

ASBMB TODAY

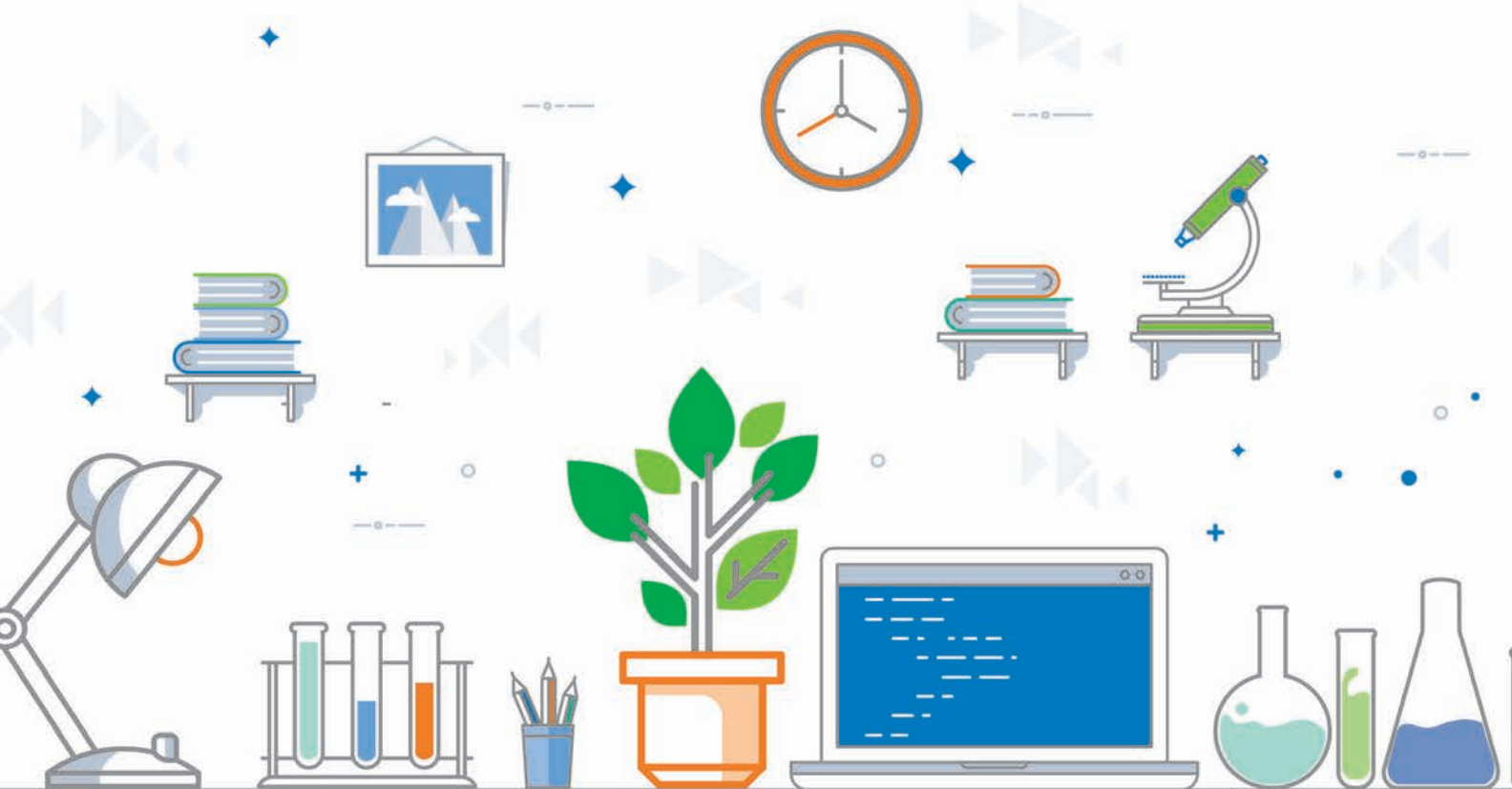
THE MEMBER MAGAZINE OF THE AMERICAN SOCIETY FOR BIOCHEMISTRY AND MOLECULAR BIOLOGY



NOT ONE MORE GENERATION

WOMEN IN SCIENCE TAKE ON SEXUAL HARASSMENT





ASBMB professional-development resources

Job board

asbmb.org/jobboard

The ASBMB jobs board has listings from academia, government and industry. Looking for your next hire? Members can post jobs for free.

Grant-writing training

asbmb.org/grantwriting

This Washington, D.C.-based summer workshop yields impressive results; 75% of participants end up with successful grants within two years.

Communications training

asbmb.org/commcourse

Can't travel for training? Take the ASBMB's "The Art of Science Communication" online course to gain the skills, knowledge and mindset necessary to become a great presenter.

Small meetings

asbmb.org/specialsymposia

Small meetings are offered throughout the year on a wide range of scientific topics. Interested in organizing a meeting? Members can work with the ASBMB to plan and organize a special symposium.

Careers blog

asbmb.org/careersblog

Every week, our jobs blog presents insights into the current job market.

Webinars

asbmb.org/webinars

We offer live webinars and recordings of past webinars on topics including getting funding, salary negotiation, research careers in industry and more.

Video tutorials

asbmb.org/careers/tutorials

Our video series has tips on networking, dressing professionally, building a personal brand and more.

asbmb.org/careers

ASBMB

NEWS

2

EDITOR'S NOTE

Share your story

3

NEWS FROM THE HILL

Congress proposes budget increases for science-funding agencies

4

MEMBER UPDATE

6

RETROSPECTIVE

Alfred Alberts (1931-2018)

9

NEWS

9 Chapter president hopes to continue building community

10 Meet the 2018 PROLAB recipients

12

LIPID NEWS

Who's in charge of PM identity?

13

JOURNAL NEWS

13 New insight into the molecular weapons of the plant microbiome

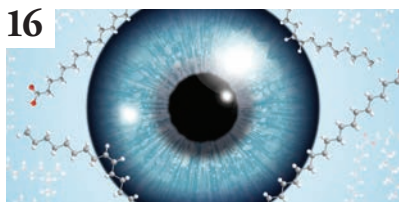
14 In reading histone modifications, an oncoprotein is modified in return

15 MCP presents draft guidelines for reporting complex spectra

16 Finding the structure of a lipid that keeps our tears clear

17 From the journals

16



FEATURES

22

NOT ONE MORE GENERATION

36

ANNUAL MEETING

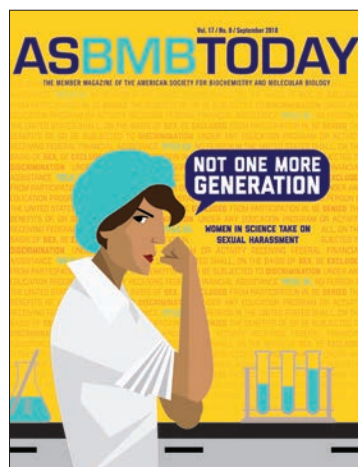
37 Orlando, here we come

39 ASBMB award winners

40 How do graduate students and postdocs choose conferences?

43 A dozen moments in the spotlight

22



With weapons ranging from Title IX complaints to online petitions, women in science are taking on sexual harassment.

36



PERSPECTIVES

46

AFRICAN-AMERICAN MEN IN THE MOLECULAR BIOSCIENCES

The importance of mentoring

50

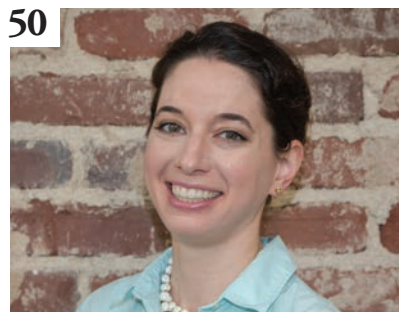
PROFESSIONAL DEVELOPMENT

Tips and tricks for applying for a faculty job

46



50



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PRINT ISSN 2372-0409

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EDITOR'S NOTE

Share your story

By Comfort Dorn

Back when I got my first newspaper job at a community weekly (circulation 1,200, give or take), I saw what I did as an extension of the local diner or the post office lobby — wherever people gathered to share their news, thoughts and stories.

A few decades and more than 10,000 subscribers later, my viewpoint hasn't changed a whole lot. Sure, we want to tell you about the great science in our journals and elsewhere, and we want to keep you informed about the big issues the life sciences research community wrestles with. But we also want this to be a place where you can keep up with other members of the American Society for Biochemistry and Molecular Biology and where they can keep up with you. We want your news (awards, promotions, big life events) and, even more importantly, your thoughts (letters and essays). This is a place for the community to knit more tightly together.

So I invite you to become a member of the ASBMB Today writing community. Our members want to read about your opinions and experiences. To get you started, we'll be launching two essay series in 2019:

- **What I wish people understood about _____.** Is there an aspect of your life, personal or professional, that others just don't get? Fill in the blank in this sentence, and then set the record straight.

- **Night shift.** Life does not end when the sun goes down, and our experiences often are heightened at night. Tell us a story about what you do while others sleep.

We also plan to devote a section of our January 2019 issue to wellness, and we invite you to submit personal



essays, photography and illustrations relating to that theme. We want to know what you do for your body and/or mind as well as what you think academic institutions, government agencies and businesses should do to promote wellness.

We have a number of other suggested topics on our submissions page, but we don't limit ourselves to those. Think about the conversations you have with your colleagues; what issues are closest to your hearts? If you have an idea, tell us about it. We'll work with you to turn it into a compelling essay.

Not quite ready to write an essay? We welcome your letters on topics of interest to our community. Or maybe you have some good news about yourself you'd like to share. Do you have a suggestion for a news story you'd like to see us tackle? Shoot us a note at asbmbtoday@asbmb.org.



Comfort Dorn (cdorn@asbmb.org) is managing editor of ASBMB Today. Follow her on Twitter @cdorn56.

Congress proposes increases for science funding in FY19

By Benjamin Corb

I wrote in June about reasons for optimism and pessimism regarding congressional support for the nation's science funding agencies. As the appropriations process slowly has progressed this summer, proposed budget increases for domestic priorities such as science give cause for cautious optimism.

With budget increases in the last three years, the U.S. Congress has an established track record of increasing investments in the federal agencies that fund scientific research, and this year's proposals indicate that Congress has every intention of continuing this trend. The U.S. House and Senate have proposed to increase the National Institutes of Health budget by at least \$1.25 billion, while giving the National Science Foundation at least a \$301 million increase for fiscal 2019. Other science offices and agencies, such as the Department of Energy Office of Science and NASA, also have fared well. Science advocates, however, must continue to keep pressure on Congress until the new budgets are passed and signed into law by President Donald Trump.

This year, the U.S. Senate is taking a creative approach, hoping to ensure passage of controversial appropriations bills by partnering them with bills that are more widely supported. To pass the perennially controversial Labor, Health and Human Services, and Education bill, which includes funding for family planning services and stem cell research, the Senate is bundling it with the defense bill, which enjoys solid bipartisan support.

FEDERAL FUNDING FOR SCIENCE AGENCIES

	FY 2018 (enacted)	FY 2019 House (proposed)	FY 2019 Senate (proposed)
NIH	\$37.3 billion	\$38.5 billion (3% ↑)	\$39.3 billion (6% ↑)
NSF	\$7.8 billion	\$8.2 billion (5% ↑)	\$8.1 billion (4% ↑)

Because the LHHS bill includes the NIH, funding for researchers across the country previously has been stymied by political disputes, and the resulting delays have wreaked havoc on the NIH's ability to make timely funding decisions.

Bundling appropriations bills is not a new concept. However, after 19 years of passing continuing resolutions that temporarily fund the government based on the previous year's budgets, this strategy may finally lead to a full-year spending bill. While the Senate is thinking creatively about ways to pass appropriations bills, the president has threatened a government shutdown unless his policy priorities are addressed.

In late July, Trump threatened to shut down the federal government unless Congress meets his demands

for funding for a new southern border wall and stricter immigration policies. It remains to be seen if the president will hold to this threat or back down to pressure from congressional leaders to keep the government funded and operating. In spite of Trump's veto threat, Senate Majority Leader Mitch McConnell, R-Ky., has stated that the funding bills will be passed before the Sept. 30 funding deadline and the congressional midterm elections.

We encourage you to visit our blog at policy.ASBMB.org for updates on the process and for ways you can be involved.



Benjamin Corb (bcorb@asbmb.org) is director of public affairs at the ASBMB. Follow him on Twitter @bwcorb.

Member update

By Erik Chaulk

Hobbs wins French science prize

Helen Hobbs is a 2018 recipient of the Institut de France Grand Prix Scientifique.



HOBBS

Created in 2002 by the Lefoulon-Delalande Foundation, the prize recognizes scientists who have made significant contributions toward physiology, biology or cardiovascular medicine.

Hobbs is being recognized for her role in discovering of a novel way to reduce cholesterol. She helped reveal that mutations in the protein PCSK9 lower levels of low-density lipoprotein, the cholesterol that contributes to plaque in arteries, which paved the way for development of a drug.

Hobbs is one of the most prestigious awards in cardiovascular research, the award carries a €600,000 prize. Hobbs will share the prize with two other awardees who have made discoveries related to cholesterol and the PCSK9 gene.

Hobbs is a Howard Hughes Medical Institute investigator and a professor of internal medicine and molecular genetics and director of the Eugene McDermott Center for Human Growth and Development at the University of Texas Southwestern Medical Center.

Hobbs is a Howard Hughes Medical Institute investigator and a professor of internal medicine and molecular genetics and director of the Eugene McDermott Center for Human Growth and Development at the University of Texas Southwestern Medical Center.

Langer named U.S. science envoy

Robert Langer, an institute professor at the Massachusetts Institute of Technology, is one of five individuals

named 2018 U.S. science envoys.

The U.S. Science Envoy Program promotes international cooperation in



LANGER

the areas of science, technology and engineering. Serving for one year, envoys are leading scientists who build global collaborations to address important scientific issues.

As a science envoy, Langer will focus on developing novel approaches in biomaterials, drug delivery systems, nanotechnology, tissue engineering and the U.S. approach to research commercialization.

The most cited engineer in history, according to Google Scholar, Langer has published more than 1,400 articles and has more than 1,300 issued and pending patents worldwide. His research focuses on nanotechnology, seeking to develop nanoparticles to treat cancer and other diseases.

Langer is one of 13 institute professors at MIT and has received more than 220 major awards.

Neena Grover receives teaching award

Neena Grover, a professor of chemistry and biochemistry at Colorado College, is a recipient of the 2018



GROVER

Midstates Consortium for Math and Science's Janet Anderson Lecture Award.

Established in memory of Hope College professor Janet Anderson, this award recognizes faculty members in the Midstates

Consortium who have distinguished themselves through teaching, research and service to their community.

Grover has been praised widely by both faculty and students for fostering a collaborative and engaging research environment.

A mentor for numerous students, Grover stays active in community outreach. She has collaborated with the Southern Colorado AIDS Project, guiding her students as they provide outreach on HIV/AIDS transmission, prevention and treatment.

Grover will speak at the consortium's 2018 Undergraduate Research Symposium in the Biological Sciences and Psychology in November.

Carroll wins governor's medal

Dana Carroll is one of four honorees who will receive the 2018 Utah Governor's Medal for Science and Technology.



CARROLL

The governor's medal is the state's highest civilian award in these fields, bestowed on individuals who have made significant contributions in science and technology.

Carroll is honored for his research in precise genome engineering, which demonstrated the effectiveness of zinc-finger nucleases, or ZFNs, as a tool for modifying DNA. Ultimately, his work provided the framework for the development of other gene-editing technologies, including CRISPR.

Carroll is a distinguished professor in the department of biochemistry at the University of Utah School of Medicine. He got the medal in June.

Stuehr wins Morley medal

Dennis Stuehr has been awarded the 2018 Edward W. Morley Medal by the American Chemical Society's Cleveland Section.



STUEHR

The award recognizes contributions to chemistry through significant achievements

in research, teaching, engineering, research administration and public service. The medal carries a \$2,000 honorarium.

Stuehr is a professor in the department of molecular medicine at Case Western Reserve University and on the staff of the Cleveland Clinic Lerner Research Institute.

His research explores the fundamental mechanisms that govern the function of nitric oxide synthase enzymes in the human body. He has authored more than 250 peer-reviewed articles.

Stuehr received the Morley Medal in May at the meeting of the ACS Cleveland Section.

Parise elected chair of UNC faculty council

Leslie Parise has been elected chair of the faculty at the University of North Carolina at Chapel Hill.



PARISE

Parise will act as chair pro tempore of the faculty council and general faculty, representing the chancellor

in academic matters as requested. She plans to address budget issues, faculty retention, diversity, family-friendly

policies and other concerns.

She previously served on the faculty executive committee and the faculty council, where she worked to improve the work-life balance on campus.

Parise is a professor and chair of the department of biochemistry and biophysics at UNC. She is also a professor of pharmacology and a member of the UNC Lineberger Comprehensive Cancer Center and the UNC McAllister Heart Institute.

Her three-year term runs through June 2020.

Hird, Morris named Beckman scholars

Miami University biochemistry majors Krystina Hird and Matt Morris have been named 2018–2019 Beckman scholars.



HIRD

Miami was chosen as one of 12 institutions to receive a 2016–2019 Arnold and Mabel Beckman Foundation scholars program award. The institutional award provides funding for three years for up to five students studying



MORRIS

chemistry, biochemistry and the biological sciences.

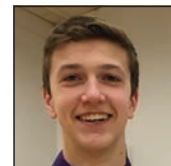
Hird's research explores how proteins move across plant cell membranes. In addition to being a senior biochemistry major, Hird is a plant biology, molecular biology and bioinformatics triple minor.

A junior double major in biochemistry and music performance, Morris has focused his research on clinical inhibitors of metallo-beta-lactamases.

Hird and Morris each will receive \$19,300 to support their undergraduate research as well as faculty support and mentorship for their research projects over two summers and one academic year.

Thorsell wins ASBMB science fair award

Anthony Thorsell received an ASBMB Science Fair Award for his project, Collection and Amplification of DNA on Various Surfaces.



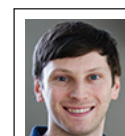
THORSELL

The ASBMB Science Fair award is presented to a middle school or high school

student participating in a local science fair who demonstrates outstanding achievement in biochemistry and molecular biology research. The award carries a \$50 prize and a certificate. Thorsell's award was sponsored by the St. Mary's University of Minnesota ASBMB Student Chapter.

Thorsell's project addressed the issue of obtaining quality DNA samples depending on the surfaces on which they were found. His research tested the amount of DNA that could be extracted from different surface types using polymerase chain reaction.

Thorsell is a student in the Cochrane-Fountain City School District in Fountain City, Wisconsin.



Erik Chaulk (echaulk@asbmb.org) is a peer-review coordinator and digital publications web specialist at the ASBMB.

Send us your news

Have you recently been promoted or honored? Do you have good news to share with your fellow ASBMB members? Email it to us at asbmbtoday@asbmb.org — and don't forget to include a photo!



Alfred Alberts (1931–2018)

By Roy Vagelos

Al Alberts first walked into my laboratory at the National Institutes of Health in 1959. Al had been working on a graduate degree in cell biology at the University of Maryland and was attending Earl Stadtman's evening lectures in microbial biochemistry. At the end of one lecture, Earl announced that he had an opening for a technician in his biochemistry laboratory at the NIH. Al applied and was accepted on the spot. He had finished most of the work toward a Ph.D. but had not yet written a thesis. Funding for his graduate work was terminating; he needed a job.

