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ASBMB TODAY

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

NATIVE AMERICAN STUDENTS EXCEL AT NIH


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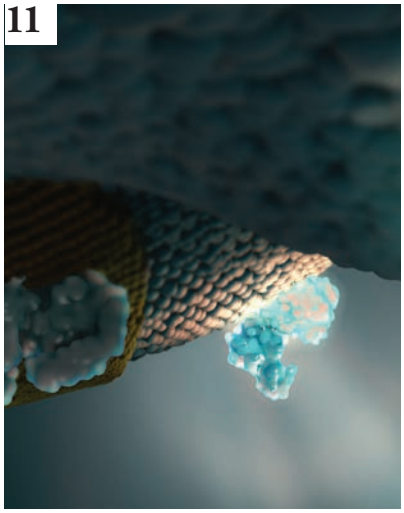

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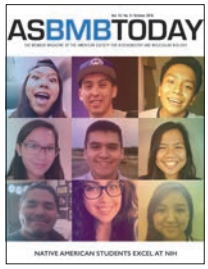

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PERSPECTIVES

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

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Gathering our community

By Natalie Ahn

Serving as president of the American Society for Biochemistry and Molecular Biology is an honor and a challenge. An honor because I grew up scientifically with the ASBMB and found my community here. A challenge because, in an era when there are gobs of scientific groups to join, maintaining the vitality of our community is among our most important goals for the future.

Since I began as president-elect a year ago, I've been in listening mode, asking researchers, mentors, postdocs, students, policymakers and anyone else who wants to talk about their views of the ASBMB.

Two questions have come up most often in these conversations.

The most common question that arises is "Who are we?" By this people mean, "What scientific scope defines our society?"

I initially found this puzzling, because I have always known that the ASBMB is exactly where I belong. But I now understand, especially when talking with younger researchers. In an era where biochemistry and molecular biology technologies form the foundation of every discipline in modern biosciences, what gives us our identity?

We are the scientists who discover the molecular mechanisms of life. The founders of the ASBMB were those who drove science beyond physiology toward a chemical and physical description of biomolecules. It was ASBMB members who discovered the fundamentals we all know about: how enzymes work, the chemistry and biochemistry of metabolic pathways, the folding and assembly of proteins, the reactions of nucleic acids and recombinant DNA technology, and the networks of signal transduction, to highlight just a few. (To see other examples, just check out asbmb.org/history/nobelprizes.)

No matter the specific system, we figure out how things work. And this is surely the frontier of bioscience as new genes emerge lacking known function and high-dimensional datasets result with accelerating speed, each creating myriad new connections between biomolecules and disease. We go beyond correlative evidence to discover new mechanisms.

New discoveries are what we all strive for. But to be creative, it is essential that we stay abreast of new knowledge and technologies. This presents us with one of our most important challenges. With the rapid pace of science, how do we stay at the cutting edge?

One way is to attend the next ASBMB annual meeting, which will focus on the mechanisms of life, in April 22–26, in Chicago. The meeting is where our community gathers each year to make contacts, exchange information, have a good time and appreciate the ASBMB's wide reach across discovery, education and advocacy, which benefits everyone.

Which raises the other question that I hear most frequently: "Why should I attend a meeting spanning broad areas of research instead of one focusing on my own specialized area?"

The answer is clear: The demand for interdisciplinary research is growing all the time. I hear this each time

I review grants: "Innovative" means integrative, not insular.

To succeed in science, you have to learn new strategies, form new collaborations and see your work from a fresh angle. At the ASBMB annual meeting, you can meet new people in other areas, fertilize your mind with their knowledge, and use this to spark new avenues in your own endeavors.

Steve McKnight, the ASBMB's past president, and I are working with the society's Meetings Committee to make the 2017 ASBMB annual meeting a must-attend gathering chock full of the latest discoveries.

You'll see exciting changes to the format next year.

Instead of having themed symposia that stretch across several days as we have had in past years, the 2017 meeting will feature 16 symposia, four concurrent ones each morning for four days. Each symposium, which is being organized by a top leader in the field, will give us fresh perspectives and integrative strategies for discovery that we all need to stay current.

An "Issues in Depth" series will feature three morning symposia, each linked by a common theme. This year's theme is "Antibiotics and resistance." It will be coordinated with a special session on new funding initiatives by the National Institutes of Health. Plus, you don't want to miss the award talks by scientific heroes who have advanced research with their discoveries and promoted education.

Poster sessions will be held on the exhibition floor. There will be networking opportunities to meet invited speakers and award winners. Importantly, we've limited concurrent programming during this time so that all eyes will be on the posters.

Speakers for the afternoon "Spotlight Talks" will be selected from volunteered abstracts. These 15-minute oral presentations will give attendees a new way to show off their latest work at the meeting.

Invigorating technical workshops will cover everything from big-picture concepts to nitty-gritty details of technologies that everyone needs to know, such as CRISPR, lipidic cubic-phase technology, drug discovery in academia, the latest innovations in proteomics, modern kinetic and equilibrium analyses, and how to glean epigenomic information from high-dimensional data.

The meeting also will offer workshops that will help you flourish as a scientist. You can learn how to write successful grants. Two of the nation's best mentors, Bill Wickner at Dartmouth College and Randy Schekman at the University of California, Berkeley will describe "how to get a life in the life sciences."

As always, the meeting will offer a full day, before the opening session, devoted to career development and professional skills training for students and postdoctoral fellows. And did I mention more than 250 travel awards will help undergraduates, graduate students and postdoctoral fellows enjoy great science?

The ASBMB annual meeting is where I presented my first public talk. The society has supported my career since, and the meeting is where I found my ever-growing community of colleagues and friends. It can do the same for you.

Please submit an abstract by Nov. 17 and join us in Chicago!

My thanks to the ASBMB Meetings Committee — Dan Raben, Andrew Kruse, Arun Radhakrishnan, Cheryl Bailey, Edgar Cahoon, Enrique De La Cruz, Evette Radisky, Florencia Pascual, Jessica Ellis, Kelly Ten Hagen, Lan Huang, Patrick Grant, Squire Booker, Takita Sumter and Yan Jessie Zhang — and ASBMB meetings professionals Joan Geiling and Danielle King.

Natalie Ahn (natalie.ahn@colorado.edu) of the University of Colorado, Boulder, is president of the ASBMB.

Vote!

By Benjamin Corb

As a 501(c)(3) nonprofit organization, the American Society for Biochemistry and Molecular Biology cannot engage in politicking, in which we encourage our members to vote for or against a specific candidate or political party. What follows is an overview of U.S. presidential candidates' positions.

In case you've somehow missed the news for the past several months, this year is a presidential election year in the U.S. The Republican nominee, Donald Trump, and the Democratic nominee, Hillary Clinton, have been embroiled in a heated campaign for months now. The finish line is finally in sight with the elections being held next month. I want to explore the candidates' views as they relate to biomedical research, because the new president will influence America's scientific agenda by establishing funding priorities and appointing directors of the National Institutes of Health, National Science Foundation and Office of Science and Technology Policy.

Clinton, who is a former secretary of state, has a record of supporting research dating back to her time as senator from New York. As a senator, she co-chaired the congressional taskforce on Alzheimer's disease. She has issued numerous policy statements on issues related to biomedical research. The statements include a commitment to find a cure to Alzheimer's disease by 2025, advocating for research in autism, HIV/AIDS and breast cancer, and support for increased funding at scientific agencies such as the NIH and NSF. She has called on Congress to fund President Barack Obama's request to combat the spread of the Zika virus. She supports an immigration policy that would offer citizenship to students in science, technology, engineering and mathematics who earn advanced degrees from accredited universities.

Trump has few formal policy statements and lacks a demonstrable record regarding support for scientific research broadly or the life sciences specifically. Like Clinton, Trump supports making research on Alzheimer's disease a top priority (although there is no specific plan on record) and also has called on Congress to pass legislation to combat the spread of the Zika virus. Unlike Clinton, Trump has suggested that the NIH is "terrible" and "has many problems," has voiced a belief in links between vaccinations and autism and supports stringent immigration policies that may affect the nation's ability to continue to attract the world's best scientific minds.

The election, of course, is about more than just who will be the next U.S. president. All members of the House of Representatives, one-third of the Senate members and 12 state governors are up for election in November. While the president sets the policy agenda for the nation, as you know, Congress controls the funding levels for all federal agencies, including the billions of dollars that go to research and development. Funding levels for the NIH, the NSF and other federal agencies that provide money for scientific research will be influenced greatly by who controls Congress and sets funding levels. Fiscal policies, such as the Budget Control Act, which enacted caps on federal spending, and the threat of mandatory spending cuts, are up for debate in the next Congress. These issues, and others, have significant effects on the research enterprise broadly and on your own laboratory specifically.

Please take the time to research all of the candidates up for election, from those vying to be president to those aiming to get on your town council, and if you're eligible, vote on Nov. 8!

Benjamin Corb (bcorb@asbmb.org) is the director of public affairs at the American Society for Biochemistry and Molecular Biology.

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Visit policy.asbmb.org.

Albany Medical Center Prize goes to Hartl, Horwich and Lindquist


HARTL


HORWICH


LINDQUIST

Three members of the American Society for Biochemistry and Molecular Biology, F. Ulrich Hartl of the Max Planck Institute of Biochemistry, Arthur Horwich of the Yale School of Medicine, and Susan Lindquist of the Massachusetts Institute of Technology, are being honored with the 2016 Albany Medical Center Prize in Biomedicine and Biomedical Research. The three researchers made fundamental discoveries related to the mechanisms of protein folding, the final step in transmitting genetic information, through which a protein structure acquires its functional characteristics.

