are going to fail, and we have to get our students through that. Right now, teachers like me are fumbling to figure out how online teaching can recreate the classroom community that we so easily build in person. As a white female educator, I also am reflecting on my role in supporting my students and attempting to integrate some analysis of race into
all my courses. I cannot avoid the uncomfortable conversation anymore, but I also need to listen to those with different lived experiences than me and acknowledge when I make mistakes. I have told students that “it’s OK to not be OK right now” multiple times this spring, but I think that living through this tumultuous time also provides a chance for us to reflect about what we value and how we might want to redefine normal.

**Explain your involvement with the Fringe Theater Festival.**
I have always found that my laboratory and teaching experiences have reinforced my theater skills. You want me to take really good notes, do the same thing every night, and if something goes wrong, I should fix it before anyone notices? Got it! I started technical theater in college as a stage manager, and I loved the organization and power of it. That sounds ridiculous or arrogant maybe, but I felt that, unlike my experiments, if I hit the GO button, the lights would (99% of the time) go on. Sadly, this year, the fringe festivals I love have been canceled. The pandemic has undoubtedly changed our lives, but I am hopeful that when a vaccine is available, we will flood the performance spaces and build these communities again. Support your local theater group if you can!
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I want to thank all of our generous donors over the past several months. Their support has been invaluable as we have expanded our digital offerings both on our online community and through our webinars. There are three easy ways to donate—either online at www.ascb.org/donate, over the phone by calling 301-347-9300, or by mail.

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