When Al showed up at the NIH, Earl told him that he would be working with me. I had been Earl's first postdoctoral fellow and then had been given an independent position to develop my own research program. I had begun by studying a reaction catalyzed by a bacterial extract requiring acetyl-CoA (or a longer-chain acyl-CoA) and malonyl-CoA. The substrates for this reaction required chemical synthesis. Al watched me do this procedure and announced that he did not want to expose himself to potential carcinogens. We agreed that he would carry out the more biological parts of our experiments; the chemistry would be left to me.

Al was not trained in biochemistry, but he learned fast. I suspected that the biochemical reaction I had been studying might represent the first step in the biosynthesis of long-chain fatty acids. We knew this field was becoming competitive. Our experiments using bacterial extracts as sources of enzymes indicated the requirement of a heat-stable protein that, when purified, led to the discovery of the



ALL PHOTOS COURTESY OF ELI ALBERTS

Al Alberts in a lab at Merck in 1995, the year he retired. He continued touring the world and lecturing about statins after his retirement.

acyl-carrier protein, or ACP. Our team isolated ACP and deciphered all the steps of long-chain fatty acid biosynthesis. ACP was the central actor in each of these steps; all the intermediates in biosynthesis were bound to ACP as thioesters. In the middle of these studies was Al, who became an instructor to some of the postdoctoral fellows in my research group. He liked to work closely with those who moved fast in the lab and enjoyed the work; he stayed clear of those who did not share his love for experimentation.

We all worked hard in the lab

during the week and partied together on weekends. We alternated homes where we ate, drank, danced (some did push-ups) and learned about each other's families.

Al was born in Manhattan on May 16, 1931, grew up in Brooklyn and graduated from Brooklyn College. He met Helene Cuba (known to most of us as Sandy) on a blind date when he was 21 and Sandy was 17. They were married in 1954. By the time Al joined my lab, they had two children, Heather and Mitchell; my wife, Diana, and I had two children about the same age.



To celebrate FDA approval of lovastatin in the late 1980s, a Merck helicopter was given the lovastatin number, MK803, as its tail number. Pictured are, in front, Art Patchett, Al Alberts, Roy Vagelos and Jonathan Tolbert; in back, Dick Monaghan, Georg Albers-Schonberg, Ben Shapiro and Ed Scolnick.

In 1966, I was invited to chair the department of biochemistry at the Washington University School of Medicine. I had never been in St. Louis prior to the invitation to visit. I agreed to move our family, but then I worried about Al. I told him he should remain at the NIH. Moving to a university research position without a Ph.D. might be tricky. The next day, Al said he wanted to continue our collaboration at Washington University. The Alberts and Vagelos families moved to St. Louis in 1966. Al came as a biochemistry instructor with a plan that he would teach in the medical student laboratory while carrying on our lab work. Our research in fatty acid metabolism continued, and I started studies in complex lipids and synthesis of cholesterol.

Al's research with me continued to be very productive, and he undertook teaching in the medical student lab with enthusiasm. He was promoted

to assistant professor and then to associate professor with tenure. I was pleased that a lack of credentials could be overcome by obvious professional accomplishments.

Life was good in St. Louis; scientific work was of ultimate importance, but there was time to follow professional baseball, football and ice hockey. The St. Louis Symphony Orchestra was excellent, as was the zoo, where we could entertain our growing families. Al and Sandy produced a third child, Eli; Diana and I added two. Our families were close.

In 1975, I was recruited to lead the Merck Research Laboratories. After a couple of visits, I was convinced that using biochemistry as the key strategy for drug discovery, focusing on molecular targets such as enzymes, cell receptors and ion channels, might be interesting and fun. I told Al that I believed this might take me in a more applied medical direction; I was ready

for a change. But my move would be risky, since I had no experience in drug discovery. I suggested that Al remain at Washington University. He said he wanted to move with me. So the Alberts and Vagelos families moved to Merck.

During my first year at Merck, I spent time with each research group, helping them to identify molecular targets in inflammatory, metabolic, allergic, infectious and cardiovascular diseases. Once a molecular target was identified, it could be attacked by the chemists and fermentation biologists, who would provide candidates for drug development.

I also thought that it would be useful to make a personal bet on a target, and for this I enlisted Al. I suggested he take on the hypothesis that high blood cholesterol was responsible for coronary heart disease, heart attacks and strokes. There was much suggestive evidence, but there was no effective drug to reduce blood cholesterol

levels.

Merck had a history in cholesterol studies, including the discovery of mevalonic acid, which was shown to be an intermediate in cholesterol biosynthesis. Academic researchers had mapped out the enzymes involved in the biosynthesis of cholesterol and stated that HMG-CoA reductase, a key enzyme in the biosynthetic scheme, was rate-limiting for the production of cholesterol; its activity would control the level of cholesterol synthesis. Thus, a molecular target was identified that could decrease cholesterol production as a means to reduce blood cholesterol or LDL cholesterol. A number of laboratories, including Merck, began to search for HMG-CoA reductase inhibitors.

Al and I learned that a Japanese lab had discovered mevastatin, a specific inhibitor of this enzyme that reduced blood cholesterol in some animals. So Merck was already behind. I urged Al to proceed, hoping he would discover a superior inhibitor. Al designed a screening assay that received compounds from Merck chemists as well as from the natural product isolation group. One candidate contained an inhibitor more potent than mevastatin. Lovastatin differed from mevastatin by a single methyl group. Al had catapulted the Merck team into the race to discover a drug to reduce blood cholesterol, although we were behind the Japanese group, which had moved rapidly into human studies showing that mevastatin reduced blood cholesterol and LDL cholesterol.

We then learned that those clinical studies had stopped without explanation. We heard a rumor that mevastatin caused tumors in dogs. Given that both compounds inhibited the same enzyme, Merck had a dilemma: Was it possible that lovastatin shared the problem of mevastatin that had halted the human studies? The Japanese lab refused to share any information. Merck stopped all clinical stud-



Al Alberts in his laboratory at the National Institutes of Health in the early 1960s.

ies of lovastatin. Al was crushed by this decision but understood, though he believed lovastatin would be free of problems.

After two years of studies demonstrating that lovastatin did not have a problem, the FDA agreed it should return to the clinic but only in high-risk patients who already had coronary heart disease as well as high total and LDL cholesterol levels. Clinical studies then demonstrated that lovastatin was safe and effective in lowering total and LDL cholesterol; the FDA approved the drug in 1987. Lovastatin was the first statin approved anywhere in the world. Al was proven right, and he was ecstatic.

Simvastatin, a second Merck statin, was brought forward in a crucial mortality study in the 1990s to test the cholesterol hypothesis. Compared with patients on placebo, those on simvastatin had a reduced overall mortality of 30 percent, reduced death from heart attacks of 42 percent and 30 percent reduction in strokes. The cholesterol hypothesis had become a fact: Reduction of total cholesterol and LDL cholesterol improved cardiovascular outcomes in patients with coronary heart disease. Al was overjoyed, as were all Merck

researchers and the entire company.

Al's statins began a revolution in the treatment of cardiovascular disease caused by high cholesterol, and Al became a rock star within Merck. He was invited to lecture to physicians and scientists in the U.S. and many other countries. Al and Sandy enjoyed these trips, where they got to see the world and where Al could recount the exciting discovery and development of the statins. Merck invited him to continue these lecture tours beyond his retirement in 1995. For several decades, Al was a scientific leader of the Deuel Conference on Lipids, a lipid biochemistry meeting on the West Coast.

After Al and I retired from Merck, we continued our interactions at occasional dinners and important family parties. We often had long phone calls focused on family updates. Al took on some board assignments from biotech companies and did some consulting for biotech investors, but in time those efforts waned, and Al and Sandy focused on children and grandchildren. Diana and I were with Al and Sandy in New Jersey a few months before Al suffered a heart attack while visiting his son Eli in Colorado. We talked a couple of times after he had coronary bypass surgery, and he appeared to be improving. He joked about becoming a rock star again when the hospital's staff learned that he was the inventor of lovastatin. He laughed with his usual twinkle. Al died after being moved to a rehabilitation facility in Colorado.

Al started as my assistant, became my partner in research and remained my friend over many years. Although he never finished his Ph.D., the University of Maryland granted him an honorary degree for contributing the statin drugs to society. He will be sorely missed by all who knew him.

Roy Vagelos (prvagelos@gmail.com) is the chairman of the board of Regeneron Pharmaceuticals and former CEO and chairman of Merck & Co.

Chapter president hopes to continue building community

By Kerri Beth Slaughter

When she was an undergraduate at Goucher College, Kelly Budge saw a need to connect biochemistry students across the campus, so she worked to start an American Society for Biochemistry and Molecular Biology Student Chapter.

“I wanted to join an academic club that reflected my interests,” Budge said, but she found she was “torn between the established chemistry and biology clubs.”

With the help of Judy Levine, a professor of biological sciences and chemistry, and future club officers, Budge created the ASBMB Student Chapter and served as president until she graduated in May.

Budge now lives in England, where she will soon start a master’s program at the University of Liverpool. Originally from Old Tappan, New Jersey, she began her undergraduate degree at Goucher College in Baltimore in 2014.

While at Goucher, Budge traveled to Muhuru Bay, a remote town in Kenya, to shadow doctors in a clinic. Most of the patients were pregnant women and young children suffering from dehydration, she said. This eye-opening experience inspired Budge to pursue a master’s degree in biomedical



COURTESY OF KELLY BUDGE

Kelly Budge graduated from Goucher College this year and moved to England. She’s enrolled in a master’s program at the University of Liverpool.

science and translational medicine, which also will help her attain her goal of attending medical school.

Along with her interest in medicine, Budge is devoted to scientific research. As president of the ASBMB chapter, she led a team to design a model protein through the Connect Researchers, Educators and Students, or CREST, program. After spending several months on the protein design,

Budge and her team had the chance to print a 3-D model and present it at the 2018 ASBMB Annual Meeting in San Diego. Budge said her experience with the CREST program helped her gain an understanding of the research opportunities available outside the wet lab.

Budge said she plans to combine her interest in research with practicing medicine as a physician. Her graduate research will focus on women’s, children’s and perinatal health. “I hope to find a specialty within this field in my later career,” she said.

Looking back on her experience as an ASBMB Student Chapter president, Budge said her success was due in part to a fantastic support system of professors and fellow student leaders. She also said she wants to build a similar community of scientists and educators in graduate school.

“Take this as your own,” Budge advises future ASBMB chapter leaders. “You can only do as much as the effort you put into it.”



Kerri Beth Slaughter (kerri.slaughter@uky.edu) is a graduate student in the biochemistry department at the University of Kentucky. Follow her on Twitter @KB_Slaughter.

Meet the 2018 PROLAB recipients

Nine emerging scientists will receive grants this year from the Promoting Research Opportunities for Latin American Biochemists program, or PROLAB, to advance their research by working directly with collaborators in laboratories in the United States, Canada and Spain.

Over the past eight years, the American Society for Biochemistry and Molecular Biology, the Pan-American Society for Biochemistry and Molecular Biology and the International Union for Biochemistry and Molecular Biology have given 69 young biochemists these travel awards.

This year's PROLAB travel grants are going to six Ph.D. students and three postdoctoral fellows; these recipients are from Argentina, Uruguay, Chile and Brazil.



Maria Fernanda Aguilar

Ph.D. student, Argentina

Home institution: Laboratorio de Cultivos Celulares de la Facultad de Bioquímica y Ciencias Biológicas de la Universidad Nacional del Litoral



AGUILAR

Host lab: Arturo Casadevall, Johns Hopkins Bloomberg School of Public Health

Research: I study the influence of

Fc domain glycosylation on the affinity and neutralizing ability of an antibody-like molecule (scFv-Fc).

What I hope to gain from my

PROLAB studies: I am excited to work with Dr. Casadevall's team and gain experience and knowledge about structural analysis of antibodies using X-ray crystallography. Also, I hope to build networks that have a lasting impact on my career and contribute to my personal and cultural enrichment.

Guilherme Braga de Freitas

Ph.D. student, Brazil

Home institution: Federal University of Rio de Janeiro



BRAGA DE FREITAS

Host lab: Marco A.M. Prado, University of Western Ontario

Research: I study the role of irisin in the central nervous system and in Alzheimer's disease models.

What I hope to gain from my

PROLAB studies: Studying abroad represents a change of environment and an opportunity to improve knowledge about ourselves. Moreover, it enhances networking, which may be a career boost. Thus, this opportunity will help me find potential ways to follow up with my research and will contribute to my personal development.

Guillermo Eastman

Ph.D. student, Uruguay

Home institution: Instituto de Investigaciones Biológicas Clemente Estable



EASTMAN

Host lab: George S. Bloom, University of Virginia

Research: I'm focusing on translation regulation in neurons by genomics approaches.

What I hope to gain from my

PROLAB studies: This opportunity will be a great experience for me to learn about Alzheimer's disease models and incorporate my background in genomics into the ongoing project. Also, it will be an invaluable opportunity to interact with other researchers and start to think about interdisciplinary collaborative projects.

Carolina Fabbri

Ph.D. student, Argentina

Home institution: Institute of Molecular and Cellular Biology of Rosario



FABBRI

Host lab: Juan A. Hermoso, Consejo Superior de Investigaciones Científicas, Madrid

Research: I study the functional characterization of the sensor proteins of the beta-lactam resistance systems of

Staphylococcus aureus.

What I hope to gain from my

PROLAB studies: Studies abroad will allow me to expand my knowledge in crystallography of membrane proteins, which is a very useful technique not only for my research project but also for my group. I will be able to learn from experts in the field, in a challenging setting, using state-of-the-art techniques.

Mercedes Garrido

Ph.D. student, Argentina

Home institution: National Institute for Agricultural Research, University of Buenos Aires
Host lab: Gregg Beckham, National Bioenergy Center, National Renewable Energy Laboratory



GARRIDO

Research: I work on development of microbial enzymatic cellulolytic and xylanolytic complexes for biomass sac-

charification.

What I hope to gain from my

PROLAB studies: I hope to learn new techniques in fungal molecular biology and enzyme characterization, interact with an interdisciplinary team of biochemists, chemists and chemical engineers, and establish a strong working relationship between the agrobiotechnology laboratory at the University of Buenos Aires, the bioenergy laboratory in Argentina's National Institute for Agricultural Research and the National Renewable Energy Laboratory in the U.S.

Laura Navas

postdoctoral fellow Argentina

Home institution: Instituto de Microbiología y Zoología Agrícola, Instituto Nacional de Tecnología Agropecuaria



NAVAS

Host lab: Lindsay D. Eltis, University of British Columbia, Vancouver

Research: I study the characterization of thermophilic bacterial laccases for biomass valorization.

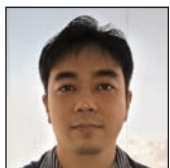
What I hope to gain from my

PROLAB studies: I wish to do collaborative work with specialized scientists and learn techniques to bring back to my laboratory. I hope the project will provide important insights into the activity of thermostable bacterial laccases and the molecular basis for these activities, facilitating the development of biomass-transforming technologies based on these enzymes. Such technologies are critical for developing sustainable biorefineries and the global bioeconomy.

Fernando Ogata

postdoctoral fellow, Brazil

Home institution: Universidade Federal de São Paulo



OGATA

Host lab: Vivien J. Coulson-Thomas, University of Houston

Research: I study the influence of glycosaminoglycans on the behavior of the thioredoxin system.

What I hope to gain from my PROLAB studies:

Thioredoxin system-deficient animals (genetically modified) had their transcriptome analyzed. These data suggest a change in glycosaminoglycan biosynthesis enzymes and core proteins of proteoglycans. These changes will be analyzed with Dr. Coulson-Thomas, an expert in the field of glycobiology.

Diego Quiroga Roger

postdoctoral fellow, Chile

Home institution: Universidad de Chile



QUIROGA ROGER

Host lab: Susan Marqusee, University of California, Berkeley

Research: The aim of my project is to understand the importance of strain in catalysis, determining the effect of the forces involved in the conformational changes associated to ligand binding and catalysis, considering the strain-induced theory as the catalytic framework using Aquifex aeolicus adenylate kinase as a model enzyme.

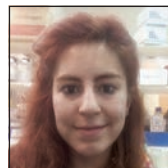
What I hope to gain from my PROLAB studies: I

believe that there is a unique opportunity to advance understanding of the relation between protein function and structure, applying a feasible and novel approach to determine the forces and energies ruling catalysis. I trust that we will achieve this, demonstrating that researchers from Chile can answer important scientific questions.

Luciana Sampieri

Ph.D. student, Argentina

Home institution: School of Chemistry, National University of Córdoba



SAMPIERI

Host lab: Juan S. Bonifacino, National Institute of Child Health and Human Development, National Institutes of Health

Research: I study changes in CREB3L2 transcription factor in cell differentiation models.

What I hope to gain from my PROLAB studies: I hope that interaction with scientists from a foreign and prestigious laboratory will give me more confidence in myself as well as increase my academic experience. I would like to gain more perspective by taking in every positive habit and piece of advice I learn during my stay in the host lab. Finally, I hope to bring back to my home institution everything I learn and apply it to improve the quality of my own and my colleagues' work.

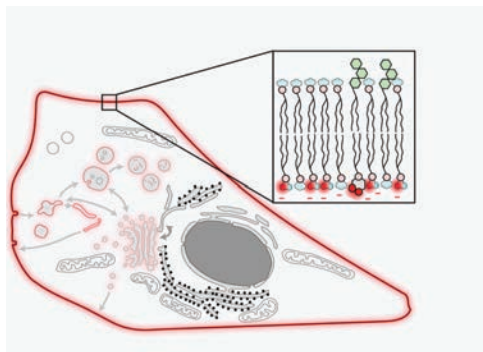
Who's in charge of PM identity?

By Gerry Hammond

The plasma membrane, or PM, is the front line of cellular life. It functions simultaneously as a border, logistical hub, communications relay and structural foundation. These functions are performed by proteins embedded in or attached to the PM. Typically, these proteins are controlled from the cytosolic face of the PM, enabling the cell to maintain executive control of PM function and adapt it as necessary.

Controlling these PM proteins poses a unique challenge in eukaryotes; the proteins must be targeted correctly and activated at the PM and not at the many other membrane organelles connected by vesicular traffic. For example, a calcium channel should not become activated after synthesis in the endoplasmic reticulum, nor should machinery tasked with pulling vesicles from the PM pull them from endosomes instead. In short, the PM needs a unique chemical identity that proteins can recognize.

We now know that lipids are critical to PM identity. In fact, the cytosolic face of the PM is uniquely enriched in anionic lipids, making the inner leaflet of the PM a distinct, negatively charged electrostatic platform. This attracts peripheral proteins with amphipathic domains, such as small GTPases and protein kinases. It also facilitates activation of membrane proteins, such as channels and transporters, as they arrive at the PM. This electrostatic code appears conserved across the kingdoms of Eukarya, though the lipids involved differ. Phosphatidylserine, or PS, is crucial in all kingdoms but is augmented by other anionic lipids, especially the



COURTESY OF GERRY HAMMOND

The plasma membrane stands apart from other membranes at least in part because of its enrichment in anionic lipids (inset), making it uniquely highly negatively charged.

phosphoinositides — highly charged phospho-derivatives of the anionic lipid phosphatidylinositol, or PI. In animals, the enrichment of PS together with phosphoinositides PIP2 and PI4P is central to PM identity. In plants, PS is instead augmented by PI4P and phosphatidic acid.

Electrostatics play a role in identifying membranes elsewhere in the endocytic network, with decreasing concentrations of anionic lipid the further into the system we venture from the PM. The big question is, How is this gradient of anionic lipids built and maintained?