Discoveries by the three recipients show the potential for the development of new drugs that could combat neurodegenerative disorders such as Parkinson's disease, Alzheimer's disease and Huntington's disease as well as cancer and drug resistance.

Established in 2000 by the late Morris "Marty" Silverman, a businessman and philanthropist, the Albany Medical Center Prize is awarded to scientists who have impacted significantly the field of medical research through their work. The prestigious award is one of the most valuable prizes in medicine, carrying a $500,000 prize.

The prize was presented formally in September.

De La Cruz wins Gray award

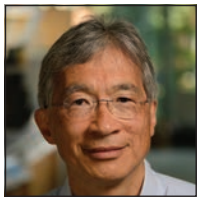

DE LA CRUZ

The Biophysical Society has announced Enrique De La Cruz as the recipient of the Emily M. Gray Award, one of the awards given out by the organization. De La Cruz will be recognized, along with the other awardees, at the society's 61st annual meeting in February.

The award recognizes excellence in biophysics education, which includes leadership in the classroom, student mentoring and public outreach. De La Cruz is a professor in the department of molecular biophysics and biochemistry at Yale University, where he has distinguished himself as an educator.

Outside of the classroom, De La Cruz works with many different scientific societies and committees. He serves on the Publications and Meetings Committees at the ASBMB and has served on the Biophysical Society Council, chairing its Nominating Committee.

Chromatin expert Wu joins Hopkins


WU

Carl Wu has joined Johns Hopkins as a Bloomberg Distinguished Professor.

Wu is considered a leading expert in the study of chromatin. Chromatin is the complex of DNA, histone proteins and associated macromolecules that forms chromosomes within the nucleus of eukaryotic cells.

Wu explored the biochemical mechanisms of chromatin remodeling at the National Cancer Institute, which he joined in 1982. In 2012, he continued his chromatin research as a senior fellow at Howard Hughes Medical Institute's Janelia Research Campus.

At Hopkins, Wu will establish a laboratory devoted to studying the structure and function of chromatin and gene expression.

Wu was elected to the National Academy of Sciences in 2006 and the National Academy of Medicine in 2010. He was honored by the ASBMB with the Young Investigator Award, formerly the ASBMB Schering–Plough Research Institute Award, in 1992.

Charpentier and Doudna win Gairdner Award


CHARPENTIER


DOUDNA

Emmanuelle Charpentier and Jennifer Doudna are recipients of the Canada Gairdner International Award "for development of CRISPR-CAS as a genome editing tool for eukaryotic cells."

Established in 1959, the Canada Gairdner International Awards are the most prestigious Canadian medical awards and recognize novel biomedical research. The award is valued at 77,804.66 in U.S. dollars.

The award is further recognition for Charpentier and Doudna's groundbreaking genome-editing tool CRISPR-Cas9, which has proved to be an exciting new biomedical technology that enables scientists simply and precisely to manipulate parts of the genome.

Charpentier is the director at the Max Planck Institute for Infection Biology and a professor at

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Umeå Unversity. As co-founder of CRISPR Therapeutics, Charpentier is developing this new technology to be applied for a wide range of biomedical purposes.

Doudna holds the Li Ka Shing chancellor's chair in biomedical and health sciences and is a professor of molecular and cell biology and of chemistry at the University of California, Berkeley. She is also an investigator at the Howard Hughes Medical Institute.

Both Charpentier and Doudna were named in Time magazine's 100 most influential people in the world in 2015. The researchers most recently were honored for developing this new technology with the 2016 Tang Prize in Biopharmaceutical Science.

—By Erik Chaulk

Coorssen to head Brock faculty of graduate studies

COORSSEN

Jens R. Coorssen has been appointed dean of the faculty of graduate studies at Brock University in Ontario, Canada. Coorssen completed his undergraduate and master's degrees at Brock University before earning his Ph.D. at McMaster University. He returns to his alma mater after an international career that has included appointments in Canada, Germany, the U. S. and most recently the Western Sydney University School of Medicine in Australia, where he served as chair of molecular physiology and head of the WSU Molecular Medicine Research Group. Coorssen's research uses systems biology, lipidomics and proteomics approaches to understand the mechanisms underlying exocytosis and diverse health issues, including central nervous system injuries, multiple sclerosis, memory deficits and preterm labor.

—By Melissa Bowman

In memoriam: Ezio Anthony Moscatelli

MOSCATELLI

Ezio Anthony Moscatelli, a professor at the University of Missouri–Columbia, died on June 2, 2015, at the University of Missouri Hospital. He was 88.

Moscatelli was a faculty member at the University of Texas at Austin and at the Missouri Medical Institute in St. Louis before arriving at the University of Missouri–Columbia, where he was a professor in the biochemistry department.

Beloved by the community, Moscatelli left a profound impact on his students, as he was one of the inaugural recipients of the William T. Kemper Fellowship for Teaching Excellence in 1991.

He is survived by his companion, Donna Becherer, and his son, Peter Moscatelli.

In memoriam: Marie T. Hakala-Zakrzewski

Marie T. Hakala–Zakrzewski died Jan. 16 at the Ives Hill Retirement Community. She was 97.

After obtaining her Ph.D. in biochemistry at Duke University, Hakala–Zakrzewski worked in the department of pharmacology at Yale University, where she met her future husband, Sigmund F. Zakrzewski. She later moved to Roswell Park Cancer Institute in Buffalo, where she worked until her retirement in 1987.

Hakala–Zakrzewski's research focused on basic studies of all aspects of chemotherapy; she published nearly 100 research papers through the course of her career.

—By Erik Chaulk

Sidney Fleischer (1930 – 2016)

By Jan Read

Sidney Fleischer, a molecular biologist famous internationally for his work on calcium and the discovery of the ryanodine receptor, is remembered as a "true giant" in his field who worked along with his wife to advance the field of cell signaling.

Fleischer died May 27 at his Nashville home at the age of 86. He retired from Vanderbilt University in 2002 as professor of biological sciences, emeritus, after a 45-year career, which included 38 years at Vanderbilt.

The discovery of the ryanodine receptor, a class of intracellular calcium release channels that plays a key role in triggering muscle contraction, has allowed scientists in multiple disciplines to make other discoveries in uncovering links to human diseases, such as sudden cardiac death, malignant hyperthermia and central core disease.

"The field of biological sciences just lost a true giant, a mentor, a great thinker and a true scientist," said Vernat Exil, who collaborated with Fleischer as an assistant professor of pediatrics at Vanderbilt from 2000 to 2014. Exil is now chief of pediatric cardiology at the Children's Hospital Heart Center at the University of New Mexico. "He was a kind-hearted and brilliant man with a great story to tell. He will be missed."

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PHOTO COURTESY OF VANDERBILT UNIVERSITY

Sidney Fleischer in the lab in 2002 with researcher Dong-Sheng Cheng.

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Fleischer's research made major contributions to furthering the understanding of how cells regulate calcium through an extensive body of work on the sarcoplasmic reticulum, a system of membrane-bound tubules that surrounds muscle fibrils, releasing calcium ions during contraction and absorbing them during relaxation, particularly in heart and skeletal muscles.

Fleischer was born in Brooklyn, New York, in 1930. His parents were Jewish immigrants from Poland. He earned a chemistry degree in 1952 at the City College of New York, where he met fellow student Becca Patras. The two then earned Ph.D.s from Indiana University. Ludwig "Lenny" Brand, a fellow graduate student at Indiana, remembered Fleischer as the "most brilliant student in the group." Brand, now an emeritus professor of biology at the Johns Hopkins University, added: "His passing is a great loss to the scientific community, and I have lost a very good friend."

Fleischer and Patras then joined the Institute for Enzyme Research at the University of Wisconsin, Madison. Fleischer was named assistant professor in 1960, and he and Patras married in 1962. Fleischer was recruited to Vanderbilt in 1964 by Oscar Touster, the first chair of the department of molecular biology in Vanderbilt's College of Arts and Science and Graduate School.

Fleischer joined the department as an associate professor and was named professor in 1968. Becca Fleischer developed independent recognition as an expert in the function of the Golgi complex, which would earn her a position as research professor in 1989. As a research team, Fleischer and his wife co-authored many publications.

Throughout the years, Sid Fleischer issued invitations to join his lab to scientists, students and postdoctoral research associates from all over the world. "In 1964, while there was a growing movement for diversity at Vanderbilt, many people recruited students either internally or regionally," said J. Oliver McIntyre, research professor of radiology and radiological sciences and cancer biology, who collaborated with Fleischer for nearly two decades. "Sid actively recruited for diversity in his lab. He had graduate students and postdocs from all over the world, including outstanding scientists and students from around the United States. He wanted these students to have the opportunity to study in America, and he wanted to expose Vanderbilt students to international faculty. He and Becca were very attached to their students, and every Thanksgiving they had a big party at their home."

Fleischer's lab published more than 580 articles, abstracts and reviews. In addition, he was the editor or co-editor of 25 books, including 20 volumes of Methods in Enzymology.

In 2002, Sid Fleischer, who then also had a secondary faculty appointment in pharmacology, led a team of researchers who developed a new strain of mouse that exhibited cardiac hypertrophy — an enlargement of the heart similar to that which causes heart failure in millions of Americans each year — that helped explain why men are subject to this fatal condition while women are spared until menopause. By genetically engineering the mice, the team was able to knock out a gene that expressed a protein involved in the release of calcium ions into heart cells. Regular spikes in calcium concentrations within cardiac muscle cells cause the heart to beat.

The knockout mice exhibited sex differences in the development of cardiac hypertrophy similar to those in humans. The male mice developed enlarged hearts, but the females did not. However, when the females were given a drug that blocked the female hormone estrogen, their hearts enlarged as well. The research was reported in the journal Nature.

Fleischer's lab published more than 580 articles, abstracts and reviews. In addition, he was the editor or co-editor of 25 books, including 20 volumes of Methods in Enzymology. Becca Fleischer served as co-editor on 13 of those volumes.

During his extensive and productive career, Sid Fleischer also was active as a member of the National Institutes of Health and the American Heart Association, as a chair and lecturer at national and international research conferences and as a long-standing editorial board member of the Archives of Biochemistry and Biophysics. He served as president of the Biophysical Society from 1989 to 1990 and was a visiting professor at the University of Minnesota, City University of New York, and the University of Kaiserslautern in Germany. In 2003, he received an honorary doctorate at the University of Bourgogne in Dijon, France.

Fleischer continued his research until his 2002 retirement and afterward continued providing ryanodine receptor antibodies to the scientific community worldwide. He exercised regularly at the Vanderbilt Dayani Center and enjoyed playing tennis with friends. A music enthusiast, he had every recording made by Johnny Cash. Fleischer was preceded in death by his wife in 1994. He is survived by niece Sharon Fleischer; nephews Jay Newman, Michael Newman and Amit Fleischer; and friend Ingrid Verhamme, a research assistant professor at Vanderbilt University Medical Center.

Jan Read (jan.read@Vanderbilt.edu) is a senior director at Vanderbilt University News & Communications. This obituary originally appeared in Research News @Vanderbilt.

Philip W. Majerus (1937 – 2016)

By Elizabethe Durando

Philip W. Majerus, a renowned hematologist and professor emeritus of medicine at Washington University School of Medicine in St. Louis, died at his home in St. Louis on June 8, after a long illness. He was 79.

Majerus is best known for research showing that low-dose aspirin prevents blood clots, reducing risk of heart attack and stroke. The discovery is credited with saving thousands of lives each year.

"Phil was an esteemed colleague to many and an extraordinary mentor who was internationally recognized as a gifted and dedicated scientist," said Victoria J. Fraser, the Adolphus Busch professor and head of the department of medicine. "He will always be recognized for his unbridled passion and enthusiasm for scientific discovery and life. His commitment to ensuring rigorous and critical analysis of medical and scientific problems stimulated new lines of investigation, fostered successful careers and promoted the pursuit of excellence."

Over a career spanning more than four decades, Majerus led research that describes the way blood clots. His work studying aspirin demonstrated that platelets play an active role in clotting, overturning the long-held idea that platelets were simply passive components of blood clots.

Majerus showed that aspirin interferes with platelet activation, reducing blood vessel constriction and dialing down the cascade of events that leads clots to form. He showed that when molecules called clotting factors interact with receptors on the surface of platelets, the platelets activate and set off a chain of reactions that makes them stick to one another and to proteins that also assemble as a result of this activation.

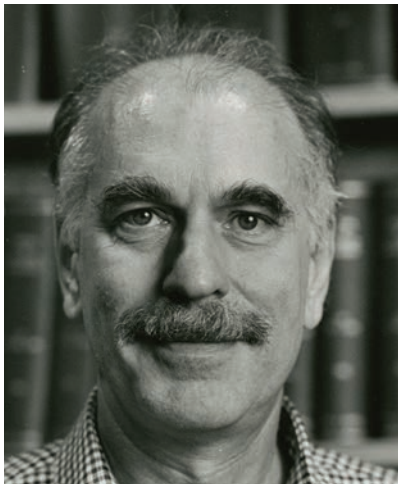

PHOTO COURTESY OF WASHINGTON UNIVERSITY

Philip W. Majerus

The work on clotting led Majerus down additional pathways, resulting in an extensive body of work understanding the inositol system, which is involved in blood clotting but also has far-reaching roles in many other cellular functions, including movement, growth, differentiation, nutrient transport and programmed cell death.

"Phil was a brilliant physician-scientist whose research has had a major impact on how we practice medicine today," said Stuart Kornfeld, the David C. and Betty Farrell professor of medicine and Majerus' longtime colleague and close friend. "His work involving low-dose aspirin and its use to prevent heart attacks is a perfect example of this. But equally important, Phil inspired generations of students and trainees with his enthusiasm, his straight talk and the rigor of his work."

Majerus joined the School of Medicine faculty in 1966 as an assistant professor of biochemistry and of medicine. He became a professor of medicine in 1971 and a professor of biochemistry in 1976 and served on the medical school faculty until 2014, when he was named a professor emeritus of medicine.

He earned a bachelor's degree in science in 1958 from Notre Dame University and his medical degree in 1961 from Washington University. He completed his internship and residency at Massachusetts General Hospital and then served as a research associate at what was then the National Heart Institute.

Majerus was a member of the National Academy of Sciences, the Institute of Medicine, the American Academy of Arts and Sciences and the American Society for Clinical Investigation. He received the Dameshek Prize for research from the American Society of Hematology.

His hobbies included skiing, running and backpacking.

He is survived by his wife, Elaine Majerus, an associate professor of medicine at Washington University; sisters Diane (Brick) Brewer and Kathy (Roby) Burke; daughters Suzanne (Rodney) Thompson, Julie Del Valle and Karen Majerus; son David (Cecily) Majerus; and four grandchildren.

This obituary originally appeared in Washington University's The Source. It was written by Elizabethe Durando.

Don't game the system — be the system

By Binks Wattenberg

Who here is tired of exchanging tales of woe about grants not funded? Most of us, I suspect. Here I will describe how a group came together to develop a plan to give lipid-related grants a fair shake while we work to increase overall funding.

Lipid researchers often feel that their grants get dinged because of a lack of expertise in lipid biology in study sections. We know that when you are an expert in a field, you have a greater appreciation for the contributions that a particular grant can make to advance the field. With this in mind, colleagues and I started an initiative to ensure that grants with a lipid focus get the expert review that they (and all grants, really) deserve.

It is lost in the mists of time exactly when and where the idea nucleated, who was there, and why I could never get the hang of the secret handshake. But in time, a notion congealed — like a vat of warm triglyceride cooling in the breeze — that instead of kvetching about the lack of lipid expertise on the study sections, the lipid community could have a role in helping provide that expertise to the National Institutes of Health and other granting bodies.

And so the Lipid Research Division, or LRD (pronounced "lard," of course), was born. Here, I will focus on how we have leveraged the LRD to help with grant review. The effort showcases how the LRD serves as an important voice for the lipid community within the American Society for Biochemistry and Molecular Biology.

The first step was to establish a membership. The staff of the ASBMB has been phenomenal throughout this process, both in welcoming the LRD as part of the ASBMB and in providing the information technology expertise and access to their membership database that were essential. We queried the ASBMB membership for interest in joining the LRD and also included non-ASBMB members to lasso them into the ASBMB fold. We established an LRD membership list of several hundred members.

The next step was crucial. We engaged with staffers at the Center for Scientific Review at the NIH. Our pitch was simple: We want to help provide expertise, not push for more funding for lipid grants.

Several LRD steering committee members already had informally spoken with study-section scientific review officers to see if they were receptive to getting suggestions for lipid-centric reviewers. The response was overwhelmingly positive. SROs have so much to deal with. Imagine having to tell a study section full of caffeine junkies that coffee would no longer be available at the meetings. Horrors! Only slightly less onerous is ensuring that each study section is populated by the requisite expertise to review 80 grants on diverse topics using a variety of techniques. SROs do heroic duty by attending national meetings, going through meeting programs, looking through the literature and querying their contacts. They were glad for the help.

Encouraged, we went right to the top, speaking with Richard Nakamura, who is the director of CSR. He thought the idea was sound and guided us as to the qualifications they look for in reviewers and what information they could use that would help SROs find the expertise they need.

With the help of Ed Marklin, the IT wizard at the ASBMB, we used the awesome power of Survey Monkey to see who in the LRD fit the CRS's criteria. Close to 50 of the LRD membership had NIH-eligible reviewing experience but currently were not serving. This was a treasure trove of potential lipid expertise. We transmitted the list to one of Nakamura's advisers at the CSR, Christine Melchior, who since has customized the list for SROs for whom she is responsible.

We are not done. We also are thinking of granting bodies outside of the NIH, such as the National Science Foundation, Department of Defense and disease-specific foundations, that could use our list. We also know there are lipid experts out there who are eluding their NIH duties. We are tracking them down.

Which brings me to my last point, which is about participating in NIH review. The review process is only as good as the reviewers who wade through the grants. If an SRO invites you to review, even though you absolutely do not have the time, make some. Give up sleeping or eating: There is plenty of time for that after you retire. See you at study section. I will bring the coffee.

Binks Wattenberg (Brian.Wattenberg@vcuhealth.org) is an associate professor in the department of biochemistry and molecular biology at Virginia Commonwealth University.

Understanding the delayed response to antidepressants

By Lee D. Gibbs

Depression is a mental illness that affects how a person feels, thinks and handles daily activities. Antidepressants are prescribed to alleviate the symptoms of depression and help the brain process and use certain chemicals that regulate mood or stress. Unfortunately, existing medications usually require two to four weeks of use before patients respond. In a recent Paper of the Week in the **Journal of Biological Chemistry**, Mark M. Rasenick and his team at the University of Illinois at Chicago describe why antidepressants have a delayed impact.