Fundamental mechanisms are still debated. For example, the extent to which vesicular traffic helps or hinders is not clear. On the one hand, selective sorting of lipids into vesicular carriers could enrich packets of anionic lipid destined for the PM. Alternatively, failure to sort efficiently would instead lead to equilibration of lipids between organelles. Side-stepping vesicular traffic altogether, non-vesicular lipid transport by lipid-binding proteins is an attractive mechanism to facilitate asymmetric lipid distribu-

tion in the cell. However, researchers have questioned whether these proteins truly transport lipids from one organelle to another to build or maintain such gradients.

One class of lipid — the phosphoinositides — seems likely to be central to either mechanism. Lipid kinases and phosphatases stationed throughout the PM and endocytic network convert the phospho-configuration of PI as it shuttles between compartments by vesicular traffic, effectively modifying its charge profile. These lipids also control many of the candidate lipid transfer proteins. For example, PM PIP2 was recently shown to control the non-vesicular traffic of the other anionic PM lipids PS and PI4P, suggesting a cardinal role for this lipid in animal-cell PM identity.

While we continue to debate these mechanisms, a key component is still missing: a sensing mechanism to enable homeostatic control of PM anionic lipid content. Such a sensor would be required to activate lipid import and shut it off once the appropriate electrostatic potential is reached. What is the nature of this sensor? Perhaps it controls the abundance of a master lipid like PIP2, which in turn controls traffic of other anionic species. Or perhaps a protein senses the electrostatic potential of the inner leaflet and engages transport.

There is still much for us to learn.



Gerry Hammond (ghammond@pitt.edu) is an assistant professor of cell biology at the University of Pittsburgh School of Medicine. His lab studies the integration of plasma membrane function by inositol lipids.

New insight into the molecular weapons of the plant microbiome

By Sasha Mushegian

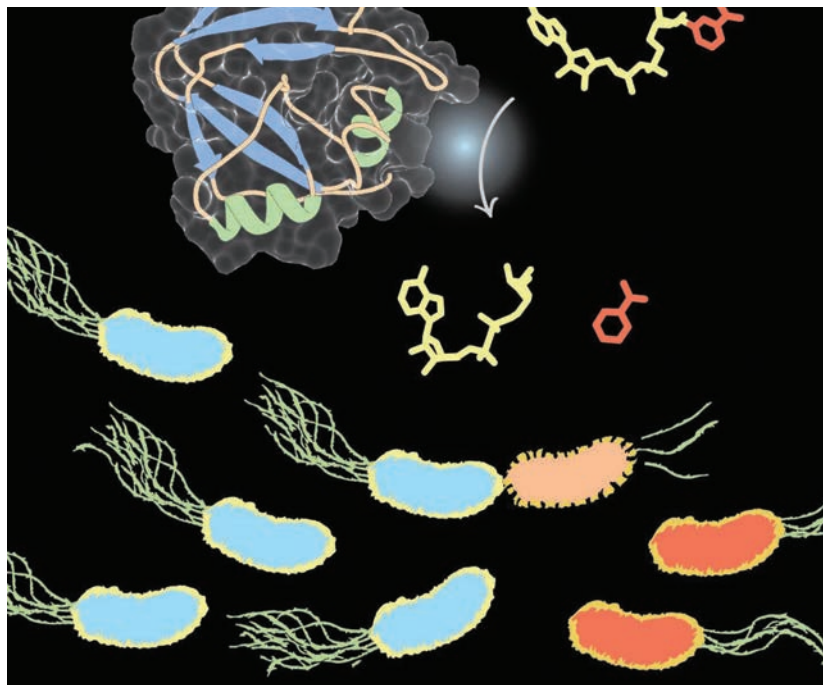
Like all organisms, plants are associated with bacterial communities in which helpful and harmful bacteria compete for dominance. Among the weapons of these warring bacteria are molecular syringes that some bacteria can use to inject toxins into others. In a study published in the **Journal of Biological Chemistry**, researchers at McMaster University in Canada pinpointed the identity of one such toxin used by a soil-dwelling bacterium that protects plants from disease.

The bacterium *Pseudomonas protegens* can kill soil-dwelling plant pathogens, including fungi and bacteria, that attack the roots of important crops such as cotton. *P. protegens* releases diverse antimicrobial compounds into the soil, but John Whitney was curious specifically about the compounds that it was injecting directly into other bacteria through the type VI secretion system, or T6SS.

The T6SS “is this molecular nanomachine that injects toxic protein into other species of bacteria and kills them,” Whitney said. “Plant protective bacteria that have (T6SS) can protect plants from pathogens better relative to (bacteria) that don’t have it.”

Jenny Tang and Nathan Bullen, undergraduate students from the University of Waterloo working with Whitney on a co-op work-study assignment, spearheaded the discovery that the toxic protein used by *P. protegens* against other bacteria acts on a molecule found in nearly all living cells: nicotinamide adenine dinucleotide, or NAD⁺.

NAD⁺ is a cofactor, or “helper” molecule, in many biochemical reactions. By injecting a protein that destroys NAD⁺, *P. protegens* is able



COURTESY OF JOHN WHITNEY/MCMASTER UNIVERSITY

The NAD-degrading enzyme Tne2 is secreted through the type VI secretion system of the plant-protective bacterium *Pseudomonas protegens*.

to kill other bacteria.

The team then investigated the genome sequences of hundreds of other bacteria to see how widespread the strategy of targeting NAD⁺ is in microbial warfare. They found that many bacteria with secretion systems carry genes similar to the one encoding the NAD-targeting toxin.

“We started to see that this isn’t just a way of killing that is enacted by plant-protective bacteria,” Whitney said. “If you look at the distribution of this (protein) among all sequenced bacteria, it appears that many different bacteria in many different environmental niches use this mode of action to outcompete other bacteria.”

The abundance of these toxins in nature raises questions: How do different bacteria in different environ-

ments evolve to resist this toxin? Are NAD-targeting toxins more effective against some bacterial species than others? Understanding the diversity of bacterial weapons is an active area of study among agricultural researchers who would like to develop better ways to fight plant diseases.

“The identification and characterization of antibacterial toxins produced by plant-protective bacteria may one day allow us to engineer these bacteria to have enhanced ability to suppress pathogens,” Whitney said.

DOI: 10.1074/jbc.RA117.000178



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In reading histone modifications, an oncoprotein is modified in return

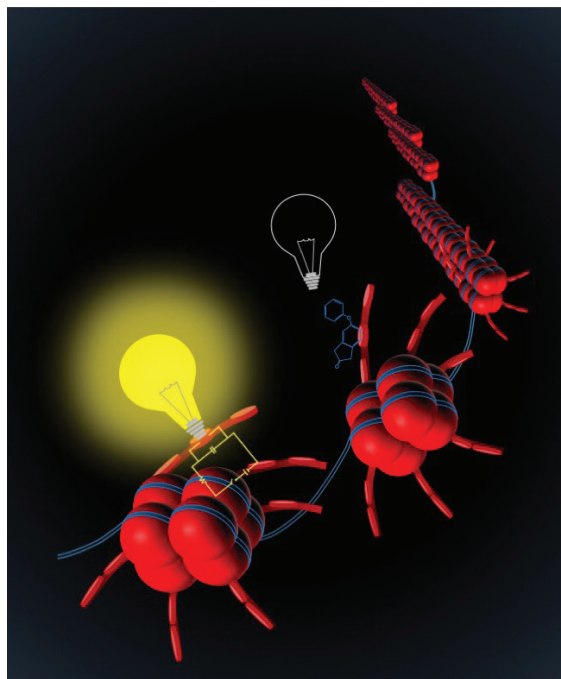
By Sasha Mushegian

Turning genes on and off is an intricate process involving communication among many different types of proteins that interact with DNA. These communications can go awry, resulting in conditions such as cancer.

Researchers at the University of Texas MD Anderson Cancer Center have uncovered an unusual form of crosstalk between proteins that affect gene expression, suggesting new ways of inhibiting metastasis in cancer. The findings were published in the **Journal of Biological Chemistry**.

Tripartite motif-containing 24, or TRIM24, is an oncoprotein, meaning it is found in higher abundance in many types of cancer cells than in healthy cells. Michelle Barton's lab at MD Anderson studies this protein. Previous research has shown that TRIM24 is, among other things, an epigenetic reader. This means that it detects certain chemical modifications of histones — proteins around which DNA is coiled — and induces other proteins to change their behavior in response, resulting in a different pattern of genes being turned on than if the histone had not been modified.

In the new study, Srikanth Appikonda, a former postdoctoral fellow in Barton's lab, found something unusual. Not only did TRIM24 “read” histone modifications, but the act of reading resulted in TRIM24 itself being modified with a small protein tag called a small ubiquitin-like modifier, or SUMO. In other words, reading the message of the



COURTESY OF SRIKANTH APPIKONDA

The lightbulb symbolizes TRIM24, a “histone reader” protein, which binds chromatin. Chromatin association triggers signaling to TRIM24, marked or “illuminated” by a post-translational modification called SUMOylation.

histone made the reader carry its own chemical message.

“This is the first time that we know of that the (histone) itself is imposing a code on the modifiers or readers,” Barton said.

What does the addition of SUMO to TRIM24 accomplish? Appikonda, graduate student Kaushik Thakkar and the other team members performed experiments to see how the genes that TRIM24 turned on and off in cancer cells differed when TRIM24 didn't have SUMO attached.

They found that the SUMO-modified TRIM24 seemed to be regulating genes involved in adhesion between cells. Cell adhesion determines whether cancer cells stay in one spot or can travel and metastasize through

the body.

“That's really where these cell-adhesion molecules are coming into play: metastasis and migration of cancer cells,” Barton said.

Multiple proteins are involved in adhesion, and TRIM24 turned some off and some on. Therefore, it's not yet clear what net effect TRIM24 has on metastasis in cancer patients. But understanding that TRIM24 is involved in this process gives researchers a place to look to learn how to stop it.

In the meantime, the SUMO modification also can be used as a possible marker in studies of other types of potential new drugs. Cancer researchers often are interested in disrupting TRIM24's interaction with histones in order to prevent aberrant

gene expression. By tracking whether TRIM24 has SUMO attached, researchers can test whether a potential drug has blocked the interaction successfully.

“The exciting thing about learning more about modifications of TRIM24, such as SUMO, is to be able to develop antibodies or other means to detect its presence,” Barton said. “(This) may be a better predictor of cancers in early stages or could be linked to potential for metastasis.”
DOI: 10.1074/jbc.RA118.002233



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MCP presents draft guidelines for reporting complex spectra

By Laurel Oldach

The editors of the journal **Molecular & Cellular Proteomics** are seeking feedback from the proteomics community on draft guidelines for publishing proteomics studies that use data-independent acquisition, or DIA, methods. The draft guidelines can be accessed from the journal's homepage, mcponline.org. Comments will be accepted until the end of September.

Steven Carr is deputy editor of MCP and senior director of proteomics at the Broad Institute. "DIA is a rapidly growing research approach that can be employed on a wide variety of instrument platforms," he said. "As such, it is important to establish rules to make sure it is properly applied."

DIA is used to collect tandem mass spectrometry data. It offers broad coverage of the proteome with high run-to-run reproducibility.

Mass spectrometers sort the ions from a sample based on their mass-to-charge ratio. In tandem mass spectrometry, there are two ionization and sorting steps. For reliable identification of a molecule, you need to know its intact precursor ion mass and also the masses produced when it is fragmented. Most strategies involve fragmenting a single precursor ion at a time.

Selection of a precursor ion can be based on observation of a peak in the first spectrum (a strategy known as data-dependent acquisition, or DDA), or it can be from a list of predetermined components of interest, i.e., targeted analysis. However, both of these approaches select only a subset of the components present for fragmentation analysis. In DIA, the whole mass range is fragmented



COURTESY OF SUE WEINTRAUB

Participants at the DIA workshop in San Diego paused for a photo.

over a series of scans. This provides fragmentation information about all components, but fragmenting multiple components at the same time produces complex spectra made of heterogeneous precursors.

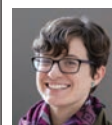
With technical advances in instrumentation and computation, DIA approaches are growing in popularity, particularly for quantitative studies of sets of related samples. However, because the spectra collected using DIA are significantly more complex than data from other approaches, they can be more difficult to interpret. Complicating the situation further, there are many competing techniques for collecting DIA data, few of which have been compared directly, and researchers have yet to develop fieldwide standards around how to interpret and report results.

MCP is taking steps to ensure that future data will be described more systematically. The editors brought together 25 DIA experts from academia and industry at a satellite workshop in San Diego after the close of the American Society for Mass

Spectrometry's 2018 meeting in June. The guidelines drafted at this workshop aim to help researchers write a thorough description of how DIA data were collected and interpreted, rendering researchers' conclusions easier to evaluate.

Among the workshop's organizers was Robert Chalkley of the University of California, San Francisco, MCP data management editor. "When we publish the draft, we will give the opportunity for anyone in the community to send in their comments and suggestions," he said.

MCP's reporting guidelines for other types of mass spectrometry study have been adopted widely by other journals. MCP's editors hope to continue to lead the field in producing guidelines that aim to allow independent assessment of the reliability of published data sets.



Laurel Oldach (loldach@asmbm.org) is a science communicator for the Journal of Lipid Research and Molecular & Cellular Proteomics and a staff writer for ASBMB Today. Follow her on Twitter at @LaurelOld.

Finding the structure of a lipid that keeps our tears clear

By Laurel Oldach

Because humans evolved from the sea, we carry a little of it with us to stay alive. Salt water makes up the cytoplasm in our cells, the plasma in our blood and the tears in our eyes.

But water alone isn't enough to keep the eye from drying out. A microscopically thin film of oils known as the lipid layer protects the tear film from evaporating. In the August issue of the **Journal of Lipid Research**, a group of Australian researchers reports the structure of a key long-chain lipid in this layer. Their finding may be used to improve treatments for dry eye.

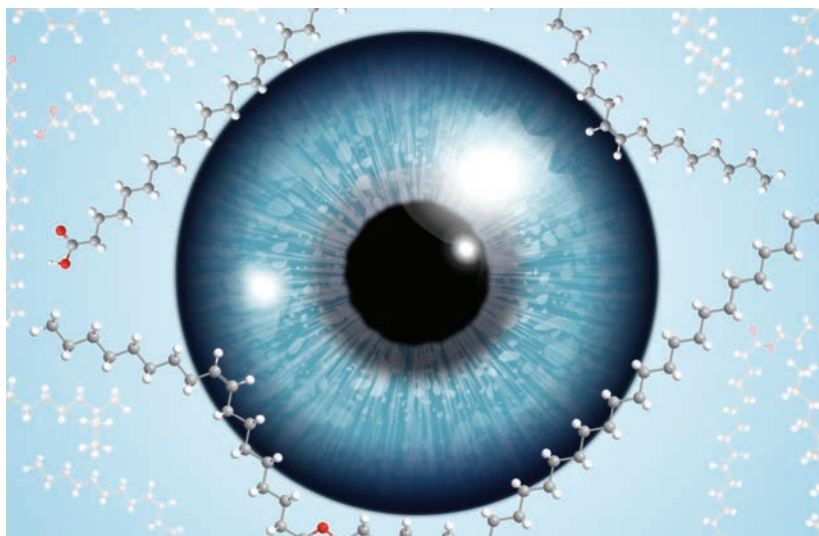
Although the long-chain lipids in question make up just 5 percent of the tear-film lipid layer, they play an important role in vision. Without them, earlier studies showed, the lipid layer would resemble an oil slick atop a puddle.

"This clearly wouldn't be satisfactory for you to look through," said Stephen Blanksby, a professor at the Queensland University of Technology who led the research team in this study.

Blanksby saw the earlier research in Langmuir troughs carried out by others as a prompt to determine the precise structure of the ultra-long-chain lipids of the eye.

The tear-film lipid layer comes from meibum secreted by the lower eyelid. Scientists can collect meibum samples from brave volunteers by running a small spatula gently over their lower lids, but it is difficult to obtain enough for conventional assays like nuclear magnetic resonance spectroscopy.

Complicating matters, the team needed to differentiate between isomers. They knew the long lipids



JOURNAL OF LIPID RESEARCH
This image by first author Sarah Hancock shows an iris surrounded by the lipid she and colleagues in the Blanksby and Mitchell labs characterized by mass spectrometry.

were made of two fatty acids but not whether they were joined end-to-end or branched, a question conventional mass spectrometry couldn't answer.

Fortunately, Blanksby and colleague Todd Mitchell of the University of Wollongong have spent the last decade fine-tuning mass spectrometric techniques to characterize lipids.

"We were able to bring a unique toolbox to bear," said Blanksby. "Some of these techniques may not exist outside Todd's and my laboratory."

By incorporating established approaches, such as ozonolysis, into a mass spectrometry workflow, the team determined that the most abundant of the ultra-long lipids is joined end-to-end, and they pinpointed each of its double bonds. The mass spectrometrists handed off the structure to chemist colleagues led by Michael Kelso, who developed a method to synthesize it.

The team now is working with

industry partner Allergan, which cofunded the research with the Australian Research Council, on incorporating the new synthetic long-chain lipid as a component of drops for dry eye. While our knowledge of the lipid layer has expanded, according to Blanksby many eye drops still use mineral oil.

"This type of work provides a framework to produce a product that mimics, and is based on, the actual components that are present in human tears," he said.

Blanksby hopes that by creating a better match to the real tear film, blurriness and other side effects of using eye drops can be alleviated.

DOI: 10.1194/jlr.M086702



Laurel Oldach (loldach@asbmb.org) is a science communicator for the Journal of Lipid Research and Molecular & Cellular Proteomics and a staff writer for ASBMB Today. Follow her on Twitter at @LaurelOld.

From the journals

By Courtney Chandler, Isha Dey & Sasha Mushegian

We offer a selection of recent papers on a variety of topics from the **Journal of Biological Chemistry**, the **Journal of Lipid Research**, and **Molecular & Cellular Proteomics**.

A protein's role in oxidative stress in obese mothers

Excessive body fat and obesity have been associated with negative effects on female fertility and pregnancy. In mice, maternal obesity impairs proper development of egg precursors

called oocytes and results in oxidative stress. In a recent paper published in **Molecular & Cellular Proteomics**, Qiang Wang and colleagues at the State Key Laboratory of Reproductive Medicine in China describe the link between poor oocyte development and oxidative stress.

The authors used proteomics to compare obese and nonobese mother mice and found that the protein TP53-inducible glycolysis and apoptosis regulator, or TIGAR, had reduced expression in the mice with a high-fat diet. Reactive oxygen species,

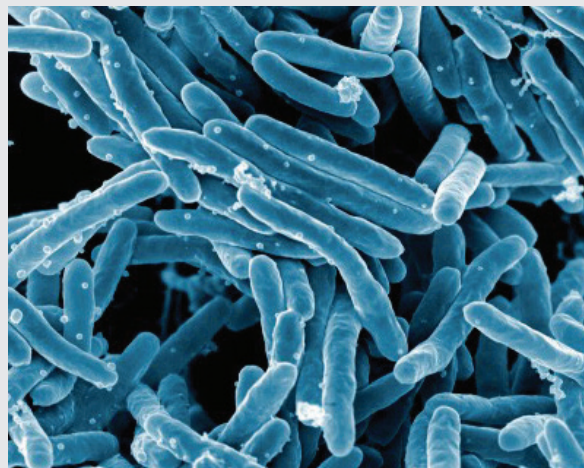
or ROS, were increased when TIGAR was depleted in mouse oocytes, which led to errors in downstream cell division events and strongly activated autophagy. Overexpression of TIGAR partly corrected cell division errors, decreased ROS production and reduced autophagy levels. Wang and colleagues further showed that the ROS production controlled by TIGAR is the driving force for the downstream autophagic response, thereby providing a link between TIGAR-mediated redox homeostasis and cell development. This study

The road to better treating drug-resistant TB

Tuberculosis is a bacterial infection caused by *Mycobacterium tuberculosis*. It is the leading cause of infectious-disease death worldwide. Global efforts to control TB infection have been hindered by the rise of drug-resistant strains. Specifically, resistance against isoniazid, one of the first-line drugs to treat those infected with TB, has emerged rapidly and has expanded among *Mtb* strains across the globe.