One consistent finding in brain and some peripheral cells of patients who suffer depression is depletion of cyclic adenosine monophosphate, or cAMP. cAMP is a second messenger. Regular antidepressant treatment activates signaling pathways to cause an increase in accumulation of cAMP and transcription of cAMP-regulated genes, which include genes for neurotransmitters and growth factors, to alleviate the symptoms of depression. Antidepressants work to increase the brain's concentrations of various neurotransmitters, such as norepinephrine, dopamine, noradrenaline, adrenaline and serotonin. Researchers suggest that the antidepressants' effects may be mediated through induction of the system that generates cAMP. But they need to understand why there is a delay in clinical efficacy of antidepressant action.

Rasenick and his team used glioma cells that lacked the monoamine transport proteins, including serotonin reuptake transport proteins, which are one of the binding sites for many antidepressants. They demonstrated that in the absence of SERT, antidepressants accumulate gradually in the plasma membrane microdomains of glioma cells. Next, Rasenick and colleagues showed that a sustained treatment with an antidepressant drug called escitalopram, better known by brand names of Lexapro and Cipralex, translocated the G-protein Gαs from lipid rafts. Lipid rafts are specialized regions of the plasma membrane that have been shown to inhibit the cAMP-generating cascade. Gαs went from lipid rafts to nonraft regions of the plasma membrane in the glioma cells, which enhanced its signaling ability.

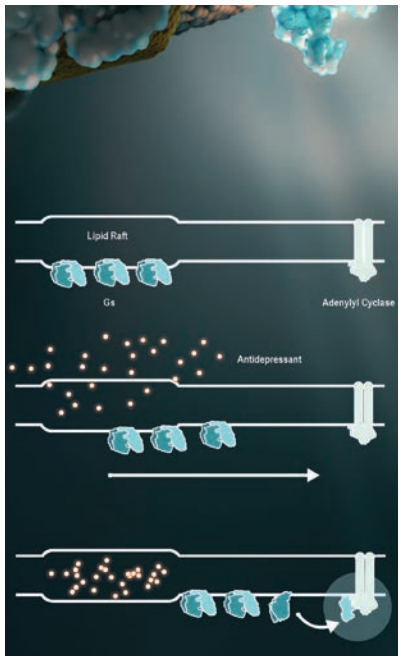

IMAGE BY MOLLY HUTTNER

Some antidepressants can accumulate in lipid rafts.

Their observation of antidepressant association with lipid rafts led them to investigate the accumulation of representative drugs from different classes of antidepressants in the lipid rafts. Their studies showed that the accumulation of drugs in lipid rafts depended on drug class. For example, only monoamine oxidase inhibitors and selective serotonin receptor inhibitors, such as escitalopram, showed association with lipid rafts over time. This phenomenon coincides with previous evidence that drugs such as escitalopram, fluoxetine and phenelzine mediate the movement of cAMP from lipid rafts to nonraft regions of the plasma membrane, while antipsychotics and anti-anxiety drugs do not.

Rasenick and colleagues further analyzed escitalopram to investigate the properties of antidepressants that preferentially accumulate in lipid rafts. The investigators tracked the accumulation of escitalopram in lipid-raft fractions from glioma cells and discovered that escitalopram gradually accumulated in lipid rafts in a concentration and time-dependent manner while its nontherapeutic enantiomer, R-citalopram, did not.

This study demonstrates that antidepressants likely have different mechanisms of action, but they all translocate Gαs out of lipid rafts. It is a gradual process consistent with delayed therapeutic effects. Furthermore, there are certain selective serotonin receptor and monoamine oxidase inhibitors that accomplish this phenomenon by accumulating slowly in lipid rafts. This discovery by Rasenick and his team has identified a novel biochemical hallmark for antidepressant action that may provide new molecular targets for antidepressant action along an accelerated timescale.

Lee D. Gibbs (Lee.Gibbs@live.unthsc.edu) is a doctoral candidate in the Molecular and Medical Genetics department at the University of North Texas Health Science Center.

Cashew compound may help to fight superbug

By Melissa Bowman

Since the 1940s, antibiotics have revolutionized the treatment of bacterial infections and greatly reduced illness and death from infectious diseases. However, the widespread use of antibiotics has led to the emergence of "superbugs" that are resistant to first-line treatments and, in some cases, to all available antibiotics. In a recent paper published in the **Journal of Biological Chemistry**, Victor Nizet of the University of California, San Diego, and colleagues showed that a compound from cashews could boost the immune system to kill drug-resistant bacteria.

According to the Centers for Disease Control and Prevention, there are more than 2 million cases of antibiotic-resistant bacterial infection in the U.S. each year, leading to more than 23,000 deaths. Among the most serious threats is methicillin-resistant Staphylococcus aureus, or MRSA, a leading cause of health care-acquired infections. To combat the growing threat of antibiotic resistance, scientists are hunting for new classes of antibiotics and immune-boosting drugs, often drawing candidates from the natural world.

A team of researchers headed by Nizet has identified an immune-boosting compound with MRSA-killing potential in extracts of cashew nut shells. Cashew nut and leaf extracts have been used as a traditional remedy for inflammation, ulcers and cancer but haven't been demonstrated to be effective in clinical trials. The active compound, anacardic acid, previously was shown to have direct antimicrobial activity.

The team of scientists found that anacardic acid provides a double boost to the function of immune cells called neutrophils, which are the body's first line of defense against bacterial infection. First, anacardic acid triggers neutrophils to release reactive oxygen species, which are toxic to bacteria, in a sudden "oxidative burst." In addition, anacardic acid stimulates neutrophils to release neutrophil extracellular traps, or NETs, which are sticky webs of DNA coated in antimicrobial compounds. Bacteria are trapped in these NETs and are killed by the antimicrobial factors.

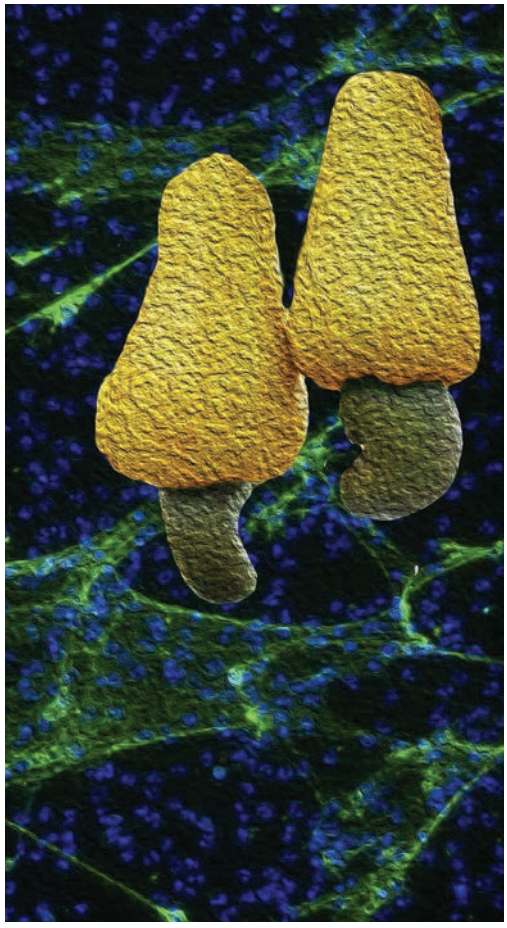

IMAGE COURTESY OF VICTOR NIZET

Neutrophil extracellular traps are sticky webs of DNA (colored green in this artistic rendering) that trap and kill bacteria (blue).

Nizet and colleagues found that neutrophils treated with anacardic acid produced more NETs and were more effective at killing bacteria, including MRSA. Drugs that work to clear infection by acting on the body's immune system could serve as important supplements or alternatives to traditional antibiotics, says Nizet, especially for antibiotic-resistant superbugs like MRSA. While anacardic acid also could kill some strains of bacteria directly, it couldn't act directly on MRSA.

There are also reasons to believe that immune-boosting drugs could be safer for patients than traditional antibiotics. Nizet explains, "Treatments that work through the immune system help preserve our microbiome, the healthy bacteria that live in our gut." Broad-spectrum antibiotics often kill good bacteria along with bad, leading to complications such as diarrhea and opportunistic infections. Overprescription of antibiotics also has been associated with increased risks of chronic disorders from asthma to obesity.

Nizet and colleagues found that anacardic acid boosts neutrophils by interacting with receptors on the cells' surface called spingosine-1 phosphate receptors, which set off a cascade of internal reactions in the cell called the PI3K pathway. This discovery could make it easier to design new drugs that mimic or strengthen the effect of anacardic acid on the immune system. In the near future, such immune-boosting drugs may provide a critical alternative to antibiotics in the fight against emerging antibiotic-resistant superbugs.

Melissa Bowman (mbowma14@alumni.jh.edu) is a scientist and health policy communicator in Washington, D.C.

Targeting semen amyloid fibrils with a small molecule to reduce HIV infectivity

By Courtney Chandler

The human immunodeficiency virus, which attacks the immune system, affects more than 1.2 million people in the U.S. There aren't any vaccines or cures. Instead, microbicides are used to help protect against the transmission of HIV from person to person. However, the process of transmission isn't understood fully and can involve both viral and human factors that promote infection.

In a recent paper published in the **Journal of Biological Chemistry**, Nadia Roan of the University of California, San Francisco, and George Makhatadze of Rensselaer Polytechnic Institute described a small molecule that prevents a specific human factor from increasing the ability of HIV to cause infection.

Researchers know that the virus itself has many factors that help it infect new hosts. There are also human factors that play a role in the transmission of HIV and a person's susceptibility to infection. One of these factors is the ordered accumulations of misfolded proteins called amyloid fibrils. These fibrils occur naturally in human semen and have been shown to increase HIV infectivity and decrease the effectiveness of anti-HIV microbicide treatments.

The infection-promoting fibrils have been observed in the semen of both healthy and HIV-infected men. Therefore, researchers want to identify compounds that disrupt the formation of these fibrils or rid them of their infectivity-enhancing properties and reduce the sexual transmission of the virus through semen.

The investigators, led by graduate student Josie LoRicco of Rensselaer Polytechnic Institute, used a screen of small molecules to identify compounds that altered the properties of specific amyloid fibrils in semen. One molecule that came out of the screen, gallic acid, further proved to be capable of reducing HIV infectivity in the presence of semen. "Gallic acid is a small molecule found naturally in many foods, including grapes and tea," says Makhatadze.

LoRicco, Roan, Makhatadze and colleagues further investigated gallic acid's properties. They used atomic force and confocal microscopies in addition to several quantitative assays to characterize the interaction between gallic acid and the fibrils. Surprisingly, gallic acid did not induce disassembly of the fibrils but instead bound to their surfaces.

The investigators conducted biophysical analysis of fibrils' surface properties to understand the nature of the interaction. They demonstrated that gallic acid limits the ability of semen fibrils to enhance HIV infection by binding to the fibrils' surfaces and neutralizing their surface charge. Additionally, the gallic acid-coated fibrils prevent the formation of new amyloid fibrils by binding the precursor components and changing their charge characteristics.

"Gallic acid appears to do two things," explains Makhatadze. "First, it inhibits new fibril formation. Second, it interacts with pre-existing fibrils and renders them incapable of facilitating HIV infectivity."

The investigators suggest that gallic acid may be a useful addition to multicomponent microbicides that target both viral and human factors involved in the promotion of HIV transmission and infection. Makhatadze suggests that "such combination microbicides will be more effective at preventing transmission compared to single-component microbicides."

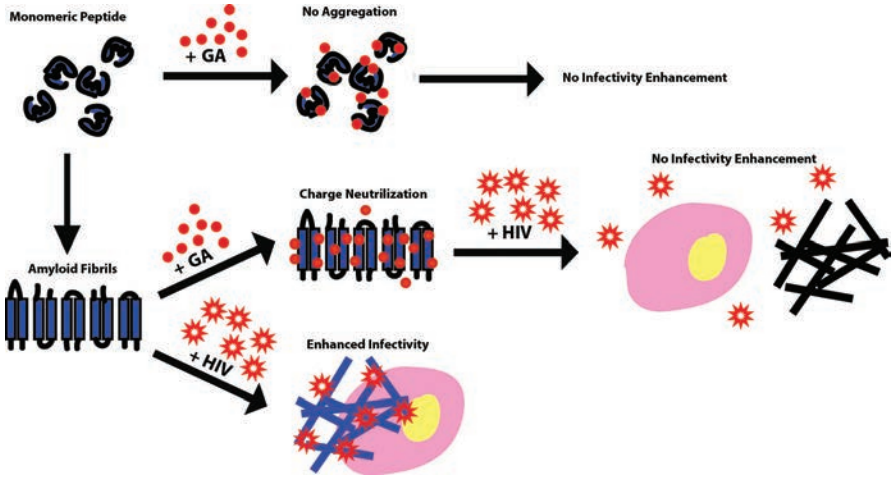

IMAGE COURTESY OF JOSIE LORICCO

Gallic acid, or GA, coats the surfaces of amyloid fibrils in semen to prevent HIV infectivity enhancement and coats the peptide precursors to prevent fibril formation.

Courtney Chandler (cochandl@umaryland.edu) is a biochemistry Ph.D. candidate at the University of Maryland, Baltimore.

WHAT'S NEW AT THE ASBMB ANNUAL MEETING?

By Angela Hopp

Whether you have attended the annual meeting for decades or plan to go for the first time next spring, you're going to want to plan ahead to get the most out of the experience. The American Society for Biochemistry and Molecular Biology Meetings Committee and the meeting co-chairs, Natalie Ahn at the University of Colorado–Boulder and Steve McKnight at the University of Texas Southwestern Medical Center, have reimagined the meeting completely after consulting past attendees, prospective attendees and symposia leaders.

HERE'S A SNAPSHOT OF WHAT YOU NEED TO KNOW:

No wiggle room with this year's deadline

If you plan to submit an abstract for short talk or travel award consideration, you must complete your submission by Nov. 17. (That's a Thursday, in case that helps.) Unlike in previous years, there will not be a deadline extension. The society will send lots of reminders, but please put Nov. 17 on your calendar.

Location, location, location

Are you sick and tired of wasting an entire day in airports and on planes to get to a meeting? Well, the 2017 annual meeting will be in Chicago. This almost-central location should allow for a little breathing room in your schedule. You might even have time for Chicago-style hotdogs and pizza, a blues show or Michigan Avenue shopping.

ASBMB '17
ANNUAL MEETING
CHICAGO | APRIL 22 – 26

Buckle up for big talks

Top-notch speakers are a staple of any solid meeting, and past ASBMB meetings have had their share of stars. Attendees, though, sometimes have had to choose between going to a great talk and some other programming. The 2017 meeting reboot solves that problem. Each morning, two ASBMB award winners will give their lectures. Those talks will not conflict with other ASBMB programming. Even better: The talks won't start until 8:45 a.m., so you won't have to skip breakfast to make it on time.

An experiment

After the big talks, four scientific symposia will run concurrently for two hours. That sounds pretty typical for an ASBMB meeting, but the distinction is in the details. The meeting co-chairs recruited 16 leaders in the field and told them to do whatever it takes to put together the best sessions they've ever led. Taking a page out of the Howard Hughes Medical Institute playbook, the co-chairs put their faith in people instead of projects.

Lunch and learn

After the scientific sessions, every poster presenter should be on the exhibition floor. The invited speakers also will be on the exhibition floor, ready to network with attendees and talk science. Poster presenters should expect significant foot traffic this year, because, by design, we've limited other events during the poster presentations. Our goals are to make the poster sessions a catalyst for communities coming together within their specific research areas to encourage professional networking and to give the posters the attention they deserve.

Show up for "Spotlight" talks

The meeting co-chairs wanted to showcase attendees' most compelling work, so they recruited two dozen scientists to evaluate all of the submitted abstracts and select speakers to give 15-minute talks. Attendees will be chosen to give short talks during 24 "Spotlight" sessions across three days. If you want your abstract to be considered for a short talk slot, you must submit it by Nov. 17. Abstracts submitted for the late-breaking deadline later in the year will be programmed only for poster presentations. The early bird gets the worm.

Work out your mind — and maybe your life too

Exciting program offerings continue into the evenings with concurrent technical and professional-development workshops. These 90-minute workshops will cover, among other things, lipidic cubic phase technology, new methods for epigenomic discovery, how to balance your work life and home life, beef up your grant writing skills, and the do's and don'ts of manuscript preparation.

For more program information, see www.asbmb.org/meeting2017.

The collage shows some of the Native American students who interned at the NIH this summer. Top (left to right): Courtney John, Skyler Bordeaux and Cole Dittentholer. Middle: JoAnne Compo, James Chief and Claire Marie Perez. Bottom: Henry Herman, Myriam Alcantar-Rama and Marilyn Franks

‘I wanted to be here and I like it here’

NIH summer program exposes Native American students to biomedical research

By Angela Hopp

About a dozen interns gathered in the sunny atrium of Building 35 on the National Institutes of Health campus in Bethesda on a blistering day in July. They were sweaty and fanning themselves after trekking under what meteorologists had dubbed a “heat dome.”

They’d spent the afternoon at the Indian Health Service, which is a federal health care provider. The interns had traveled there and back on the D.C. metro, which sometimes does and sometimes does not have air conditioning.

Some of the interns were old hands at the region’s public transportation system, having spent a few summers already at the NIH. Others were new, still learning the ropes and delighted by the subway.

All were obedient, though not necessarily eager, when Rita Devine corralled them into a small, windowed conference room overlooking the well-lighted atrium to talk.

As they rummaged through their backpacks and checked their cell phones, they grumbled a bit about practically needing an escort to breathe while at the IHS.

“Well, you guys didn’t embarrass the family name or anything?” Devine asked jokingly.

“I did!” a young man joked back.

Devine, the assistant director for science administration at the National Institute of Neurological Disorders and Stroke and one of the NIH’s internship coordinators, is used to the students’ good-natured ribbing.

She has raised two children of her own, and she sounded much like a parent as she tried to squeeze information out of the interns about their visit: “So, you met Damian? He talked to you about the scholarships? Anything about scholarships for master’s programs?”

Devine has overseen the participation of Native Americans in the NIH summer internship program for the past nine years. In 2007, she recalled, her boss told her, “There are no Natives in this program. You need to do something about that. See if you can fix it.”

So she did just that.

This summer, Native American students made up 15 percent of the summer cohort of interns at NINDS. That’s impressive given that Native Americans make up only about 1.5 percent of the U.S. population and are underrepresented in science, technology, and engineering and math careers.