A recent paper by Luisa Nieto Ramirez of Colorado State University and colleagues published in **Molecular & Cellular Proteomics** helps improve our understanding of the physiological consequences of resistance for bacterial populations by using proteomic and metabolic comparisons of strains with or without isoniazid resistance. The researchers used clonal pairs, meaning the pairs originated from the same genetic lineage with the only difference being a known genetic mutation that made one of the clones resistant to isoniazid. Two types of pairs were used; one set came from a laboratory-adapted strain, and the other came from a clinical strain.

The group looked at differences between isoniazid-sensitive and -resistant clonal pairs and found that the pair from the clinical strain background showed more changes than the pair from the laboratory-adapted background. Therefore, they concluded that genetic background does affect the proteomic changes that occur after isoniazid resistance is acquired, suggesting that a one-size-fits-all treatment strategy may not work across resistant strains from different sources. They also identi-



NIAID

This scanning electron micrograph shows *Mycobacterium tuberculosis* bacteria, which cause tuberculosis.

fied 26 proteins that changed in abundance in both types of resistance clones, indicating that some proteomic rearrangement events are independent of genetic background. Many of these proteins were implicated in energy metabolism, beta-oxidation and alternative lipid biosynthesis. These shared changes could be exploited as novel targets for drug development to combat isoniazid resistance and improve treatment strategies.

— Courtney Chandler

DOI: 10.1074/mcp.RA118.000821

provides evidence of the direct effects of maternal obesity on the quality of oocyte development and implicates TIGAR in oocyte maturation in mice, which may have implications for how pregnancies are monitored for obese mothers.

DOI: 10.1074/mcp.RA118.000620

Redox sensing in the mosquito gut

Mosquitoes vary in their ability to carry diseases and also in their insecticide resistance; understanding this variation is key to developing vector control strategies. Gabriela O. Paiva-Silva and colleagues at the Instituto Nacional de Ciência e Tecnologia em Entomologia Molecular in Brazil demonstrated that the redox-sensitive transcription factor nuclear factor erythroid 2-related factor 2, or Nrf2, coordinates multiple stress responses in the midgut of the mosquito *Aedes aegypti*. Nrf2 depletion affected intestinal stem cell homeostasis, redox balance, viral load and responses to insecticide challenge. Thus, the Nrf2 gene could be a candidate for genetic modification to decrease the transmission of viruses such as Zika. The research was published in the **Journal of Biological Chemistry**.

DOI: 10.1074/jbc.RA117.001589

Long noncoding RNA goes wrong in kidneys

Autosomal dominant polycystic kidney disease is one of the most common monogenic diseases; kidneys develop fluid-filled cysts that can eventually lead to kidney failure. Peter Igarashi and colleagues at the University of Minnesota investigated the roles of long noncoding RNAs, or lncRNA, in the pathogenesis of the disease. They found a kidney-specific lncRNA that was downregulated in a mouse model of the disease and in cystic kidneys from patients. Deleting this lncRNA in cells increased mTOR

signaling and mitochondrial respiration, suggesting that these are pathways to investigate to understand the disease. The research was published in the **Journal of Biological Chemistry**.

DOI: 10.1074/jbc.RA118.001723

Gangliosides control obesity, coat color

Diabetes and obesity are two of the most serious clinical concerns in the U.S. A 2010 report showed 32.2 percent of men and 35.5 percent of women are obese, and type 2 diabetes affects 27 million to 29 million Americans with signs of dyslipidemia, indicating a relationship between diabetes and lipid metabolism.

Gangliosides are sialic acid-containing glycosphingolipids that play important roles in cell signaling. The ganglioside GM3, a precursor for making complex gangliosides, is important in development and disease. GM3 deficiency leads to reduced brain development and function, whereas GM3 is elevated in the fat cells of obese animals and in the plasma of type 2 diabetic patients, inducing insulin resistance. A recent study by Kei-ichiro Inamori and a team from Tohoku University and Nippon Boehringer Ingelheim Co. in Japan, and published in the **Journal of Lipid Research** has singled out GM3 synthase, or GM3S, as a critical factor in controlling obesity and insulin resistance. When genetically obese mice were modified to lack GM3S, they showed reduced body weight and improved insulin and glucose tolerance. Also, preliminary observations showed that GM3S knockout mice had a different coat color than the unmodified obese ones.

This finding provides evidence for the contribution of lipid metabolism to obesity and diabetes. Further studies with melanin synthesis would give a better understanding of the role of lipid metabolism in skin color development.

DOI: 10.1194/jlr.M085753

Bitter signals from pathogens

Bitter taste receptors are not found only on the tongue; these G-protein-coupled receptors can be found in diverse tissues, including the airways. In a study published in the **Journal of Biological Chemistry**, Robert J. Lee and colleagues at the University of Pennsylvania examined the non-taste-related functions of bitter taste receptors by studying receptors expressed in the cilia of cells in the nose and sinuses. In response to quorum-sensing molecules produced by the common airway pathogen *Pseudomonas aeruginosa*, the receptors were activated and participated in signaling pathways important to innate immunity.

DOI: 10.1074/jbc.RA117.001005

Cell-replacement therapy for Parkinson's disease

Cell-replacement therapy shows promise as a treatment for neurodegenerative diseases such as Parkinson's disease. The therapy for Parkinson's disease involves differentiating stem cells into dopaminergic neurons and transplanting them into patients. However, transplantation outcomes are affected by variability in differentiated cells, including contamination with other neuronal cell types or residual undifferentiated stem cells.

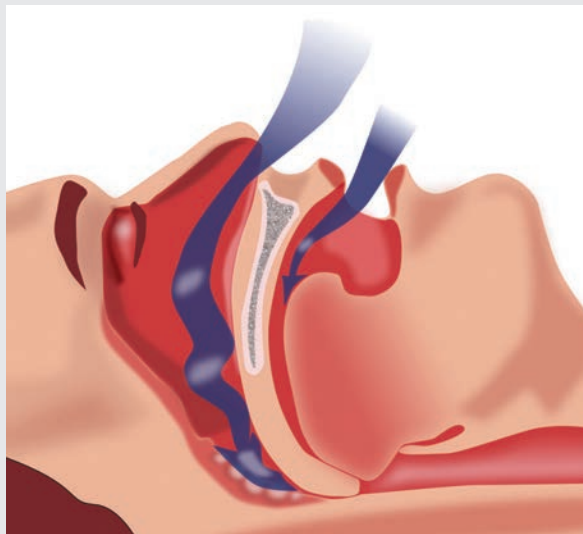
A paper in **Molecular & Cellular Proteomics** describes an isolation procedure that relies on novel cell surface markers to yield a more homogeneous population of differentiated neurons. Hossein Baharvand, Ghasem Hosseini Salekdeh and their international team developed a transgenic human embryonic stem cell line that contains a green fluorescent protein reporter under control of a transcription factor involved in dopaminergic neuronal development. They tracked

Fat metabolism is linked to sleeping disorder

Obstructive sleep apnea, or OSA, is a clinical disorder characterized by recurring partial or complete blockage of the upper respiratory airway during sleep, causing the patient to wake up abruptly, gasping and choking. A 2014 report by the National Healthy Sleep Awareness Project states that at least 25 million adults in the U.S. suffer from obstructive sleep apnea. Another study shows that prevalence of OSA in the U.S. has increased over the past two decades, owing to an increase in obesity cases. This, along with the fact that OSA is associated with high blood pressure and stroke, indicates a possible link between OSA and lipid levels in the human body.

A patient-based study led by Luciano Drager at the University of Sao Paulo, Brazil, and reported in the **Journal of Lipid Research** provides insight into the effect of OSA on lipid metabolism and a possible mechanism by which continuous positive airway pressure, or CPAP, a special ventilator to continuously keep airways open, works to treat OSA patients. In this study, OSA patients were found to have reduced breakdown of triglyceride-rich lipoproteins and, subsequently, reduced clearance of their metabolites from the plasma compared to non-OSA control individuals. Treating OSA patients with CPAP significantly improved plasma lipid clearance by increasing lipolysis of the triglycerides.

OSA leads to many cardiovascular complications including stroke, mainly due to fat deposits along the inner arterial walls, making them thicker. This study



COURTESY OF HABIB M'HENNI/WIKIMEDIA COMMONS

This diagram shows the obstruction of ventilation in sleep apnea.

provides an understanding of a possible mechanism behind this. Since OSA also increases insulin resistance and is associated with the development of type 2 diabetes, a major global health problem, and type 2 diabetes patients have an increased risk of heart disease, this study provides insight into the physiology of how disease symptoms and causes are interconnected.

— Isha Dey

DOI: 10.1194/jlr.M083436

differentiation using GFP expression and used quantitative proteomics to identify proteins that were enriched in partially differentiated cells called dopaminergic progenitors. Using antibodies against one of these proteins, called contactin 2, they isolated progenitors and transplanted them into rats modeling Parkinson's. Rats treated with contactin 2-enriched cells had enhanced dopamine release and reduced Parkinson's phenotypes compared with rats treated with unsorted cells. This work provides a strategy to improve transplantation success by better selecting for dopaminergic progenitor cells, representing an important step toward standardizing cell-replacement therapy.

DOI: 10.1074/mcp.RA118.000809

Tau, synuclein and amyloid use different doors

Misfolded aggregates of the proteins tau, alpha-synuclein or beta-amyloid spread from cell to cell during the progression of Alzheimer's and Parkinson's diseases. Binding of these aggregates to heparan sulfate proteoglycans, or HSPGs, on cell surfaces triggers their intake into cells. Marc Diamond of the University of Texas Southwestern and an international team examined how sulfation and glycation patterns of HSPGs affected their interactions with these protein aggregates. Tau aggregates required a very specific glycosaminoglycation

and sulfation pattern for binding and cellular uptake, whereas alpha-synuclein and beta-amyloid interactions with HSPGs were more complex and variable. The research was published in the **Journal of Biological Chemistry**.

DOI: 10.1074/jbc.RA117.000378

Smoothing heart rhythms

The G-protein-coupled receptor Smoothed, or SMO for short, has a central, canonical role in the Hedgehog developmental signaling pathway in vertebrates. Natalia A. Riobo-Del Galdo and colleagues at Thomas Jef-

Screening heart disease drugs 10,000 times faster

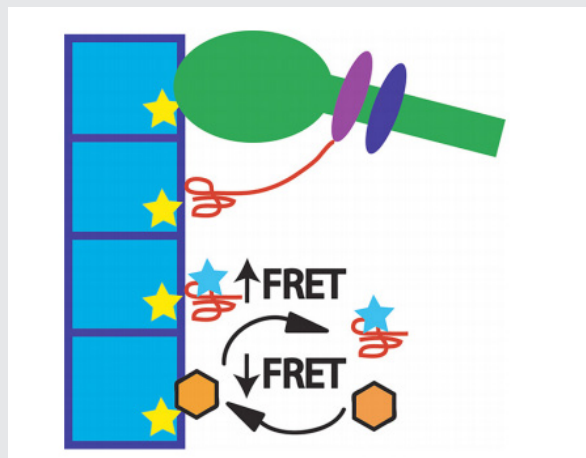
Actin and myosin are an iconic duo. The pair of filamentous proteins grip and slide past one another, generating the force that allows muscles to contract and cells to move and divide. But this dynamic relationship can go wrong: When interactions between actin and myosin are either too weak or too strong, muscle or heart disease can result.

Researchers at the University of Minnesota overseen by muscle researcher David Thomas developed a method to quickly screen thousands of chemical compounds to evaluate their effect on actin-myosin binding. The results were published in the **Journal of Biological Chemistry**.

The method is based on fluorescence resonance energy transfer technology, or FRET, which is used to sense interactions between molecules by detecting the transfer of energy between a fluorescent molecule and a nonfluorescent sensor molecule. Thomas's team improved on the method to make it faster and more precise.

"We call it direct waveform recording, and it's 10,000 times faster than the standard way to measure fluorescence lifetimes," Thomas said. "As a result, we can use fluorescence lifetime detection for high-throughput applications such as the screening of large chemical libraries for drug discovery."

Piyali Guhathakurta, a research associate in Thomas' lab, led the effort to screen compounds that affect how myosin and actin interact. Out of 727 compounds tested, 10 significantly affected actin-myosin binding. These compounds now can be tested further for poten-



COURTESY OF LAURA K. GUNTHER AND CHRISTOPHER M. YENGO

This cartoon diagram showing the FRET assay developed by David Thomas' lab accompanied a commentary on Thomas' JBC paper. The method was used to screen hundreds of compounds for interactions with actin.

tial clinical applications.

Previously, only two potential drugs targeting actin-myosin interactions have entered clinical trials. By accelerating the early stages of chemical screening, the researchers hope to facilitate faster discovery of heart and muscle disease drugs. Thomas has started a company, Photonic Pharma, out of his lab to commercialize and license the compounds discovered using these methods.

"It opens up a lot of possibilities that were not known to be worth pursuing before," Thomas said.

— *Sasha Mushegian*

DOI: 10.1074/jbc.RA118.002702

erson University investigated SMO's role in a noncanonical Hedgehog signaling pathway in cardiomyocytes and intact hearts. They found that SMO activation selectively controlled outward voltage-gated potassium repolarizing currents; an SMO agonist induced ventricular arrhythmias. The noncanonical Hedgehog signaling pathway may thus be important for understanding heart health. The research was published in the **Journal of Biological Chemistry**.

DOI: 10.1074/jbc.RA118.001989

DAG dictates correct cell division

In cell division, or mitosis, one cell undergoes multiple regulated steps to form two daughter cells. Essentially, the process consists of doubling chromosomes and disrupting the nuclear membrane followed by separating chromosomes to opposite ends of the cells, reassembling the nuclear envelope and, finally, dividing the cytoplasm of the parental cell to form the two similar cells. Disruption in nuclear membrane reassembly

leads to genome instabilities in cancer, which makes nuclear membrane reassembly an important topic in cancer research. Diacylglycerol, or DAG, a downstream molecule of G-protein-coupled receptor signaling, has been shown to be essential in forming the nuclear envelope in nonsomatic cells.

A recent collaborative study by Gary Chung and a team in the United Kingdom and the U.S., published in the **Journal of Lipid Research**, has identified the novel role of DAG in regulating nuclear envelope reassembly during mitosis

in somatic cells. The authors found DAG to be localized to the reforming nuclear envelope. Moreover, depleting DAG from cis Golgi, its cellular reservoir, reduced the rim curvature of the nuclear envelope, which is important for pore formation and correct development of the nuclear membrane. This finding opens up new avenues of research with respect to the role of lipids in controlling cell division and thus cancer.

DOI: 10.1194/jlr.M083899

The power of bicelles

Methanotrophic bacteria convert methane to methanol, so they are a promising source of enzymes for methane remediation and biofuel production. However, key enzymes from these bacteria, such as particulate methane monooxygenase, or pMMO, lose activity when removed from membranes or reconstituted

in detergent micelles, making them difficult to study or adapt for these practical applications. In a study in the **Journal of Biological Chemistry**, Amy Rosenzweig and colleagues at Northwestern University reconstituted pMMO into bicelles, detergent-embedded discoidal lipid bilayers. Expressing the enzymes in this form restored methane oxidation activity and enabled the pMMO crystal structure to be determined. These results showcase the benefits of reconstituting membrane proteins in bicelles or other membranelike environments.

DOI: 10.1074/jbc.RA118.003348

Hacking hairpin heme

Natural heme-binding proteins are primarily helical, and engineered heme-binding proteins have mostly been based on helical scaffolds. Nagasuma Chandra and colleagues at the Indian Institute of Science explored alternative architectures by designing

a water-soluble heme-binding peptide with a beta-hairpin conformation. In their report in the **Journal of Biological Chemistry**, the authors propose evolutionary explanations for the absence of this topology in natural heme-binding proteins and suggest that the peptide could be used in applications targeting heme.

DOI: 10.1074/jbc.RA118.001768



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Upcoming ASBMB events and deadlines

SEPT

Ovarian Cancer Awareness Month

- 13–16: Frontiers in RAS Pathobiology and Drug Discovery, Stratton, Vt.
- 25: The Many Faces of Kinases and Pseudokinases early registration deadline
- 20: Webinar—Image is Everything: Preparing your Figures for Publication

OCT

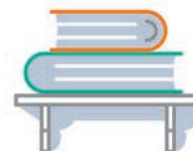
National Breast Cancer Awareness Month

- 1–5: The Art of Science Communication online course begins
- 3–5: Science Outreach: Models, Methods and Measures, New York, N.Y.
- 4–7: Transcriptional Regulation by RNA Polymerase II, Snowbird, Utah
- 11–13: ASBMB exhibits at Society for Advancing Chicanos Hispanics & Native Americans in Science (SACNAS) National Conference, San Antonio, Texas
- 14: The Many Faces of Kinases and Pseudokinases poster deadline
- 15: Accreditation deadline

NOV

American Diabetes Month

- 1: The Many Faces of Kinases and Pseudokinases registration deadline
- 1: Call for proposals for 2020 special symposia deadline
- 14: Annual meeting abstract deadline
- 14–17: Annual Biomedical Research Conference for Minority Students (ABRCMS)



ASBMB



**NOT ONE MORE
GENERATION**

**WOMEN IN SCIENCE TAKE ON
SEXUAL HARASSMENT**
BY LAUREL OLDACH

“I was driven out of science by a harasser in the 1980s.”

Coming from a woman who has since helped to found a scientific society, served as director of the Genetics Society of America and presented her research on sexual harassment to a 2018 National Academies panel, it is a surprising statement. But Sherry Marts left academia after finishing her Ph.D. at Duke and never went back.

2018 has been a banner year for confronting sexual harassment in science. The National Academies of Sciences, Engineering and Medicine published a report on the high prevalence of harassment of women in science, and the National Institutes of Health and National Science Foundation are updating their sexual harassment policies. It appears that science might be catching up with the #MeToo movement, which has raised awareness of workplace sexual harassment. However, critics say that large institutions are moving too incrementally and could do much more.

Three decades ago, Marts said, she got almost no support from her institution. Her harasser was a technician in her graduate lab. She said he harassed her at work and then started following her home.



MARTS

“I took it to the head of the laboratory, who told me to just deal with it,” she said. “I took it to the chair of the department, who said he didn’t want to hear about it. Then I thought, ‘If I take this to the dean, it’s going nowhere.’”

Instead, she made a report to the university’s Equal Employment Opportunity office. “The EEO office at Duke stepped in and made all of the faculty go through sexual harassment training again,” she said, “and basically called the chair of the department out on the carpet for not dealing with it.”

In the aftermath, Marts was not popular in her department. However, a faculty member offered her space to finish up her dissertation. “I found out later it was partly because he had a daughter doing a master’s degree in electrical engineering who was facing some of the same crap.”

Marts found a way to make the daily workplace harassment stop. But the solution cost her a place in her first graduate lab and her trust in the university.

And her harasser? “He stalked me for five years after he left. They let him resign; they didn’t fire him. And he’s now a faculty member at a university, in neuroscience.”

Parts of the scientific community have been trying to address sexual harassment for several years, motivated by high-profile cases that made headlines long before 2018.