Former NIH interns are beginning to make inroads in their respective fields. “Right now, we’ve got three of our youngsters in medical school,” Devine said. “One’s going to be starting this fall. And another one, who’s what we call an urban Native, who did not grow up in a reservation, is a neurosurgeon looking for a residency.”

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Happy happenstance

Devine didn't start out with a career in science training in mind. She earned her undergraduate degree in animal science from the University of Delaware in 1983. When she graduated, she needed to pay off her school loans, so she got a job as a technician in a tropical medicine lab. After that, she went to graduate school at Georgetown University, earning her Ph.D. in developmental biology in 1993. She followed that up with two postdoctoral fellowships at the NIH.

"I was going to actually start a business of my own doing microscopy, because I love to do electron microscopy," she told me. A few weeks before she finished up her second postdoctoral fellowship, Story Landis, who was the scientific director at NINDS, offered Devine a permanent job at the NIH doing part-time research and part-time administrative work.

In that position, when she wasn't at the bench, Devine was translating researchers' lab space requirements for architects and contractors.

"(Landis) needed somebody who knew the science and could talk to the (principal investigators) and who the PIs would trust as an administrator," she said.

Soon enough, Devine got involved in long-range strategic space planning, looking at where the science was going and making sure the NIH campus would be physically ready for new recruits and pursuits.

"But, like with most split jobs, you're doing two full-time jobs. I just couldn't do it," she said. She gave up the bench.

At that time, she reported to Henry McFarland, an Arizona native who led the NINDS neuroimmunology branch. When he asked her to start recruiting Native American students to the summer program, Devine wasn't sure she had the bandwidth for it. "I thought I already had too much to do," she said. But she accepted the assignment anyway with the idea that it wouldn't be too big of a deal.

Boy, was she wrong.

It starts with recruiting

Several times a year, Devine heads out to visit tribal elders at their reservations, school administrators and community groups. This summer she went to New Mexico.

She has made many connections over the years; information about the program often spreads by word of mouth. Several of the interns in the cohort this year are from the same reservation.

But it hasn't always been this way. Devine has worked hard to earn parents' and community leaders' trust. "For the first couple of years, I sold my soul several times, saying, 'I'll make sure to take care of your kid.' That seemed to work," she said.

Imagining the potential cultural minefield, I asked her how she prepared for her visits and, in particular, if she'd read any books.

"I haven't read that book, but I probably could write that book," she quipped.

Indeed, missteps were inevitable. Once, she tried to persuade a tribe in Maine to meet with her, but they refused her invitation.

"I couldn't understand it. I'd gone all the way up to Maine to try to visit with them, and they wouldn't see me," she recalled. "Of course, I hadn't done appropriate homework. What had happened was, in the '50s, their kids were taken from this island they lived on and were forced to assimilate in Boston. And I'm thinking, well, here I am, some white person (saying), 'Give me your kids.' Yeah, they didn't want to talk to me."

For more than a century, the federal Bureau of Indian Affairs and religious groups orchestrated the removal of Native American children from their homes and placed them in non-Native households and boarding schools so

that they would assimilate. The Indian Child Welfare Act of 1978 aimed to end this practice and gave tribes jurisdiction over custody cases, but tensions remain to this day in light of the disproportionate rate at which Native children are placed by the state into the foster care system.

In 2013, Maine officials and tribal leaders created the nation's first Truth and Reconciliation Commission, modeled after those in Africa and South America. Last year, the commission found that Native American children are five times more likely to be placed in foster care than non-Native children.

Even after learning about the past abuses and appealing to the tribe elders, Devine couldn't persuade them to allow their children to participate in the government-sponsored internship program. "They wouldn't see me. But I have overcome that with other tribes now because I learned from that," she said.

Like nothing they've ever known

The minimum age to participate in the summer program is 16. Devine acknowledges that that's pretty young but says that's intentional. She jokes that "around here you get a résumé around age 5," and there's a hint of truth in that.

Montgomery County, which houses the sprawling NIH campus and many other federal offices, is one of the wealthiest counties in the nation. The median household income is more than $94,000. The NIH itself is nestled among multimillion-dollar homes.

Compare that with the Pine Ridge Indian Reservation in South Dakota, home to several of the interns, where almost half of residents live below the federal poverty line.

"You know, it's a tough go. The reservations are a tough place to grow up often. So we do a lot of things. We recruit them. We walk them through the process," Devine said. "The goal is to get them through high school and help get them into college — and make sure they know they have support."

The students start arriving in Bethesda in late May, and they can stay through the end of September if they want.

"They're supposed to spend at least eight weeks in the program. Sometimes, if it's literally the first time off reservation, they can't stay that long because they get too homesick," Devine said.

During their stay, they live with volunteer host families. Devine is responsible, though unofficially, for making those arrangements too.

"Initially, all the kids came to our house first, because it was a trust deal. They needed to know where they were going, and their parents needed to know where they were going," she said. "They came here, and we'd get them settled. Make sure everyone was comfortable. And then the host families would come pick them up at our house or we'd take them there."

These days, for the most part, they stay at the homes of their host families from the start. That is, if host families can be found. The housing part of the program, Devine says, is "the toughest thing to sustain." The NIH has no official role in securing housing for interns. But Devine handles it anyway.

Some host families keep the students the entire summer. Others can offer only a few weeks.

"We've been very — knock on wood — very, very fortunate. There's a lot of good people in this area," she said. "The agreement I did make with the tribal leaders when I started this was that they would not be put in apartments, hotels or dorms, because they were so afraid of the alcohol and drug issues that they wanted them put in a family setting."

Devine advertises the need for host families at religious centers, houses

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of worship and community message boards — using her personal email address to comply with NIH regulations. When too few families step up, she has been known to enlist her own family members. And, she says, "any given day in the summer, you might find a bunch of kids sprawled on my floor if their housing doesn't work out."

Once the interns are settled, they begin their NIH assignments in basic research laboratories and clinical settings.

Student experiences

Harvey Herman is a senior at Creighton University in Omaha. He's from Mission, South Dakota, the largest city in the Rosebud Indian Reservation, home to a branch of the Lakota people. This was Herman's second summer at the NIH.

For a while, Herman thought he'd like to become a physician. Last year he worked with the herpes virus at the NIH. This summer he studied exosomes.

But he was impressed this summer by the work of a guest speaker who studies neuroplasticity and works with indigenous populations. Herman said hearing about her work made him reconsider his plans.

"She and I talked one-on-one a little bit, and she helped lessen the effects of depression in some of her (patients) just by doing mind-training games that help work different parts of the brain," he said. "I thought that was pretty fascinating, because I struggle with depression, and this year it kind of killed me — like killed me a lot. And what I want to do is get a Ph.D. in psychology with an emphasis on addiction studies. I want to work back on the reservation with that, because there are a lot of addiction issues."

Myriam Alcantar–Rama is from Pine Ridge Indian Reservation. She's a sophomore on the premed track at the University of New Mexico.

This was Alcantar–Rama's third summer at the NIH. At the National Human Genome Research Institute, she's studying drug resistance in melanoma and in the lab performs Western blots on the genes SOX10 and PTEN.

Though she'd like to be a pediatrician one day, for now she's double majoring in biology and linguistics.

"My dad is fluent in Lakota, and so in my house he only speaks Lakota. So I know a lot of Lakota, and I know a lot of Spanish as well. I'm really good at picking up languages," she said.

This was the second summer at the NIH for James "Jamie" Chief, also of the Pine Ridge Indian Reservation.

Chief, a premed student at Montana State University, is helping to map GABAergic neurons in respiratory regions in adult transgenic rats in Jeffrey Smith's lab at the NINDS. "We inject these viral vectors in them, and we let them do their thing. Then we extract the brains. We do slices first, and then we stain them."

While some interns return to the same labs year after year, others, including Chief, try out new ones, which has its benefits.

"The lab I was in last year … it was pretty much just me and (the PI) in the lab, working on whatever it is we were working on that day," Chief said. "But in the lab I'm in now, it's three interns, one postbacc and like three postdocs — all in one big lab, everyone rushing around like crazy ants. It's a lot more chaotic. But it's good having the extra interaction, asking what everybody is doing, seeing what they're working on."

For first-time interns like Joanne Compo of the Yakama Indian Reservation in the state of Washington, just the idea of traveling across the country sounded a little crazy initially.

"It was weird coming here, kind of out on a limb," said Compo, who is beginning her studies at the University of Washington this fall. "It's cool to come out here and have this experi-

ence, because I would get nothing like this even miles away from home."

Compo noted that many of the interns were strongly encouraged by their parents to participate.

"I think I have a different situation than a lot of people here, because my parents didn't go to college," Compo said. "It wasn't that they weren't pushing me, but if I wasn't going to go to college or do any after-high school education, it wasn't that big of a deal. They kind of left it up to me, but I decided that I wanted to be here and I like it here."

Cherella Hughes, a senior public health major at Fort Lewis College in Durango, Colorado, also is from the Pine Ridge Indian Reservation. Both of her parents hold master's degrees.

Hughes is working in a clinical setting at the NIH and analyzes interviews with patients who are depressed and who have suicidal ideation.

"Our main focus is the 48 hours before their (suicide) attempt, but mostly want to know what happened in the 24 hours leading up to their attempt. So, like, did they have a stressful life? Did they have work issues, family issues? Did they consume alcohol or any other substances?" she said.

Hughes said she has lost a number of friends and family members to suicide. Other interns said the same.

"Every week, you know, somebody committed suicide. I was able to deal with it in my own ways. I feel very sorry for the family and anyone close to them. But at the same time, my stepfather works with suicide prevention every day. He's on call a majority of the time. So it kind of became normal for me," Hughes said. "I think that, in the end, as long as you're able to help someone in some way, then even though it's a stressful issue, I just feel like people come here to NIH because they realize they suffer from depression and they want to help others as well."

Hughes said she looks at the experience as a way one day to help those in her community, in particular youth who suffer from depression. Though suicide rates vary by tribe, the data make one thing perfectly clear: No other U.S. population loses young adults to suicide at the rate at which Native Americans do.

Though Hughes has spent four summers at the NIH, she's considering doing a two-year postbaccalaureate stint there after she graduates. Like a lot of the other interns, she's ready to get a jump on her career and isn't interested in wasting any time.

"I'm not trying to sound mean or stereotype," she said, "but I always like joke around whenever I hear that (new grads are taking time off to travel). Because we come from very low-income families, and that is such a non-Native thing to do. It's like 'I'm going to go find myself.' But I already know who I am," she said. "I think it would be great to travel for vacation …"

Devine piped up: "Cherella, what's that saying?"

Hughes paused and then continued: "'Remember who you are and what you stand for.' I think it also goes back to, like, because I grew up very traditionally Lakota, I kind of feel like I always knew where I belonged."

Extracurricular activities

Each summer, Devine schedules a number of field trips so that the interns can get the most out of the regional offerings.

They visit the Smithsonian's National Museum of the American Indian, "which they hate," she noted. They attend an American Indian Science and Engineering Society chapter meeting. They go to events on the National Mall. They present posters at scientific meetings.

Devine, with help from members of the Native scholars group at the NIH, arranges an annual tubing trip on the Potomac or Shenandoah rivers, and she and her husband invite the interns

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PHOTO COURTESY OF NIH

Rita Devine recruits Native Americans every summer.

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to spend time at their vacation home. "We have a weekend house on the river. So their host families can get a break, they come with us down there," she said.

Before summer comes to a close, Devine added, "we have a big barbecue here at our house, and all the kids are required to come." Representatives from the Society for Advancement of Chicanos/Hispanics and Native Americans in Science and AISES join them at the cookout.

Live and learn

Katherine Roche is a senior investigator at the NINDS. Her research program focuses on how synaptic proteins are trafficked to and retained at synapses. She's also the training director at the NINDS and this summer hosted interns in her lab for the first time.

"It's good to have senior people that know their way around, but it's also fun to have students, either graduate students or undergraduate students — or even high school students — because they always look at things from a fresh perspective and ask naïve questions, which a lot of times aren't so naïve," she said. Those questions make "you think more carefully about what you're already doing."

Importantly, she said, "A lot of times, students' ideas about what being a researcher are quite different from the reality." She said she hopes to instill a love of science in the interns and that she appreciates how having a diverse workforce can make science better.

"(Devine) has become so successful with the Native American outreach that it has become a very vibrant part of our training program — really, all thanks to her hard work and dedication," Roche said.

Though Devine doesn't gush about the results she has achieved, she has every right to. She said she appreciates that the interns and their families trust her and are willing to teach her about their cultures. "I find that if you're open to folks and just ask questions and make sure that they know that you want to understand and appreciate, they cut you a little bit of slack," she said.

She has learned a lot over the years, and she laughs off some of the more comical misunderstandings, like the time the Navajo interns refused to go up to the third floor of her home, where her son's room is, to play videogames because there was a mounted deer head on that floor.

"The traditional Navajo have this thing against deer. They fear they cause mental illness," she said. "The thinking is that maybe out West with wasting disease, maybe eating deer may cause mental illness."

Devine says she knows some people might think that's a silly superstition, but she thinks about how her Catholic upbringing influences her own thinking: "I believe some guy died and three days later was resurrected and walking around. It's where you come from. So I try to really think before I say stuff or assume anything."

Devine advises mentors and host families to keep an open mind.

When a group of students stayed at her house year after year, she let them burn sage (known as smudging) to purify the place of evil spirits. "I'm OK with that. Have at it! Do what you have to do," she said.

She also advises that they not underestimate the students. One thing's for sure, Devine said: "These kids are resourceful. They make my kids look so spoiled … They're very capable. And they're cool. They're cool kids."

Angela Hopp (ahopp@asbmb.org) is the ASBMB's communications director and executive editor of ASBMB Today.

Upcoming ASBMB events and deadlines

OCT

Oct. 6–9: ASBMB Special Symposium: Transcriptional Regulation by Chromatin and RNA Polymerase II, Snowbird, Utah

Oct. 13–15: Society for Advancement of Hispanics/Chicanos and Native Americans in Science National Conference, Long Beach Convention Center, booth #226, Long Beach, Calif.

NOV

Nov. 9–12: Annual Biomedical Research Conference for Minority Students, booth #701, Tampa, Fla.

Nov. 17: Abstract submission deadline for ASBMB 2017 Annual Meeting, Chicago

DEC

Dec. 1: Travel award deadline for the ASBMB 2017 Annual Meeting, Chicago

Dec. 3–7: American Society for Cell Biology annual meeting, booth #835, San Francisco

ASBMB
American Society for Biochemistry and Molecular Biology

Send my tax dollars to Mississippi

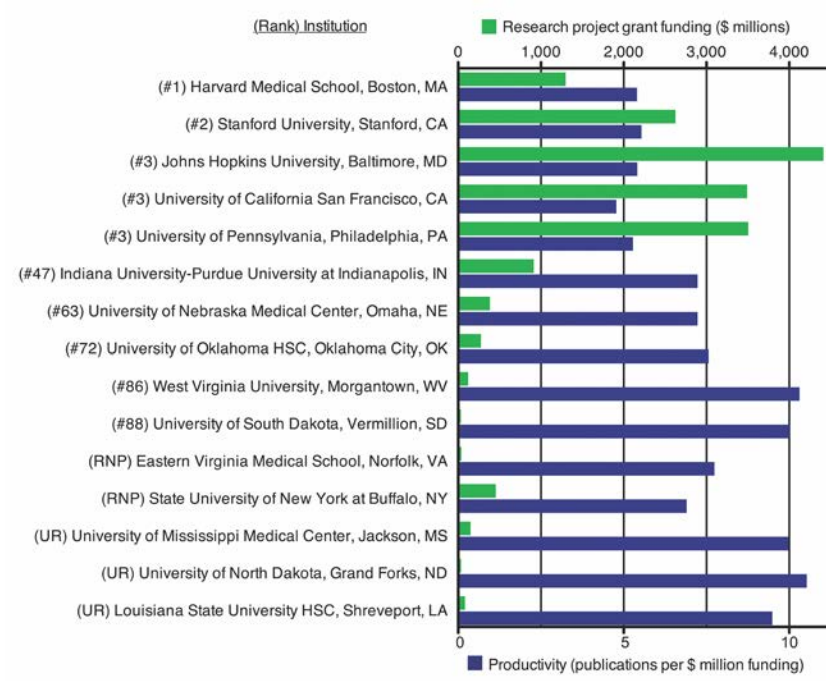
By Wayne P. Wahls

Taxpayers fund the National Institutes of Health, the NIH funds biomedical research, and benefits of that research are returned to taxpayers. Understandably, NIH officials, such as Deputy Director for Extramural Research Michael Lauer and Director of the National Institute of General Medical Sciences Jon Lorsch, are interested in maximizing the return on taxpayers' investments (1, 2).

One key challenge lies in the fact that NIH funding is allocated disproportionately to a minority of investigators, institutions and states. Lorsch, Lauer and others point out that these skewed distributions of funding lead to diminishing marginal returns on taxpayers' investments (2–6).

In Lorsch's example, using NIGMS funding data, $200,000 annual direct costs for a first R01 grant, such as one to a new principal investigator, would, on average, buy the taxpayers approximately five scientific publications during the funding period. Remarkably, the same amount of funding for a third R01 grant to an established investigator would buy the taxpayers, on average, only one additional publication.

"The choice seems obvious," said Lorsch in a 2015 piece he wrote for the journal Molecular Biology of the Cell (2). "Taxpayers net four more papers by funding the new PI than by giving the established PI a third grant." Disparities (or biases) in the allocation of funds to individual investigators can undermine the productivity of the nation's biomedical research enterprise.



FIGURES BY WAYNE WAHLS

Figure 1. Grant funding and productivity by institution (2006-2015). Institutions are listed by rank according to "Best Medical Schools: Research" (7) (RNP, rank not posted; UR, unranked). Amounts of NIH research funding and numbers of grant-supported publications are from NIH RePORTER (8) and PubMed, respectively.

The same principles apply at the level of institutions. Let me illustrate this by comparing the five top-ranked institutions to 10 arbitrarily chosen, lower-ranked institutions listed in the 2016 U.S. News & World Report rankings of "Best Medical Schools: Research" (7). The data, which are available to the public, are total research project grant, or RPG, funding (8) and RPG-supported scientific publications from 2006 to 2015 (from PubMed).

Each of the five top-ranked institutions received more RPG dollars than each of the lower-ranked institutions (Figure 1). This makes sense, given that amounts of NIH funding (total and per faculty member) were criteria used by U.S. News & World Report for rank ordering. Notably, each of the lower-ranked, less-funded institutions produced more publications per dollar of RPG funding than each of the top-ranked, highly funded institutions. Plotting the data a different way reveals diminishing marginal returns on investments relative to total funding, to mean funding per project and to mean funding per principal investigator (Figure 2).