Research into solving academia’s problem with sexual harassment and misconduct, comprehensively reviewed in a report by a panel that the National Academies convened (the same panel Marts presented her research to), has uncovered two broad themes that need to change: first, the way that institutions respond to and redress reports of sexual harassment; and second and more broadly, a culture permissive of sexual harassment in the first place.

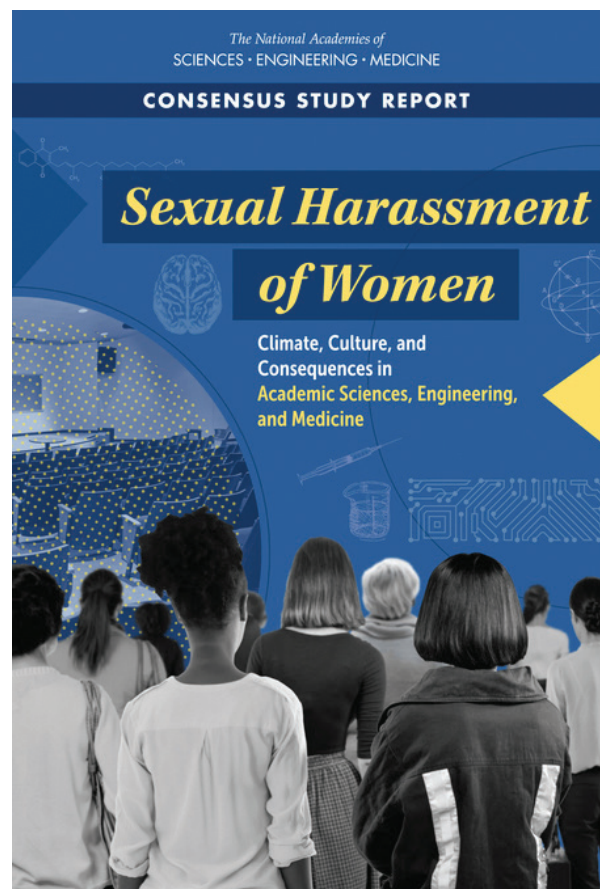
Title IX investigations

Julie Libarkin, then an associate professor of earth and environmental sciences at Michigan State University,



LIBARKIN

was assaulted by an emeritus colleague at a department social event. She reported it, but not until after she had been promoted to full professor. She has trouble articulating exact reasons for the delay but said that “for sure it was a combination of (post-traumatic stress disorder) and my department culture.”



NATIONAL ACADEMIES OF SCIENCES, ENGINEERING & MEDICINE

In June, the National Academies released a report on sexual harassment in science, engineering and medicine. The report, two years in the making, outlines the prevalence and harmful effects of gender discrimination, and provides recommendations for reducing its effects.

The National Academies' recommendations:

The National Academies of Sciences, Engineering and Medicine's panel on sexual harassment of women in those fields made a number of recommendations to reduce harassment in the lab, which appear below. The panel's report elaborates on specific actions to accomplish each recommendation.

- Create diverse, inclusive and respectful environments.
- Address the most common form of sexual harassment: gender harassment.
- Move beyond legal compliance to address culture and climate.
- Improve transparency and accountability.
- Diffuse the hierarchical and dependent relationship between trainees and faculty.
- Provide support for the target.
- Strive for strong and diverse leadership.
- Measure progress.
- Incentivize change.
- Encourage involvement of professional societies and other organizations.
- Initiate legislative action.
- Address the failures to meaningfully enforce prohibitions on sex discrimination.
- Increase federal agency action and collaboration.
- Conduct necessary research.
- Make the entire academic community responsible for reducing and preventing sexual harassment.

Libarkin made a report to Michigan State's Title IX office, which investigated the case. Title IX of the Civil Rights Act of 1964 states that no person may be discriminated against on the basis of sex in any federally funded training environment, so allegations of gender discrimination, sexual harassment or assault on campuses historically have been routed through institutions' Title IX offices. (More on this later.)



ISSADORE

Michelle Issadore is the senior associate executive director of the Association of Title IX Administrators, a professional organization for the university staff members who hear and investigate sexual violence reports. Issadore noted that when speaking to targets of assault like Libarkin, these coordinators must walk a delicate line.

"The best Title IX coordinators I've worked with are really skilled at expressing their desire to support a student ... within the constraints of the position," Issadore said. "A Title IX coordinator who's meant to be a neutral party can't say, 'I believe you. We're gonna go after this person.'"

When a student or employee alleges an actionable violation, the Title IX office seeks to verify everything in the report. Stubborn neutrality can protect the rights of the accused and protect the institution from liability, but it also can do further harm to victims seeking redress for trauma.



FREYD

Jennifer Freyd, a professor of psychology at the University of Oregon, presented her research on sexual harassment of graduate students to the panel that wrote the National Academies report. According to Freyd, "For many people, probably the majority of people,

when they've reported sexual violence their life has just gotten worse."

Research by Freyd and others suggests that the response to reporting sexual violence can be a strong predictor of how the target will fare moving forward, even stronger than the violence itself. For a person already recovering from an initial trauma, what Freyd terms "institutional betrayal" in the form of a skeptical or indifferent response from an institution the target depends on can be a second blow with disproportionate impact.

Libarkin noted that any institution will have a vested interest in protecting its public image and its senior, grant-earning employees and in avoiding a costly lawsuit. "Honestly, I don't really feel like universities can adequately investigate power-based sexual misconduct. When there isn't a finding of sexual misconduct, I'm not always confident that that's actually accurate. There's this potential for a university to brush it under the rug."

More than a slap on the wrist

Even if the Title IX investigation confirms an initial report, the perpetrator may not face meaningful consequences. Sanctions are typically a matter for another institutional office, which Issadore says reduces the appearance of conflicts of interest.

Libarkin said her case was referred to the human resources department, which forwarded the report to her department chair. Though she had been promised anonymity, she said, the document included her name and some medical details. The department chair knew both her and the perpetrator as colleagues — a conflicted position that is not uncommon, according to Libarkin.

"I knew he wouldn't know what I needed," she said of her chair; she requested that a third party with more

Institutional secrecy can be damaging

Universities guard the results of Title IX cases as confidential personnel matters. Although required by law to disclose violent crimes, including sex offenses that happen on or near their campuses, universities generally don't release information about the prevalence of sexual harassment complaints, the perpetrators or how they are punished. Often, college officials make the argument that harassers should have an opportunity to learn from their mistakes. While the practice stems from due process and privacy concerns, it can obscure the number and nature of problems caused by serial harassers, allowing them to move from one institution to another or operate without oversight at meetings.

Molecular biology professor Jason Lieb resigned from the University of Chicago in 2016 after he made unwelcome sexual advances to numerous students at a departmental retreat and, according to some reports, raped a student incapacitated by alcohol. The assistant provost who oversaw the investigation recommended that Lieb be fired. He resigned before that could occur.

Before being hired at the University of Chicago, Lieb

had been the subject of a Title IX investigation at the University of North Carolina. He was then recruited from UNC to Princeton for a director position, from which he abruptly resigned just seven months later. The New York Times reported that the hiring committee in Chicago had received an anonymous tip that both prior universities had launched Title IX investigations of Lieb. While the hiring committee reviewed the file from UNC, which found no policy violation, before making the decision to hire Lieb, neither the hiring committee nor the Times could obtain clarity about what happened at Princeton.

According to the National Academies report on sexual harassment, "Institutions gain protection from liability by adopting standard practices that perpetuate ineffective policies and shield patterns, perpetrators and outcomes from scrutiny." One of the major recommendations in the report is that universities make their investigation and sanctioning procedures public and transparent to prevent cases like Lieb's.

experience join the sanctioning process. She said she thinks this request was granted only because of her position as a full professor and because the perpetrator was retired.

After her chair sent the perpetrator a letter laying out the consequences of his actions, which Libarkin declined to describe, the man came to Libarkin's house. "He showed up twice. I called the cops both times," she said. "I don't think anybody who hasn't experienced PTSD can really understand how traumatizing it is to have this happen."

In May, Libarkin posted on her blog a memo that she had sent to the administration of Michigan State University. The memo details her objections to her experience with the university's Title IX process, which she said was opaque, failed to maintain her anonymity and put her at unnecessary risk of retaliation. Libarkin gave MSU a number of specific policy recommendations to improve its Title IX process. She pointed out that because of institutional secrecy

about investigations, she has no way of knowing whether her harasser victimized anyone else (see "Institutional secrecy can be damaging" above).

Cases like Libarkin's show that filing a complaint through Title IX may do little to change harassers' behavior. According to the National Academies' report, compliance with Title IX is not enough, and institutions need to "move beyond legal compliance to address culture and climate."

Federal interpretation of Title IX has been inconsistent. From 2011 to 2017, the Department of Education interpreted all campus sexual harassment and violence as subject to Title IX and investigated institutions accused of mishandling cases. Draft rules developed by Trump administration officials, leaked to the New York Times in late August, appear to tighten the definition of actionable harassment and prioritize due process protections for those accused of harassment or assault (see "Changing federal Title IX requirements" on page 34).



NIH RECORD

In August, National Institutes of health Director Francis S. Collins (right), shown with principal deputy director Lawrence Tabak at a December advisory committee meeting, received a letter from two members of Congress requesting that he take more serious action to prevent sexual harassment at institutions funded by NIH.

Federal agencies respond

In the wake of the National Academies report, federal science agencies have struggled to change how they address sexual misconduct. The National Science Foundation introduced and then partially backtracked from an aggressive new policy statement, while leaders of the NIH have resisted taking actions that would reach beyond its Bethesda, Maryland, campus.

At a congressional hearing in February on sexual harassment and misconduct in science, Rhonda Davis, head of the office of diversity and inclusion at the NSF, introduced a new reporting portal that allows scientists who are unsatisfied with their universities' responses to file reports directly to the NSF. The agency can act as a neutral third party to address these sexual harassment claims.

In March, the NSF proposed updated guidelines to reduce sexual harassment in labs and at field sites it funds. Its proposed Article X would

require grantees to report when an NSF-funded principal investigator has violated the agency's code of conduct relating to sexual harassment and when a PI is placed on administrative leave related to a harassment finding or investigation. The initial proposal mentioned that the NSF can unilaterally revoke funding from investigators found guilty of sexual harassment.

In response to the NSF's request for public comment on proposed Article X, the American Society for Biochemistry and Molecular Biology submitted several recommendations suggesting that the agency work with other federal entities, including the NIH, to create standard procedures for sexual harassment reports, ensure that investigators who transfer awards between institutions have no record of previous sexual harassment investigations and ensure transparency when responding to sexual harassment reports.

Tricia Serio of the ASBMB's Public Affairs Advisory Committee crafted the ASBMB's comments. She said



NSF BUILDING PHOTO, NSF. NIH BUILDING PHOTO, LYDIA POLIMENI/NIH

Both the National Institutes of Health and the National Science Foundation have struggled to redress sexual misconduct by the researchers they fund. The NSF (left) rolled out, then retreated from, a plan to cut funding to investigators who have committed misconduct. The NIH (right) has avoided such action altogether, arguing that discipline is universities' responsibility.

she sees no provision in Article X for layers of response that calibrate to the wide spectrum of sexual misconduct.



SERIO

As a dean of students at the University of Massachusetts Amherst, Serio also sees difficulties not apparent to some advocates.

“The first institution to step forward is really sticking their neck out,” Serio said.

Institutions must comply with state-specific employee privacy laws, she said, one example of the delicate legal balance when pursuing meaningful changes to sexual harassment policy.

After collecting comments, the NSF hosted a roundtable in July to present a revised Article X incorporating feedback from the scientific community. According to ASBMB Science Policy Analyst André Porter, who attended, officials tempered the NSF's initial plan.

“Officials emphasized the impor-

tance of due process and ensuring that all actions would be within their legal jurisdiction,” Porter said.

Instead of emphasizing unilateral action by the agency, he said, the new policy shows an agency “seeking instead to work with university administrations.” For example, he said, the revised article provides for ongoing support to trainees, even if a PI is removed from a grant; it does not prevent individuals from moving grants between institutions after a Title IX investigation unless university punishments like suspension have been applied; and it offers a standard operating procedure for grantee institutions to report such punishment.

Meanwhile, the NIH plans to change its procedure for investigating misconduct in labs on its campus. A June policy update, presented at a meeting of the Advisory Committee to the Director, included a new provision that said that, instead of being handled internally by the head of each institute, all intramural allegations of sexual misconduct will be referred to a

Title IX: It's not just for students

The Civil Rights Act of 1964 included 11 sections; as written, Title IX refers to participation in federally funded educational programs, while a different clause, Title VII, applies to racial and gender discrimination in employment. So how did Julie Libarkin, a university employee, end up at her university's Title IX office?

According to the U.S. Department of Education, Title IX applies to all areas of education. In a 2013 white paper, the Association of Title IX Administrators explained that this includes protecting faculty and staff from gender discrimination, harassment and assault.

"We're not suggesting that Title VII doesn't apply to an employee-on-employee complaint of sex or gender discrimination," the white paper states. "It does. But Title IX is an additional overlay, and colleges and uni-

versities must be compliant with both laws."

Recent case law also has extended Title IX protections to trainees outside of university settings. In a key lawsuit, a former medical resident argued that harassment by the training program director at her hospital and retaliation after she reported him — which culminated in her dismissal from the residency program — violated the hospital's Title IX obligations. In the wake of a 2017 decision that Title IX applied to the dismissed resident, said Michelle Issadore of the Association of Title IX Administrators, health science centers and training hospitals have begun to set up Title IX processes.

"Their questions are really specific and unique compared to colleges and universities," Issadore said. "It's an area where we're continuing to learn and grow."

single office that will hire a third party to investigate. The agency has introduced new mechanisms for reporting and is putting the final touches on a campuswide survey of workplace climate planned for this fall.

Critics say these changes, while in line with the National Academies panel's suggestions, are not enough. The NIH supports the bulk of the U.S. biomedical workforce, with more than 80 percent of the agency's budget going to support university labs and nongovernmental research institutes. The NIH has resisted making bold policy changes to help curb sexual harassment in these labs. During the advisory committee



TABAK

meeting, Lawrence Tabak, principal deputy director of the NIH, said the agency funds institutions and not individuals. He said it is up to universities to ensure that their employees behave appropriately.

"These are university employees, and a university can deal with these matters as they see fit," Tabak said later in an interview. "From the vantage point of a funding agency, our goal is to make sure that the work can be conducted in the most appropriate

manner possible."

In early August, U.S. Sen. Patty Murray, D-Wash., and U.S. Rep. Rosa DeLauro, D-Conn., ranking female members of the Senate and House committees that oversee the NIH, sent a critical letter to NIH Director Francis Collins. They drew an unfavorable comparison between the NSF's actions to redress harassment and those of the NIH, writing that the NIH "has largely failed to take steps to hold its awardee institutions accountable for fostering safe workplace environments." They requested sweeping data on harassment trainings, the number and amount of legal settlements, and whether and how often the NIH audits grantee institutions, due back within just nine days of receiving the letter. Analysts said that the tight deadline was a way to indicate seriousness.

Murray and DeLauro are among the women leading the charge in Congress and in statehouses to fight sexual harassment. Melissa Melendez, California state assemblywoman representing the 67th district, has introduced a bill in the California statehouse to address sexual harassment in Sacramento. U.S. Reps. Barbara Comstock, R-Va., and Jackie Speier, D-Calif., have worked on multiple

bills to prevent sexual harassment in and outside of Congress. Anne-Marie Boisseau, legislative correspondent for Speier, stated in a July email that a new version of H.R. 6161, a 2016 bill designed to address sexual discrimination in the workplace, is in the works. The updated bill specifically addresses sexual harassment in science.

Changing institutional culture: online activists

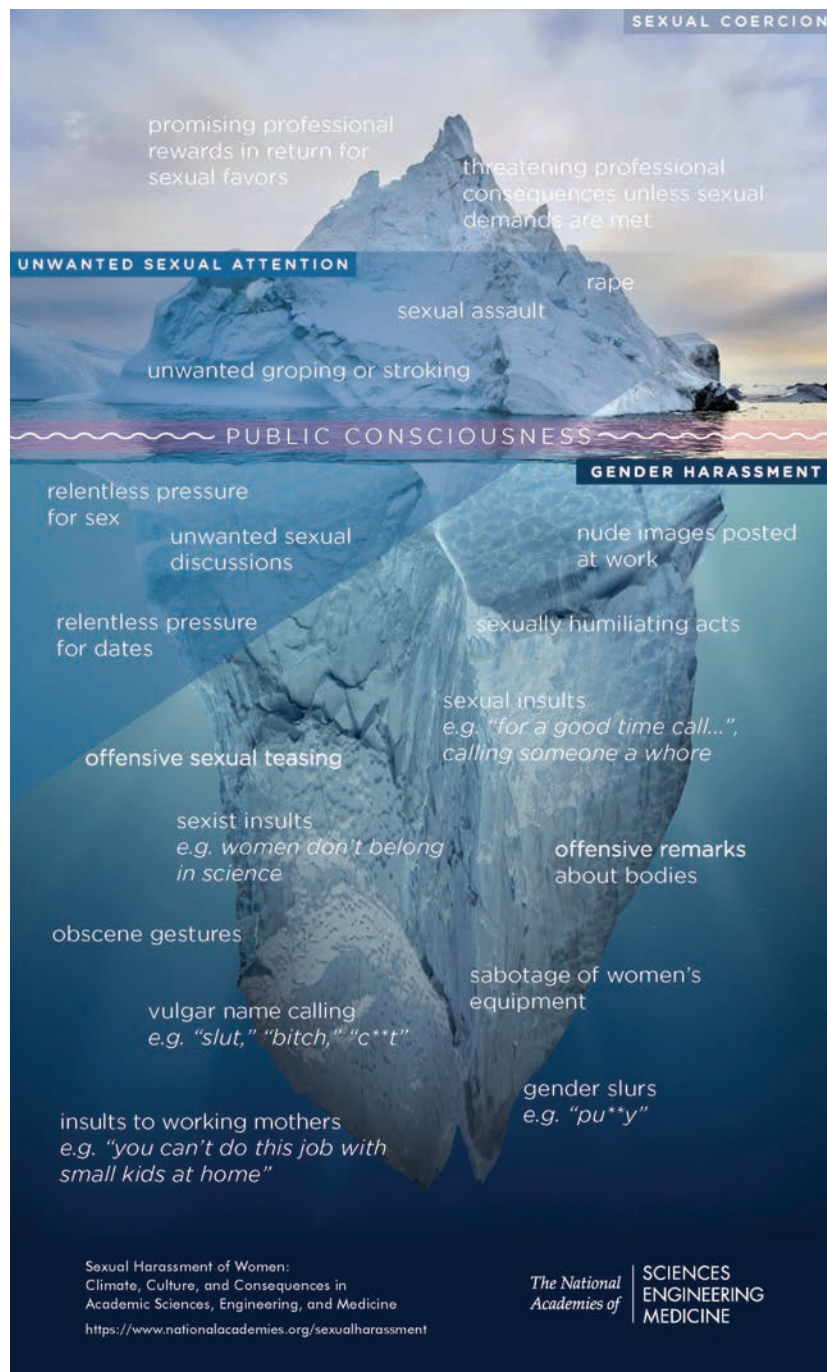
A hostile or sexist institutional climate is a strong predictor of sexual harassment, according to the National Academies report. Take, for example, the Salk Institute. In July 2017, three of its four female full professors filed suit against the institute, stating they had been prevented from applying for private funding available to their 27 male peers, denied opportunities to present their work and prevented from advancing. The institute denied the claims and harshly criticized the productivity and scientific caliber of the plaintiffs.

Less than a year later, the journal *Science* reported that Inder Verma, then the highest paid scientist at the Salk, had sexually assaulted numerous colleagues and trainees over decades. The Salk placed Verma, whose disparaging remarks about female colleagues were cited specifically in one of the three discrimination suits, on administrative leave in April, and he resigned in June. Two of the suits have been settled out of court.

The complaints of pervasive gender discrimination targeting even the most well-established women in the institution were an indicator of an environment permissive of come-ons, harassment and assault, according to the National Academies report, which likened a culture of pervasive sexual harassment to an iceberg. Rape, coercion and assault, the forms of sexual violence that make headlines, are only the visible part of an iceberg borne up by gender discrimination and unwanted sexual attention that rarely

enter the public consciousness.

If institutional leadership turns a blind eye to any form of sexual harassment, the report says, it encourages all harassment to persist. In the scientific hierarchy, “you’ve got power in the hands of a small number



NATIONAL ACADEMIES OF SCIENCES, ENGINEERING & MEDICINE
The National Academies report compares gender discrimination to an iceberg. Physical assault and coercion may attract more public attention, but such actions are borne up by less conspicuous sexual attention and gender harassment that often combine to create an environment permissive of more serious behavior.

of people,” said Jennifer Freyd, the Oregon psychology professor. “If those people become abusers or tolerate abuse, that creates a very difficult situation for anybody who’s not at the top of that hierarchy because, if they say anything or do anything, they might lose their whole position in the system.”

The National Academies report focused on changing institutional cultures by preventing bad behavior rather than changing hearts and minds. The report includes a long list of evidence-based suggestions to change institutional climates. (See “Broadening trainees’ support” below and “The National Academies’ recommendations” on page 24.)

The scandal that led to Verma’s resignation was a watershed moment for BethAnn McLaughlin, an assistant professor of neurology and pharmacology at Vanderbilt University Medical Center. In addition to his position of power at the Salk, Verma also had served as chief editor of Proceedings of the National Academy of Sciences, and he remains a member of the National Academy of Sciences.

To McLaughlin, the disconnect between the National Academies’ sexual harassment report and the science



McLAUGHLIN

academy’s retention of members who have been found guilty of sexual assault, harassment and retaliation was unacceptable.

“It’s such a bad look for our most prestigious academies to have these predators ... still in places of honor,” said McLaughlin, noting five other known serial harassers who have lost their jobs over their actions but still enjoy lifetime membership in the NAS. Her efforts intensified after reports alleged that NAS member Francisco Ayala, who resigned from the University of California–Irvine after a harassment finding, had discussed openly the ease with which a single NAS member can blackball nominees.

McLaughlin took to Twitter to speak out. In May, she started a petition to remove confirmed harassers from the National Academies. By late July, more than 5,100 people had

Broadening support for trainees

The National Academies of Science, Engineering and Medicine’s 2018 report on sexual harassment of women, released this summer, noted that concentration of authority in one adviser with make-or-break power over trainees’ careers puts the less powerful parties at risk of harassment or assault. One proposal to revamp the academic hierarchy is to expand a trainee’s team of formal mentors. Annual thesis committee meetings in several graduate programs around the U.S. require the student to speak to the committee without the primary adviser.

There is debate about whether this intervention truly will enable reporting. Scott Barolo, graduate director of the program in biomedical sciences at the University of Michigan, is among those who question its effectiveness.

“There still may be some students who feel unsafe talking to their committee, even with their adviser standing out in the hallway,” he said.

According to Jennifer Freyd, a psychology professor at the University of Oregon, the policy is still worthwhile.

“When you ask somebody who’s being mistreated about how it’s going, and you attend to their answer, no matter what their words are you can begin to pick up what’s really going on,” she said. “They hesitate a little. They look down at the floor. That doesn’t prove anything, but it’s a red flag that you need to follow up on.” Freyd said that just being aware of committee surveillance may rein in professors who take advantage of perceived opportunities to abuse their students.

Meanwhile, other approaches could broaden trainees’ support networks. This year, Barolo’s program is rolling out mentoring groups that will introduce first-year students to a range of senior students and faculty early on.

“In my experience, when students are in distress for any reason, sometimes they want to talk to a faculty member they know really well. Sometimes they want to talk to a faculty member who is outside their program,” Barolo said. “The best thing we can do is make sure there are opportunities for all those possible interactions to happen.”

signed it. McLaughlin dismisses the objections initially raised by NAS President Marcia McNutt that the academies' bylaws are difficult to change.

"Everyone says, 'Gosh, it's really hard to do this.' It's really not," McLaughlin said. "All you have to do is, if you want an honor, submit a document from your institution that says, 'I haven't been found guilty of violating Title IX.' That's a really, really low bar."

In a written statement in late May, McNutt and her counterparts at the academies of engineering and medicine stated that the three institutions "have begun a dialogue about the standards of professional conduct for membership in our three Academies."

McLaughlin followed up with a similar petition urging the American Association for the Advancement of Science to remove fellows who are sexual harassers. She has been vocal in criticizing individual leaders of both the NAS and the AAAS. Like many women who take a stand online, McLaughlin has faced significant pushback, some of it intensely personal.

To help her fight sexism, she has recruited male allies. It started with Scott Barolo, a Twitter friend she's never met in person. "It's tricky," Barolo said. "You don't want to be rushing in to try to rescue women on Twitter, because they don't really need that."

But McLaughlin says she told him, "We need all the heroes. Everybody in — let's go."

They made a list of male scientists on Twitter who support McLaughlin's efforts and started #STEMTrollAlert. The hashtag is designed for women experiencing Twitter harassment or having the same argument over and over to "tag in" male allies to respond to arguments, sincere or otherwise,

from men McLaughlin dubs trolls. "Instead of me having to explain it 700 times, their male peers have explained it," she said.

"BethAnn has a gift for making it easy for other people to contribute," said Barolo, a professor of cell and developmental biology at the University of Michigan School of Medicine. "She's one of a number of women of science on Twitter who are articulating the sheer amount of work that women in science are expected to do ... and changing norms. They're changing cultural expectations about what's OK in science."



AHN

Natalie Ahn, immediate past president of the ASBMB and a professor of chemistry and biochemistry at the University of

Colorado Boulder, acknowledges the risks of such activism. "I commend the individuals who are taking our institutions, funding agencies and scholarly academies to task on the issue of sexual harassment," Ahn said. "Many are young investigators who have the most to lose by speaking out."

Though public activism about harassment can come at a personal cost, petitions such as McLaughlin's are a proven tool for changing scientific culture. Just ask the astronomers.

Changing institutional culture: scientific societies

The American Geophysical Union is regarded as a leader in tackling sexual harassment in science. In 2015, four women reported that University of California, Berkeley, astronomy professor Geoffrey Marcy, famous as an exoplanet hunter, had sexually harassed them. After a Title IX investigation confirmed their reports, the university said that it had put Marcy on notice, warning him to avoid misconduct in the future. When the



ASBMB

Scientific conferences are increasingly recognized as places where sexual harassment can occur. According to Sherry Marts, many serial harassers find targets at talks or poster sessions and begin by pretending an interest in their work. “The fact that it’s happening is ugly enough,” said Marts. “But the aftermath is that this young woman... is left thinking to herself, ‘I guess my research sucks.’”

allegations and his sanction became public, a petition to support his targets circulated throughout the earth and space sciences community. Marcy resigned shortly thereafter.

The AGU held a town hall about discrimination and bullying soon after Marcy’s resignation. Personal stories shared at that event made it clear that the field had a problem.

“When we became aware of how serious the problem was, we felt an obligation to live up to our core values,” said AGU CEO Chris Mitchell. “All of us, collectively, have to work on this problem.”

The AGU put together a task force to update its ethics codes and meeting protocols to promote a more positive work culture in the lab, in the field and in meetings. An influential study published in 2014 by anthropologist Kathryn Clancy had shown that a high proportion of women trainees were harassed by academic superiors in the field, and very few who had reported harassment were satisfied with the outcome of their reporting. Trainees in the earth sciences are especially likely to work in the field.

Sherry Marts, who left academic science for a career in nonprofits after her experience at Duke, helped the

AGU to overhaul its meeting code of conduct. Now a coach and consultant for professional organizations, Marts has worked on harassment at professional society meetings since about 2014. She ran a survey, loosely based on Clancy’s study, to gather information about harassment in meetings; 60 percent of respondents, who were overwhelmingly female, said they had been harassed at a meeting. Armed with data on the problem, Marts began working on systems to address it. She helps organizations to strengthen meeting codes of conduct and goes to meetings to act as a fact-finder and train society staffers in responding to harassment allegations.

According to the ASBMB’s Tricia Serio, a clear code of conduct is not just useful for catching offenders. It also changes culture. “It sends a really strong message to groups that have been targeted in the past that as a field we take this seriously.”

The AGU incorporated harassment into its definition of research misconduct and now employs a staff director whose sole job is to handle ethical matters in publication and professional conduct. Recipients of society honors and candidates for volunteer leadership are required to disclose any history of allegations or institutional investigations.

The National Academies panel cites the AGU’s work as a model for the role scientific societies can play in changing the culture. According to Frank Krause, chief operating officer of the AGU from 2011 to 2017, the society leads the field because its senior leadership recognized the importance of this issue and focused on doing something about it.

“That’s the key,” he said. “Not just accepting that ‘this problem’s bigger than us, let’s let somebody else take care of it.’”

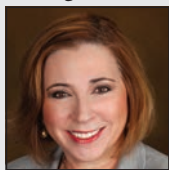
Natalie Ahn of the ASBMB agrees. “The National Academies’ report clarifies the key role of institutions

Double jeopardy: The intersectionality of sexual harassment

While most women are sexually harassed at some point, some women are targeted disproportionately. The National Academies report on sexual harassment cited multiple studies showing that women who belong to ethnic or sexual minority communities face more harassment than white women.

A seminal article published in 2006 reported that women who are ethnic minorities are in “double jeopardy,” facing both sexual harassment and ethnic harassment at work. The same is true among scientists; a study of astronomers confirmed that women from minority communities experienced more harassment and felt less safe in the lab than either their male counterparts or white women.

Not only are women from minority communities harassed more often, but the harassment also can be more damaging. This disproportionate impact is thought to come from more frequent, subtle messages that people with multiple marginalized identities don’t belong or are not as competent.



FLORES

Sonia Flores, vice chair of diversity and justice and professor at the University of Colorado Denver and chair of the American Society for Biochemistry and Molecular Biology’s Minority Affairs Committee, said she has noticed a change in workplace

bullying over the past few years.

“Men are more conscientious about sexual harassment. But the discrimination based on ethnic background is even more pervasive,” Flores said. “Here at the hospital, we’ve seen an increase of maybe 25 percent.”

The increase, which began after the 2016 election, stems mostly from patients harassing doctors, nurses and medical trainees of color, she said.

In her role as vice chair of diversity and justice, Flores is developing a code of conduct for patients and a

toolkit care providers can use in response to harassment from their patients. She also has started doing bystander training, which equips people to intervene on behalf of their colleagues.

“It’s important that people become allies, regardless of their ethnic background and gender,” Flores said.

A 2000 study on sexual harassment and racial disparity argued that women of color may be less likely to report their harassers than their white counterparts. According to Flores, this is because the risks associated with reporting a harasser are even higher for minority women.

“I think it’s not only the fear of retaliation, but the fear of being labeled a troublemaker,” she said, noting negative racial stereotypes tied to expressions of emotion.

And for a woman who experiences harassment, according to Jasmine Mena, a psychology professor at Bucknell University, it can be impossible to determine what dimension of her identity the harasser sees as a target. Many of these cases go unreported, making it difficult to gauge the prevalence of the problem.

While the available data suggest a troubling trend, many in the field agree that more research is needed.

Anita Hill famously spoke out in 1991 about her workplace sexual harassment by then-Supreme Court nominee Clarence Thomas, and she is now a professor of social policy, law, women’s, and gender and sexuality studies at Brandeis University. Hill joined a June discussion in Irvine, California, on the National Academies of Sciences, Engineering and Medicine report on the high prevalence of sexual harassment of women in science.

“There’s just not enough research around race and ethnicity and sexuality and harassment, and how it compounds,” Hill said. “How do we include more voices in this discourse that is under the radar?”

in sustaining — and changing — a climate that enables tolerance of sexual harassment,” she said. “It is up to all of us who hold power on a local level — all faculty members as well as administrators — to pay attention, actively work to enlighten our colleagues, and establish a clear code of conduct that is seriously enforced.”

A challenge that is poised to bedevil professional societies as it does

universities is how to redress misconduct. “Everybody’s aligned with (the idea) that this is bad behavior,” said Krause, who is now the CEO of the Federation of American Societies for Experimental Biology, a coalition of scientific organizations that includes the ASBMB. “It’s really the publication of the issue and what the consequences were for a given individual that are so controversial to

Changing federal Title IX requirements

Policy changes reportedly under consideration at the U.S. Department of Education, which were leaked to the New York Times in late August, would narrow institutions' responsibility to redress sexual misconduct under Title IX.

While 2011 guidance from the department required universities to redress any conduct interfering with or limiting a student's access to education, the leaked draft says Title IX covers only "unwelcome conduct ... so severe, pervasive and objectively offensive that it denies a person access to the school's educational program."

According to the Times, the draft also restricts universities' responsibility to include only misconduct that occurs on campus (not, for example, in the field or at a fraternity residence) and that is reported to a campus official. (Earlier guidance included any misconduct a university "knows, or reasonably should know, about.")

The draft also includes procedural changes to Title IX investigations that would prioritize due process for the accused. This would align with sentiments expressed by U.S. Secretary of Education Betsy DeVos in 2017: "Every survivor of sexual misconduct must be taken seriously; every student accused of sexual misconduct must know that guilt is not predetermined." Advocates for assault survivors and targets of harassment worry such changes would do further harm.

When this article went to press in late August, the Education Department had not released the full policy proposal. Needless to say, it may end up scrapped, revised or implemented.

wrestle with."

Because professional society members are not employees, said Marts, "there aren't as many legal and liability constraints as there are in an employment harassment situation."

For example, meetings are private events, so it isn't difficult to ask problem attendees to leave. Other societies are discussing taking steps, as the AGU has, to revoke awards or membership in response to verified allegations. But should a university be informed of poor behavior by an employee at a conference?

"I like to say that's a litmus test for how conservative your association's legal counsel is," Marts said.

The Experimental Biology meeting, which the ASBMB co-hosts with four other scientific societies, publishes a detailed code of conduct barring various types of gender discrimination and sexual harassment. Consequences now include removal from the meeting, being banned from future EB meetings or, in the case of egregious violations, a police report.

Thinking bigger: Women changing the culture

What unites the people driving the effort to stop sexual harassment and bullying in science is not their job titles. They aren't all university presidents, deans, legislators or society executives. Instead, women in various positions of power are demanding change.

Marts believes that the National Academies report exists because a cadre of women and other minorities "have finally reached a level of power and success in science that they can actually afford to turn around and say, 'This stops now.'"

Statistics cited by the National Academies report show that organizations that have more women in power are less likely to foster abuse. Pro-

moting a more diverse and inclusive science workplace is a major goal of the National Academies' report. But activists say there is a long way to go.

"We owe it to our younger colleagues and future leaders in science to create a wholly nondiscriminatory environment, where everyone can reach their full potential for creativity and discovery," Ahn said.

In the weeks before the National Academies' report launched, BethAnn McLaughlin, the neuroscience professor who started the NAS and AAAS petitions, teamed up with Michigan geophysicist Julie Libarkin to start a blog where women can share their stories of harassment anonymously. One woman, who wrote under the pseudonym Jen, described an experience eerily similar to the one Sherry Marts had had in graduate school some three decades earlier. When Jen told her harasser to stop, speaking up cost her her PI's goodwill and gained her very little, she wrote. According to Jen, the harasser is now a Howard Hughes Medical Institute investigator.

Hearing variations on the same few stories breaks her heart, McLaughlin said, but it also galvanizes her. She believes that after serial predators are removed from academia, the real work will begin: rehabilitating victims and making science a genuinely safe and welcoming environment for all. But for now, she said, she's focused on the harassers.

"I got to the tipping point, where I was like, 'Not one more generation of women. I will throw down as hard as I need to.'"

Daniel Pham contributed to this article.



Laurel Oldach (loldach@asbmb.org) is a science communicator for the Journal of Lipid Research and Molecular & Cellular Proteomics and a staff writer for ASBMB Today. Follow her on Twitter at @LaurelOld.

CALL FOR SUBMISSIONS

ASBMB Today will launch two essay series in 2019:

What I wish people understood about _____

Is there an aspect of your life, personal or professional, that others just don't get? Fill in the blank in this sentence, and then set the record straight.

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ASBMBTODAY

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ASBMB '19

ANNUAL MEETING
ORLANDO | APRIL 6-9

37 Orlando, here
we come

39 ASBMB award
winners

40 How do graduate
students and
postdocs choose
conferences?

43 A dozen moments
in the spotlight

Orlando, here we come

By David Bernlohr & Hao Wu

April in Orlando. When you hear those words, you might think of spring break or Disney World. Instead, we invite you to think about something that might be even better — the 2019 American Society for Biochemistry and Molecular Biology Annual Meeting. Scheduled for April 6–9 at Orlando's Orange County Convention Center, the meeting will feature exciting scientific and educational sessions that are sure to rival any theme park — and you won't need to stand in any long lines.

The scientific session themes for 2019 are organized around some of the society's historical strengths and introduce new and dynamic topics certain to represent the forefront of contemporary science. As such, the annual meeting is an opportunity for students new to the disciplines to become more familiar with core concepts and for senior investigators to hear and interact with those pushing the boundaries.

The scientific program includes 16 symposia linked to structure, function and regulation of biomolecules and systems. Sessions familiar to those who have attended the meetings for years include Catalysis and Enzyme Action, Glycobiology, and Mitochondrial Metabolism. Relatively new sessions include Advances in Cryo-EM, Autophagy, Breakthroughs in Plant Biochemistry, Aging and Longevity, Circadian Rhythm, and Inflammation. With these, we guarantee you will find twists on old subjects as well as old BMB newly applied in rapidly advancing new sciences.

As at past annual meetings, poster



ASBMB

Attendees gather to learn about the work of their peers at the poster session at Experimental Biology 2018 in San Diego, of which the ASBMB annual meeting is a part.

sessions represent an amazing opportunity to immerse oneself in topics varying from genome dynamics to chemical biology and from signal transduction to synthetic biology (see a complete list on page 45). Authors of selected abstracts will give short platform talks as well. Poster sessions often represent a new student's introduction to the biochemical disciplines. Every Ph.D. trainee should attend the ASBMB annual meeting as an essential component of their developmental program.

An important benefit of attending the annual meeting is interacting with thought leaders in the field, including those receiving named awards

(see the list of 2019 award winners on page 39). In addition, the 16 symposia chairs for the 2019 meeting are exceptional leader-scientists (see box). With the scope of science they cover, the ASBMB sessions and events represent an unmatched opportunity to enjoy the latest breakthroughs and hear thought leaders in a range of areas that fall under the biochemistry and molecular biology umbrella.

A unique feature of the ASBMB annual meeting is the multitude of educational and career-oriented sessions and networking events. Your participation will be rewarded not only with exposure to new science but also the chance to establish col-

laborations, network, and gain access to mentoring and career advice. The meeting is an exceptional opportunity for trainees to identify potential future postdoc mentors and find the

latest information on new job opportunities. Representatives from life science companies and suppliers also will be on hand to demonstrate and provide information on the newest in

biochemistry and molecular biology technology and resources.

Don't wait. Submit your abstract soon. Competitive travel awards are available for eligible students and postdoctoral fellows. Submission and application sites open in September. Check asbmb.org and future issues of *ASBMB Today* for all the details.

Orlando beckons, and the science, sun and surroundings await. Make the 2019 ASBMB annual meeting a priority in your spring schedule.

2019 ASBMB symposia organizers

Hashim Al-Hashimi, Duke University

Anja-Katrin Bielinsky, University of Minnesota

Michelle Chang, University of California, Berkeley

Yifan Cheng, University of California, San Francisco

Natalia Doudareva, Purdue University

Brian N. Finck, Washington University in St. Louis

Anne Imberty, Centre de Recherches sur les Macromolécules Végétales

Beth Levine, University of Texas Southwestern Medical Center

Judy Lieberman, Harvard Medical School

P. Darrell Neuffer, East Carolina University

Laura Niedernhofer, University of Minnesota

Julia Segre, National Institutes of Health

Amita Sehgal, University of Pennsylvania

Yang Shi, Harvard Medical School

Pablo Sobrado, Virginia Tech

Xiaoliang Sunney Xie, Harvard University

Look for more symposia information in October's ASBMB Today.



David Bernlohr (bern1001@umn.edu) is a professor of biochemistry, molecular biology and biophysics at the University of Minnesota and co-chair of the 2019 ASBMB annual meeting program committee.



Hao Wu (wu@crystal.harvard.edu) is a professor of biological chemistry and molecular pharmacology and of pediatrics at Harvard Medical School and co-chair of the 2019 ASBMB annual meeting program committee.

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ASBMB
American Society for Biochemistry and Molecular Biology

ASBMB award winners

Don't miss their lectures at the annual meeting in Orlando



SOLDATI-FAVRE

Alice and C. C. Wang Award in Molecular Parasitology

Dominique Soldati-Favre

Université de Genève
*The ins and outs of toxoplasma
invasion and egress*



DUNHAM

ASBMB Young Investigator Award

Christine Dunham

Emory University
*Mechanisms of RNA-mediated
translational control*



TONKS

Earl and Thresa Stadtman Distinguished Scientist Award

Nick Tonks

Cold Spring Harbor Laboratory
*30 years of protein tyrosine phosphatases
— basic research to novel therapeutics*



GARG

ASBMB Award for Exemplary Contributions to Education

Neil Garg

University of California, Los Angeles
*How organic chemistry became
one of UCLA's most popular classes*



THORNER

Herbert Tabor Research Award

Jeremy Thorner

University of California, Berkeley
*Regulation of plasma membrane
homeostasis: Dissecting
TORC2 signaling*



BANERJEE

ASBMB–Merck Award

Ruma Banerjee

University of Michigan
Signaling through sulfide



GRONENBORN

Mildred Cohn Award in Biological Chemistry

Angela Gronenborn

University of Pittsburgh
*The awesome power
of fluorine NMR*



BANKAITIS

Avanti Award in Lipids

Vytas Bankaitis

Texas A&M Health Science Center
*Instructive regulation of phosphoinositide
signaling by lipid transfer proteins*



TORRES

Ruth Kirschstein Diversity in Science Award

Jorge Torres

University of California, Los Angeles
Dissecting the mechanisms of cell division



THOMPSON

Bert and Natalie Vallee Award in Biomedical Science

Craig Thompson

Memorial Sloan Kettering Cancer Center
*The role of metabolites in regulating
cellular differentiation and gene expression*



SIN CHNG

Walter A. Shaw Young Investigator Award in Lipid Research

Shu Sin Chng

National University of Singapore
*Bacterial lipid trafficking
and outer membrane homeostasis*



SHIPPEN

William C. Rose Award

Dorothy Shippen

Texas A&M University
*Breaking new ground: the emergence
of non-canonical functions
for telomerase subunits in plants*



KUHLMAN

DeLano Award for Computational Biosciences

Brian Kuhlman

University of North Carolina School of
Medicine
*Designing novel protein structures and
interactions with Rosetta*



KAHN

FASEB Excellence in Science Award

Barbara Kahn

Harvard Medical School
*Glucose transport, adipose biology
and novel mechanisms for regulating
systemic insulin sensitivity*

How do graduate students and postdocs choose conferences?

By Sarah Martin

The first time someone asked me this question, I did not have an answer. Throughout my years of undergraduate, graduate and now postdoctoral fellowship research, I have been to many conferences, but I never thought about why I chose the ones I attended.

To gain more insight into my past choices and why I was now choosing to attend the American Society for Biochemistry and Molecular Biology annual meeting, I asked my colleagues why they attended specific conferences, what they thought of the ones they had attended and how much influence their mentors had over their decisions. Through these conversations, I began to understand their choices.

Fast forward to Experimental Biology 2018 in San Diego (of which ASBMB is one of the five host societies). I decided the best way to understand how conferences address the topics my colleagues had brought to my attention would be to jump in feet first, attend sessions and talk to other attendees to learn about opportunities I might have missed out on.

Teaser: If you want everything in one conference, EB is the meeting you should attend.

My mentor told me I should go

This was the No. 1 answer I heard from trainees, and it is not a bad thing. Mentors have attended many types of meetings and can provide a mentee with new information. Conference decisions should include a

dialogue between mentor and mentee to provide both parties with a mutually beneficial experience.

Side note to any mentors reading this: Please keep reading so you can share this information with your trainees, and remember, you have a strong impact on your trainees' decisions. Trainees need to understand their goals in attending a conference. This can help the mentor and attendee navigate a daunting conference schedule to find the activities that best fit those goals.

Before I left for EB/ASBMB 2018, my mentor and I went over my poster dialogue to discuss the key scientific points I needed to convey. We talked about the scheduled speakers so I could begin to plan my days. And on my return, we discussed what I had learned, the feedback I had received on our project, and the people I connected with and reconnected with during the conference.

It's small and intimate, which allows me to network

I know "Experimental Biology" and "small and intimate" don't seem like they would go hand-in-hand. At least that's what I thought before I attended EB 2018.

I went to the conference in what I thought was a mentorless state. It was not my first time doing this, but I had never attended a conference of this size.

When I arrived on Saturday, I was immediately welcomed into

the ASBMB travel award recipient sessions. The morning included career-path seminars with advice from leaders in biotechnology, academic science, government and nontraditional tracks. Only trainees attended, so it was a more comfortable place to ask speakers questions than the general sessions. Also, these sessions took place before the start of the larger conference, so speakers were more available to continue one-on-one discussions.

Saturday afternoon was filled with interactive sessions on networking, resume building and interview tips and techniques, followed by panel discussions with the morning lecturers. Because many of these had similar themes, I got to know other attendees as I passed from session to session. I continued to run into many of these people throughout the conference. The ASBMB travel award sessions helped me make many unexpected contacts.

Without my mentor, I was nervous about the remainder of the conference. As I walked around alone, I noticed many laboratory groups. Some mentors had encouraged members of their labs to attend and also reached out to previous lab members who were attending. I have never seen such reunions at any other conference.

I always heard that at large meetings you are just one of many. This could not be further from the truth. Even without a mentor, I was never alone at EB. Members of my previous graduate department welcomed me into their lab groups. I ran into col-



ASBMB

The session on building your CV is just one of many offerings for trainees at the ASBMB annual meeting. This photo was taken this year in San Diego.

laborators, graduate students I hadn't seen in years and faculty members from my current university. When I walked into EB, I thought it would be impersonal, but I was met by old friends and colleagues in addition to making new contacts.

I want to hear and meet with high-profile speakers

EB and ASBMB are the best opportunities to hear top speakers in a multitude of fields, from the opening lecture Saturday evening through the last lecture on Wednesday. The ASBMB makes sure that its session organizers choose a diverse group of expert lecturers to share their ideas with the scientific community. And the ASBMB is committed to rotating speakers, so each year is a unique experience of hearing top-tier scientists.

In total, the 16 scientific sessions each include four speakers in the themed field, providing attendees an opportunity to pick from more than

60 top-tier scientists from around the world — and that's just the morning sessions. The afternoon sessions offer many additional speakers, including junior faculty, postdoctoral fellows and students presenting research from their laboratories.

My research has focused on lipid biochemistry, so I was excited to start the conference with a session on lipid signaling and metabolism. However, I was surprised when I was equally excited about a session on new insights into the links between metabolism and disease and one on advances in single-cell -omics. These talks might not have been part of a smaller, more focused conference, but they directly pertained to experiments related to my work.

The ASBMB not only provides an opportunity to hear experts but also to meet them after their lectures. During the conference, I heard a lecturer state that approximately 75 percent of scientists are introverts. I — an extrovert — appeared to be the odd woman out. If I wanted to meet a speaker, I would seek them

out and talk to them. Most of my peers were uncomfortable doing this, thus making the “Meet the Speakers” sessions truly exceptional. I attended a few of these sessions and was able to have one-on-one conversations with lecturers, including Kim Orth, the ASBMB–Merck Award winner. We spoke for about 15 minutes on topics ranging from her work over the years to choosing career paths. She was very cordial and willing to share her career experiences. All the lecturers attended these sessions and seemed equally engaged in conversations with trainees at all levels.

I want to network, I need career advice, or I want to meet people working in alternative careers

All of us know your network never can be large enough, and we all need a little career advice from time to time. I have never attended a conference that provides so many opportunities

to learn about alternative careers and talk to people in those career paths and that also provides educational seminars on how to obtain those positions. In addition to the Saturday sessions for travel award recipients, the ASBMB ran a series of career development workshops throughout the conference.

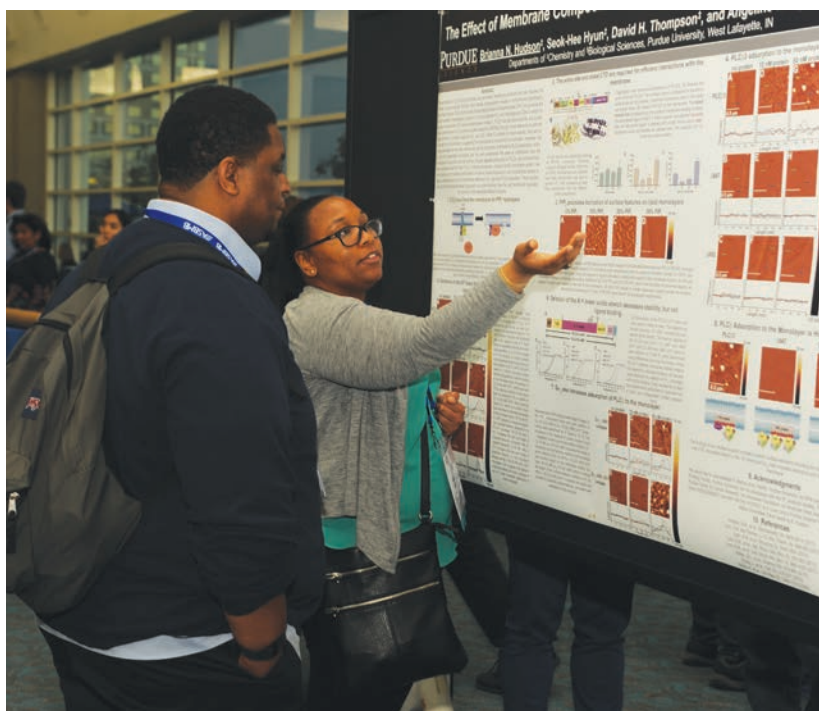
Along with all the ASBMB programing, EB had an entire area dedicated to career development resources. There, you could practice presentations with experts who gave feedback and critiqued your CV. You could visit the job board or attend any of the educational seminars hosted by experts in particular topics. These small-group sessions were capped at 40 people, which made it easier to ask questions.

Through attending the sessions and workshops, I learned about the advanced grant-writing process, such as how to write and obtain a K99/R00 award; I attended sessions run by individuals who made the transition from academics to industry; and I went to workshops that made me reflect on all of the skills I have without even realizing I have them. Through these workshops, I gained an understanding of what I most value in a career: constructing and asking interesting scientific questions (grant writing), sharing my knowledge and mentoring younger scientists, and working as part of a team to accomplish goals.

I want to present my work

Most conferences, especially small ones, offer only poster session slots to graduate students and postdoctoral fellows. The ASBMB has made it a priority to schedule Spotlight Sessions with 15-minute talks, many of them given by trainees. Over the three-day conference, more than 100 trainees gained experience in giving oral presentations.

The ASBMB plans to expand speaking opportunities for trainees by



ASBMB

In addition to poster sessions like the one pictured here, some grad students and postdocs at the ASBMB annual meeting get to present their work in Spotlight Sessions — and more opportunities to share research are in the works for 2019.

adding short poster preview presentations on selected abstracts. These “flash talks” will be judged by a small panel, and feedback will be provided. The talks will give even trainees the experience of presenting their work to a large audience, including some of the world’s top scientists, and will highlight their work to relevant scientists who then can seek them out for discussion. It also will help attendees find relevant posters in the poster hall sessions.

I want food, fun and free stuff

All joking aside, we’re all human and the reward pathways are strong in us. EB covers it all, from great conference locations to the many receptions with free food and drink and the 233 vendors giving out headphones, candy, toys, T-shirts and more. At most conferences, you’re lucky to get a pen and some paper. EB, and

especially the ASBMB, goes out of its way to make sure you have a full conference experience up through the last day.

EB was an amazing experience for me scientifically — I heard some of the top scientists in the world — but also for career development, networking opportunities and the ability to share my work with a diverse group of scientists. I can say for certain that I never before had attended a conference that not only met but also exceeded my expectations.

I’m counting the days until EB 2019 in Orlando. I hope I’ll see you there.



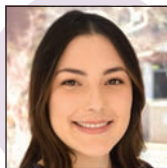
Sarah Martin (Sarah.Martin@UTSouthwestern.edu) trained with Robert Murphy at the University of Colorado Denver Anschutz Medical Campus in lipid biochemistry and mass spectrometry. She is currently a postdoctoral fellow at the University of Texas Southwestern with Helen Hobbs and Jonathan Cohen.

A dozen moments in the spotlight

More than 200 scientists — from undergraduates to senior investigators — presented their research during Spotlight Sessions at the 2018 American Society for Biochemistry and Molecular Biology Annual Meeting. These talks were selected from abstracts submitted by attendees who opted to be considered. The criterion for selection was simple: Is the science exciting?

Spotlight Sessions, which were introduced at the 2017 meeting, took place this year during the prime afternoon hours with no competing seminars scheduled. Each session consisted of five 15-minute talks on related topics, with each talk including three minutes for Q&A.

The ASBMB is planning a third year of Spotlight Sessions at the 2019 annual meeting in Orlando. The abstract submission deadline is Nov. 14. To inspire you to get started on your abstract, we offer the words of a dozen 2018 spotlight presenters reflecting on their experiences.



NEWHARDT

Maria Newhardt, Ph.D. candidate, Oklahoma Medical Research Foundation

Session: Advances in mitochondrial biochemistry

Title: Cytoplasmic PFK-2 activity affects mitochondrial PDK4 levels in the heart

As a second-year graduate student attending my first conference, I was shocked that my abstract had been chosen for a talk. I was worried my inexperience would negatively affect how my work was received, and I did not want to squander this great opportunity. I was blown away by the feedback I received after my talk. Scientists from all career levels found me at a poster session and talked with me for hours about my presentation and how excited they were about my work. I will fondly remember my first scientific talk. An amazing welcome into the ASBMB community.



YOO

Haneul Yoo, graduate student, University of Chicago

Session: Molecular chaperones and protease systems

Title: Molecular chaperones disperse Pab1 hydrogel more quickly than misfolded aggregates

I was about to give my first talk at a big national conference. I strode to the podium, looked up to see my audience, and started talking. One lady who sat toward the front was smiling. And she kept her smiling face throughout the talk. I don't know what that smile meant, but it gave me courage. I don't know who you are, but thank you. Thank you for giving me courage. I gave my first talk at a big national conference.



RESENDES

Karen Resendes, associate professor, Westminster College

Session: BMB professional development: advancing successful careers

Talk: Effects of a data analysis intensive course on student critical thinking skills, confidence and post-graduation success

The research I presented on student success in my advanced cell and molecular biology course was a completely new avenue of study for me. The opportunity to present this work to a wider audience via the Spotlight Session validated for me the relevance and importance of the project. Furthermore, it sparked great conversations with my fellow scientists and helped increase traffic at my poster presentation the next day. Perhaps most important is that selection for a talk at the ASBMB annual meeting is highly influential in the promotion process at my small, primarily undergraduate institution and highlights the importance of pedagogical research alongside bench science in career development.



HAMMOND

Gerry Hammond, assistant professor, University of Pittsburgh School of Medicine

Session: Molecular basis of signaling

Title: SAC1 degrades its lipid substrate PtdIns4P in the ER to maintain a steep electrochemical gradient on donor membranes

One of the most rewarding experiences as a young PI is seeing and hearing your trainees present. In San Diego, I watched a young research assistant from my lab, Brady Goulden, present our lab's work on PI 3-kinase signaling like a pro in his talk, "Novel biosensors for an enigmatic phosphoinositide." Seeing so many young scientists given a chance to present in the Spotlight Sessions — including those like Brady who are not even at grad school yet — really makes me feel the ASBMB is ushering in the next generation of researchers.



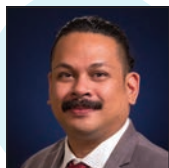
ROBINSON

Anne Robinson, graduate student, Washington University in St. Louis

Session: Emerging antibiotics from nature

Title: Ni(II) uptake by yersiniabactin, a metallophore produced by uropathogenic *E. coli*

While wrapping up conversations at my poster, I anxiously considered how quickly I could get to my immediately following Spotlight Session. Ten long minutes of speed walking later, I burst into the room — a touch out of breath — uploaded my slides and started presenting. Little did I know what I was in for — an afternoon of inspirational science, new friends, great food and local beer. Colleagues from various backgrounds shared outstanding ideas. Afterward, our eager conversations spilled into the hallway, where we watched a Dole container ship in the San Diego bay. Beers sustained our discussions further, and we continue to converse today via email.



DAMO

Steven Damo, assistant professor, Fisk University

Session: Metals in biology

Title: Zinc-mediated oligomerization of S100A12

I was delighted to have my abstract selected for a Spotlight Session talk. As a junior faculty member at a primarily undergraduate minority institution, I am limited in the number of conferences I can attend each year. The Spotlight Session was an excellent venue to present my lab's work and facilitated expanding my network with other faculty in my research field. Additionally, several students in attendance at my talk expressed interest in my research and choice of profession. This was both flattering and an important reminder of our responsibility as faculty to prepare the next generation of scientists.



CHATTERJEE

Champak Chatterjee, associate professor, University of Washington

Session: Reading, writing and erasing epigenetic marks

Title: Chemical tools to investigate gene regulation by histone sumoylation

My Spotlight Session was a great opportunity to meet scientists from several continents who share a passion for epigenetics research. Invited speakers came from as far away as Switzerland and South Korea! While the science presented truly rocked, even more awesome was the informal discussion that lasted late into the night over several rounds of beverages. Spotlight Sessions are a great opportunity to bring together talented early-career scientists who share similar interests and to foster a spirit of international cooperation (over a few spirits).



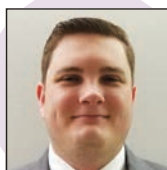
DUMBREPATIL

Arti Dumbrepatil, postdoctoral fellow, University of Michigan

Session: Redox enzymes

Title: A novel radical SAM mechanism mediated by the interferon-inducible protein viperin

As a postdoc, the thought of presenting your data at ASBMB is nerve-racking enough; having only 12 minutes to present added a whole extra level of stress. I was extremely glad to have my adviser, Neil Marsh, to help me organize all my data into just eight slides. Presenting a spotlight talk helped me learn how important it is to design simple, clean figures and that putting together a set of well-organized slides makes the task of reaching out to the audience extremely easy.



CONNELLY

Zachary Connelly, graduate student, Louisiana State University Health Science Center Shreveport

Session: Physiological regulation by cell signaling

Title: Foxa2 promotes prostate cancer bone colonization

This experience was an incredible one. Here, I got to present my work to people across all types of science disciplines. It allowed for stimulating questions, but even more exciting was forming potential collaborations after my talk was over. It was a cool experience to see everybody engaged in my topic and be supportive toward a student. This is something I hope every student could get the chance to do.



ROWLAND-GOLDSMITH

Melissa Rowland-Goldsmith, associate professor, Chapman University

Session: BMB education: active learning

Title: Using an innovative approach to teach students how to communicate about scientific topics to nonscientists

Student feedback about my upper division cancer biology class was so positive I wanted to share my unique science communication approach with science educators. It's been many years since I've presented at a national meeting, so I was nervous about doing so. At the meeting, instead of being nervous, I was excited to share my story. Early during my presentation, I found a friendly face in the crowd. During the 12 minutes, I watched his face to ensure he stayed engaged. Thanks to that stranger I had no fear and enjoyed sharing my project with other scientists.



KHAN

Naazneen Khan, postdoctoral fellow, University of California, San Diego

Session: Glycoimmunity

Title: Rapid evolution of bacterial exotoxin B subunits independent of A subunits: Sialic acid binding preferences correlate with host range and intrinsic toxicity

Initially, when I was selected for a Spotlight Session, I was very excited, but at the same time I was thinking about stage fright. I started practicing a week before the meeting, but I still was not happy about the way I delivered the presentation. When I heard many of the presentations at the meeting — including the ASBMB awardees' lectures — I understood how to give a good presentation, especially how to answer the questions. This is not limited to the ASBMB meeting; I have applied what I learned to my monthly lab presentations. Presentation is all about how well you tell the story to make it understandable to a lay person.



HAMADANI

Kambiz Hamadani, assistant professor, California State University San Marcos

Session: Ribosomes and translational regulation

Title: Novel in vitro tag-and-modify protein sample generation methods for multiplexed single-molecule FRET screening

I got to meet and chat with a long-time scientific hero of mine and get direct feedback from them on my recent paper — which they disagreed with ... D'oh!

ASBMB 2019 abstract topic categories

To be considered for a Spotlight Session at the 2019 ASBMB annual meeting, you need to submit an abstract in one of these categories. The application site opens in September. Go to asbmb.org for information.

2000 Genome Dynamics: DNA Replication, Repair and Recombination

2010 Chromatin Structure, Remodeling and Gene Expression

2020 RNA: Processing, Transport, and Regulatory Mechanisms

2030 Protein Synthesis, Structure, Modifications and Interactions

2050 Enzyme Chemistry and Catalysis

2060 Chemical Biology, Drug Discovery and Bioanalytical Methods

2070 Genomics, Proteomics and Metabolomics

2080 Signal Transduction and Cellular Regulation

2110 Bacteria and Parasites: From Microbiome to Antibiotics

2120 Metabolism and Bioenergetics

2130 Lipids and Membranes

2140 Biochemistry of Organelles and Organelle Trafficking

2150 Glycans and Glycobiology

2160 Interdisciplinary/Translational Science (SEBM)

2170 BMB Education and Professional Development

The importance of mentoring

By Suzanne E. Barbour

A growing body of literature points to the importance of effective mentoring in the success of underrepresented minority, or URM, students in science, technology, engineering and mathematics. The mentor-mentee relationship was cited as one of the three pillars of success in a doctoral program in a 2015 report from the Council of Graduate Schools. In that report, 62 percent of African-American and Hispanic doctoral candidates cited their research mentors as major factors in their success.

For this series, I spoke to five African-American men studying or working in the life sciences (see box on page 47). Of the five, all cited mentors as a major factor in their decision to pursue a degree in STEM. The most junior of the interviewees, Nisan Hubbard and Christopher Barnes, emphasized the impact of early mentors on their decision to persist and ultimately to pursue doctoral degrees in the molecular biosciences.

“The best thing about science and life itself is the fact you can have multiple mentors that could facilitate that interest you may have,” Hubbard said. “It honestly started in middle school with my biology teacher, Mr. Johnson. From him opening my eyes to my coordinators at Virginia Commonwealth University helping me to foster my interests and turning that energy into productivity and clarifying my pathway to success. Without them, I don’t think I would be able to have a clear understanding of what science is and what it takes to get there.”

Barnes said: “My very first mentor, Dr. Gary Pielak at the University of North Carolina, nurtured this idea and helped start me on a path toward a career as a scientist. If it were not

“The best thing about science and life itself is the fact you can have multiple mentors that could facilitate that interest you may have”

– NISAN HUBBARD

for his mentorship and belief in my abilities, I would not be where I am today.”

Our most senior interviewees, Carlton Barbour and Craig Cameron, talked about the positive impact of more informal and sometimes very early mentoring on their career decisions.

“My maternal grandfather, who worked for Esso Research and Engineering, sparked my interest in science,” Barbour said. “His passion for science and engineering was obvious, and his efforts to expose his children and grandchildren to science were never-ending. I was also influenced by my junior high school and high school science teachers who made exploring scientific principles fun. My sister’s career path (in biochemistry and molecular biology) also influenced me to pursue science as a career.”

Cameron shared: “I have been blessed with having mentors, from my fellow graduate students and research supervisors to my committee members and department heads. Without positive people and positive environments, my minority status could have easily disincentivized my pursuit of science and being a scientist.”

Barbour gave a specific example of the benefits of attentive mentoring. “Early in my career, I hesitated to take leadership roles on the projects assigned to me,” he said. “Fortunately, I worked for a supervisor who

recognized my talent and worked to ensure I developed and used the skills I needed to lead ... My company demonstrated their trust in my judgment by assigning the technical recruiter role to me.”

Science versus medicine

Another theme throughout the interviews was the participants’ decisions to pursue science versus medicine and, for some, whether to choose academia as a career path. Again, access to mentors and role models emerged as a significant determinant.

Describing one of his earliest mentors, Hubbard said, “He was the guy who taught me that there is more to science than medicine, and he helped open my eyes to the many facets of what biology is.”

Barnes described the evolution in his thinking while studying chemistry as an undergrad at the University of North Carolina and pharmacology as a graduate student at the University of Pittsburgh. “My choice to major in STEM-related disciplines was driven by my desire to become a doctor as well as to feed the curiosity bug that gripped me throughout my childhood,” he said. “However, it wasn’t until I entered college that I realized the word ‘doctor’ doesn’t necessarily just mean an M.D., but also a Ph.D. As a research scientist, I realized that I could explore the world for a living,

AFRICAN-AMERICAN MEN IN THE MOLECULAR BIOSCIENCES — A THREE-PART SERIES

The three articles in this series will explore the experiences of African-American men in the molecular biosciences through interviews with five men at various stages in their careers, including two students, two faculty members and a researcher in the biotechnology industry.

The careers of these five men span nearly four decades when taken together and include experiences in academia, industry and consulting. Although each has had unique experiences, the commonalities in their stories provide insight into the challenges and opportunities facing African-American men in the molecular biosciences. This series is an exploration of their lived experiences, hopes for the future and advice to the next generation of African-American men who aspire to careers in the molecular biosciences.



HUBBARD

NISAN HUBBARD, a doctoral candidate at Northwestern University, is completing a Ph.D. in reproductive biology. He is one of 14,354 African-American male grad students in science, technology, engineering and math (representing about 2 percent of all STEM graduate students), 10 percent of whom are in the biological sciences, according to 2016 data from the Survey of Graduate Students and Postdoctorates in Science and Engineering. Only about 3,000 (about 1.5 percent) of the more than 195,000 STEM doctorate holders recorded in 2015 were African-American men, according to the Survey of Earned Doctorates.



BARNES

CHRISTOPHER BARNES is a Howard Hughes Medical Institute Hannah Gray postdoctoral fellow in Pamela Bjorkman's laboratory at the California Institute of Technology. He is one of only 477 African-American male postdoctoral fellows across the STEM disciplines, according to the 2016 National Science Foundation data. Nearly 50 percent of African-American male doctorate holders in STEM are employed in the academic sector, the Survey of Doctoral Recipients reported in 2015; however, African-American males account for only 2.1 percent of the STEM workforce in academia (and not all are tenured or tenure-track faculty).



CHANEY

JOSEPH CHANEY is an assistant professor of biochemistry at Xavier University of Louisiana, where he studies molecular nanomotors. He earned his Ph.D. at Purdue University. He is a member of the American Society for Biochemistry and Molecular Biology Minority Affairs Committee.



CAMERON

CRAIG CAMERON holds the Eberly family endowed chair in biochemistry and molecular biology at the Pennsylvania State University, and his laboratory focuses on DNA replication in positive-strand RNA viruses.



BARBOUR

CARLETON BARBOUR is lead scientist in process and analytical development at Emergent BioSolutions, a global life sciences company focused on developing and manufacturing medical countermeasures for biological and chemical threats as well as emerging infectious diseases. He is also the author's brother. According to the 2015 Survey of Earned Doctorates, 28 percent of African-American male doctorate degree holders in STEM were employed in the private, for-profit sector, representing 1.5 percent of that workforce, according to 2015 National Academy of Sciences data.

figuring out cures and answers to some of the greatest problems we face as a global society.”

Cameron had a similar epiphany in the mid-1980s when he was an undergraduate student with an interest in medicine. “My volunteering activities in the hospital provided me with a bird’s-eye view of the devastation associated with viral infection and the corresponding emotional distress caused by dealing with such events on a daily basis,” he said. “This was the beginning of the AIDS epidemic and even predated the naming of the virus. This experience made it clear to me that practical medicine was not for me but provided ample motivation for pursuit of a research career that might facilitate the discovery and/or development of antiviral therapies.”

Barbour’s lack of early experience with African-American role models in academic science shaped his career goals. “I never imagined myself as a college professor, since I did not have role models who could help me appreciate the role,” he said. “I was more interested in using science to solve the practical problems I perceived were addressed by the life sciences industry. Unfortunately, I have had few career mentors outside my graduate adviser, my grandfather, my sister and my science teachers.”

Giving back

Numerous studies provide evidence of the value that underrepresented STEM students place on altruism and helping others, so it is not surprising that the interviewees expressed interest in giving back to their communities, often in the form of mentoring. Although there were significant generational differences in their responses to questions (to be explored in future articles), interest in grooming the next generation of diverse bioscientists was a consistent theme from the youngest of the respondents (Hubbard) to the most senior (Barbour).

Hubbard wants to be a pipeline of resources and information for the future, he said. “I feel like my place in science and my experience do influence that because I find that, even when searching for opportunities, I need an aspect where I can mentor and when I can teach to pass on knowledge. I feel like this will be a duty of mine for as long as I am a part of STEM, and especially in academia where there is always a call for more diversity and people of color but not the necessary follow-up to get to a point where we are seeing the needle move significantly.”

Barbour said he believes it is important to serve as a role model and an example of a successful African-American male scientist. His technical

recruiting role provided an opportunity to be active in the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers and to demonstrate leadership and organizational skills that his technical position did not exploit, he said. “Once I became a successful recruiter, I considered pursuing recruiting as a career but decided to remain in a technical role.”

Taken together, all these comments underscore the importance of mentoring in the career decisions of African-American men.

Next month, the same participants provide their perspectives on the degree to which race and ethnicity have affected their career progression and the importance of career–life balance in managing this impact. Although some commonalities were expressed, interesting generational differences emerge in the five men’s views on these important issues.

Related studies

For links to research studies on diversity in science, go to asbmb.org/asbmbtoday.



Suzanne E. Barbour (sbarbour@uga.edu) is the dean of the University of Georgia Graduate School.

JBC

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Awards are given to the first authors of exceptional JBC papers that appeared in the preceding year. Students, postdoctoral researchers and faculty members who have not yet received tenure are eligible.

To nominate a young scientist who has published an outstanding 2018 JBC paper, send your nomination to George N. DeMartino, chair of the selection committee, at george.demartino@utsouthwestern.edu.

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Written a good book lately?

Are you an ASBMB member who has published a book in 2018? If so, we'd like to feature your work in an upcoming issue of ASBMB Today. Please email a synopsis (<100 words), an image of the book's cover and your headshot to asbmbtoday@asbmb.org.

ASBMBTODAY



Tips and tricks for applying for a faculty job

By Danielle Snowflack

Are you thinking about applying for faculty positions this year? Your first interaction with the faculty search committee will be through your application package, so it is crucial that you take the time to put together a polished and well-edited application.

The American Society for Biochemistry and Molecular Biology's Education and Professional Development Committee recently invited three faculty members to describe what faculty search committee members are looking for when they review your materials. Here are excerpts from the resulting webinar.

Nathan Vanderford

Assistant professor, department of toxicology and cancer biology, University of Kentucky



VANDERFORD

Before applying for any faculty position, thoroughly research the department to make sure you are a good fit. Departments often are looking to hire researchers who fill a certain research niche or are experts in a specific new technology or method, something that will complement ongoing work at the institution. Be sure to highlight these skills in your cover letter or research statement.

It is very forward-thinking for applicants to consider how they'll be mentored and how receptive they'll be to mentoring. Identify a few people within the department that you'd like to be mentored by, and use this to tailor your application package.

Dorothy Lerit

Assistant professor, department of cell biology, Emory University School of Medicine

Four questions about faculty job applications

1. What's the right number of applications to submit in a job search?

This is like a student asking how many pages a paper needs to be. The answer: As many as it takes. Apply to all the schools where you think you'd be a good fit. Do your research; if you can see yourself at that institution, apply. At best, you'll have multiple offers, and you can weigh them to determine which fits you best.

2. How much help should I expect from my adviser?

This will depend on your adviser; some are more available than others. It's important to reach out to people you feel comfortable talking to and who are going to provide meaningful feedback. Get as many people as possible to review your application; their feedback will help you put your best foot forward.

3. What kind of funding should I have when applying at a research-intensive university?

Having transition funding, whether it's through a National Institutes of Health K award or another mechanism, certainly will get your application package reviewed by the committee. However, departments may pass on individuals with funding if they are not the right fit. Conversely, if you fill a niche the department is interested in and demonstrate promise, you can get a job without funding.

4. Tell me about the typical structure and format of a chalk talk. What's expected?

The chalk talk may seem antiquated, but it is the single most critical event during your on-site visit. You are expected to share your current research, the direction of that research over the next couple of years (particularly related to funding you'll pursue) and your longer-term plans for your lab (again, focused on funding).

Universities have different requirements for the chalk talk. After accepting an on-site interview, ask the search committee about the format and then get lots of practice. To help you prepare, sign up for the ASBMB's communication training focused on creating a presentation without slides for a diverse scientific audience. Registration opens Sept. 3 at asbmb.org/commcourse.

Write a succinct cover letter (about a page) highlighting why you're applying for this position and why you are a good fit. This is a good place to highlight your top



LERIT

accomplishments and touch on your broad vision for your research and how it can be incorporated into the goals of the department.

Your research plan needs to be coherent, concise and thoughtful. For most applications, the research statement will be from three to five pages, as specified by the job posting. This is where you highlight both your short-term and long-term plans; the committee wants to see that you have not only the foresight to know what you'll focus on as soon as you get to an independent position but also a vision of how you will develop that into a career.

Richard Singiser

Professor, department of chemistry and physics,
Clayton State University

At primarily undergraduate institutions, departments are not necessarily looking for candidates to fill a research area; instead, the department looks for someone who can teach certain disciplines. Be sure to emphasize those skills in your cover letter, CV and teaching statement.

The quickest way to get your application disregarded is to apply for a teaching position in a subject you are not trained in.



SINGISER

A teaching philosophy offers you the opportunity to share what you know about education and how you want to convey material. Even if you only have experience as a teaching assistant, focus on what you've seen in the classroom and how those experiences have shaped

how you want to run your classes. Reflect on how you would actually approach teaching, since that will be one of your primary responsibilities.

Watch the webinar

Interested in learning more about what goes on behind the scenes at faculty search committees? Watch this webinar (and others) at asbmb.org/webinars.



Danielle Snowflack (dsnowflack@asbmb.org) is the ASBMB's director of education, professional development and outreach. Follow her on Twitter @drsnowflack.

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The wellness issue — January 2019

Deadline: Oct. 15

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What keeps you well?

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CLASSIFIEDS

Johns Hopkins University School of Medicine: Biological Chemistry Department Director (Chair)

JOHNS HOPKINS UNIVERSITY & MEDICINE

The School of Medicine at Johns Hopkins University has initiated a search for the position of Paul and Christine Englund Professor and Director (Chair) of the Department of Biological Chemistry. Current departmental research interests are broadly focused on better understanding fundamental mechanisms in all aspects of life sciences. The Director will provide the Department with academic, intellectual, and administrative leadership, helping to shape and advance the Department's vision of preeminence in all of its endeavors.

Candidates must have a distinguished record of scholarship, one that would be commensurate with a tenured appointment as Professor. Experience in administration is strongly preferred. Applications from candidates whose experience has prepared them to make strong contributions to diversity and inclusion in higher education are strongly encouraged.

Applicants are requested to submit brief statements of interest and curriculum vitae by October 1, 2018 to kparkent@jhmi.edu.

Fraunhofer USA Center for Molecular Biotechnology CMB: Scientist - Vaccine Formulation

Fraunhofer USA

A position is open for a Scientist to head vaccine formulation research at Fraunhofer USA's Center for Molecular Biotechnology (Fraunhofer CMB) in Newark, Delaware. Fraunhofer USA is a not-for-profit charitable organization dedicated to the advancement of research, and Fraunhofer CMB is focused on the development of technologies to improve vaccine and therapeutic design and delivery, and to advance lead molecules to the clinic. This position addresses the development of new vaccine formulations to combat infectious diseases.

Fraunhofer CMB offers a competitive salary and benefits package and is an equal opportunity employer. Interested candidates should e-mail their resume, referencing the position title 'Scientist - Vaccine Formulation' to Stephen.Streatfield@fhcmb.org

Case Western Reserve University: Chair and Professor, Department of Biochemistry

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The School of Medicine at Case Western Reserve University (CWRU) invites applications and nominations for the position of chair of the Department of Biochemistry. The institution seeks an outstanding scientist with the skills and vision necessary for developing and strengthening an innovative research program that integrates basic biochemical research with other School of Medicine (SOM) and university departments, as well as affiliate hospital programs. The new chair will be supported by a competitive recruitment package that includes substantial support for additional faculty recruitments to the department.

Applicants should submit a curriculum vitae, a letter of interest addressing research, educational, administrative and leadership goals to: Stanton L Gerson, M.D. Biochemistry Chair Search Committee, c/o Tracy Rehl (biochemistry-chair-search@case.edu).

Okinawa Institute of Science and Technology Graduate University: Faculty



Okinawa Institute of Science and Technology Graduate University invites applications for at least 2 new faculty positions as part of its planned expansion. Targeted areas for the current search include, but are not limited to, Aging, Cancer Biology, Developmental Biology, Disease Models, Epigenomics, Host-Microbe Interaction, Immunology, Organoids, and Synthetic Biology.

Successful candidates are expected to establish an active and independent program of research, to supervise Ph.D. students, to teach in the graduate program, and to perform university services as required. Generous research resources will be provided, which may be supplemented with external grants. Appointments will be Tenure-Track or Tenured. Starting date is flexible.

Application Deadline: September 30, 2018 (EDT)

groups.oist.jp/facultypositions



To see a full list of jobs, please visit asbmb.org/careers.

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Learn more about submitting your abstract.
asbmb.org/meeting2019

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