The choice seems obvious: Taxpayers net more scientific publications by funding investigators at the University of Mississippi Medical Center (and other low-ranked institutions) than

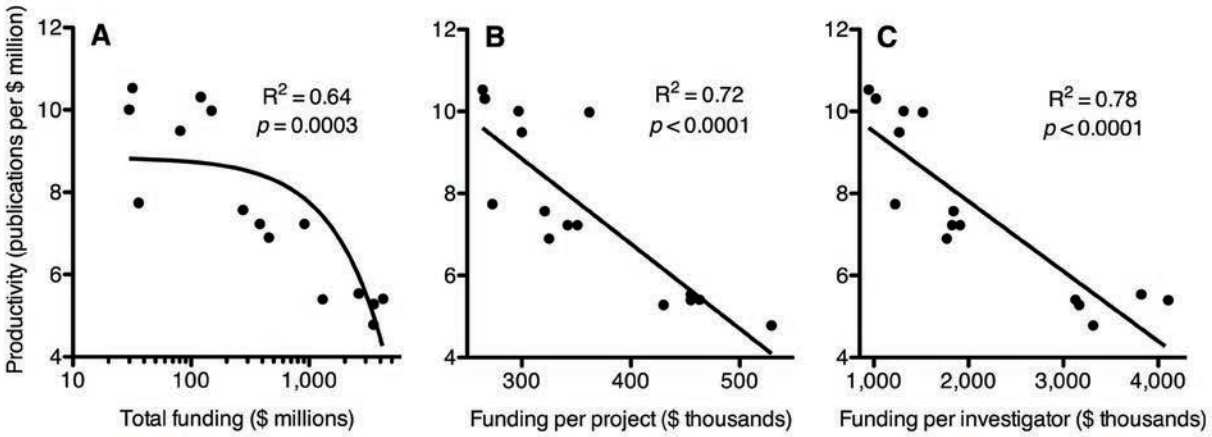


Figure 2. Relative returns on taxpayers' investments. Plots show publications per dollar of NIH research-grant funding as a function of (A) total funding, (B) mean annual funding per project, and (C) mean funding per principal investigator at each institution. Lines and statistical values (inset) are from linear regression; the curvature in panel A is due to plotting total funding on a log scale.

by giving the funds to prestigious and top-ranked institutions.

Why are quality rankings and funding allocations (to individuals, institutions and states) discordant with productivity metrics? I suspect the answer has to do with implicit bias during the allocation of funds (9). Scientists and NIH officials who review grant applications are influenced by pervasive subconscious attitudes or stereotypes that can differ substantially from quantitative realities. Even quantitative realities can be misleading. For example, perceptions about the quality of institutions based on total research funding or funding per faculty member (bigger must be better!) are flawed because they fail to normalize for the number of faculty members actually doing research. More fundamentally, such metrics provide no insight into return on investment.

We cannot eliminate subjective assessments central to grant review, journals' decisions on which manuscripts to publish, and authors' decisions on which papers to cite. We cannot avoid the implicit biases and overt perceptions that shape our subjective assessments. But we can measure and adjust for disparities and biases in allocation and outcome that stem from our subjective assessments. Cogent arguments for optimizing the allocation of funding at the level of investigators (1, 2, 5, 6) apply equally well at the level of institutions (10) and states (11). Such adjustments would mesh nicely with, and should be a key component of, NIH initiatives to address institutional and geographical funding bias and to promote the diversity, productivity and sustainability of the nation's biomedical research enterprise.

We need systematic analyses of funding versus productivity differentials by institution and of how those values compare to grant application success rates. Well-funded institutions, like well-funded investigators (12), should receive extra scrutiny. Meanwhile, I encourage the NIH to invest a greater fraction of my tax dollars in places like the University of Mississippi Medical Center, because these low-ranked institutions can provide greater returns on taxpayers' investments than prestigious institutions that currently receive a disproportionate share of NIH research funding.

REFERENCES

1. Lorsch, J.R., *iBiomagazine* http://bit.ly/1USXVmH (2015).
2. Lorsch, J.R., *Mol. Biol. Cell* **26**, 1578 – 1582 (2015).
3. Doyle, J.M., *et al.*, *Mol. Phychiatry* **20**, 1030 – 1036 (2015).
4. Berg, J.M., NIGMS Feedback Loop Blog. https://loop.nigms.nih.gov/2010/09/measuring-the-scientific-output-and-impact-of-nigms-grants/ (2010).
5. Fortin, J.M. & Currie, D.J., *PLoS ONE* **8**, e65263 (2013).
6. Gallo, S.A. *et al.*, *PLoS ONE* **9**, e106474 (2014).
7. US News & World Rep. http://grad-schools.usnews.rankingsandreviews.com/best-graduate-schools/top-medical-schools/research-rankings (2016).
8. National Institutes of Health Research Portfolio Online Reporting Tool (RePORT). http://report.nih.gov/index.aspx (2016).
9. Kirwan Institute for the Study of Race and Ethnicity http://kirwaninstitute.osu.edu/research/understanding-implicit-bias/ (2016).
10. Murray, D.L., *et al.*, *PLoS ONE*, **11**, e0155876 (2016).
11. Wahls, W.P., *Peer J.* **4**, e1917 (2016).
12. Berg, J.M., *Nature* **489**, 203 (2012).

Wayne P. Wahls (wahlswaynep@uams.edu) is a professor of biochemistry and molecular biology at the University of Arkansas for Medical Sciences. His research on meiotic chromosome dynamics is supported by grant GM081766 from the National Institutes of Health.

Accreditation, three years on

By Peter J. Kennelly

During year three of the accreditation program for baccalaureate degrees in biochemistry and molecular biology at the American Society for Biochemistry and Molecular Biology, 54 new colleges and universities joined the program.

For those who don't know about the ASBMB accreditation program, it was conceived, designed and implemented by members of the biochemistry and molecular biology educational community. All aspects of the program, from application screening and question development to exam scoring, are driven by the time, effort, ideas and community spirit of nearly 100 volunteers, who are ably assisted by a handful of ASBMB staff members. You can see how far the accreditation program has come by reading earlier reports in ASBMB Today.

The ASBMB is extremely grateful for the support of our many volunteers. It is with pride and pleasure that we acknowledge their contributions by appointing them ASBMB Education Fellows. Our 2016 appointees include:

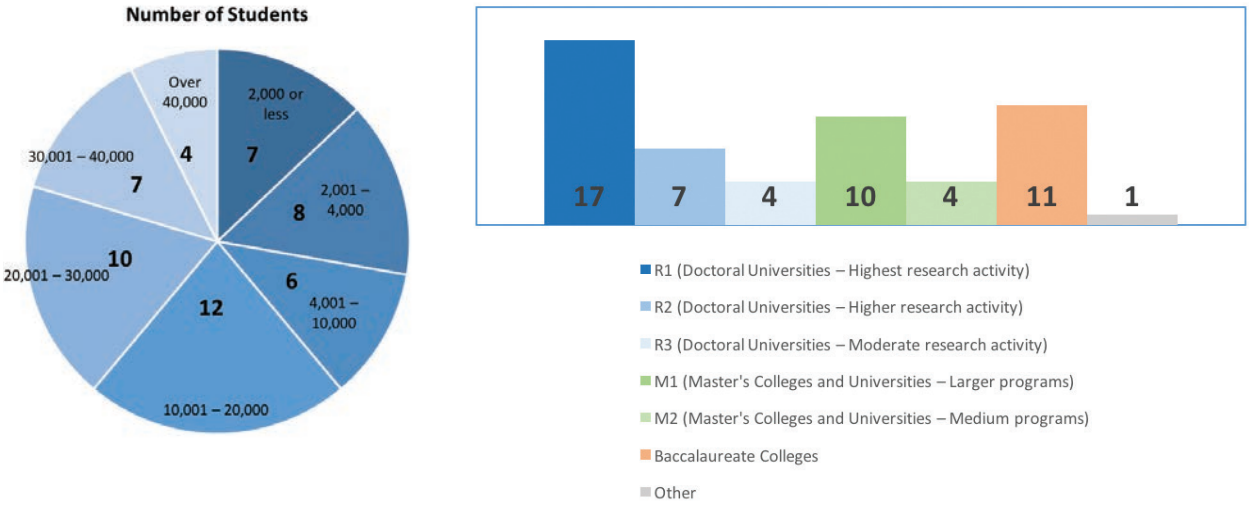
- **Paul Black,** University of Nebraska–Lincoln
- **Brian Chiswell,** Touro College
- **Cheryl Clauson**, Saint Leo University
- **Jennifer Fretland,** Takeda Pharmaceuticals
- **Margaret Kanipes,** North Carolina A&T University
- **Melissa Kosinski–Collins,** Brandeis University
- **Mary Peek,** Georgia Institute of Technology
- **Evelyn Swain,** Presbyterian College

A vehicle for independent program assessment

The ASBMB certification exam provides institutions with an independently developed and scored assessment of student performance that can be utilized for evidence-based program review and development. In addition to its intrinsic value, independent program assessment of this type is currently, or will soon be, required by regional college and university accreditation bodies.

A valuable credential for students

For students, ASBMB certification provides a credential that is performance based, national in nature and



The 54 accredited institutions encompass a broad spectrum of types (as categorized by the Carnegie classification for universities and colleges) and sizes.

Volunteers were recognized as the 2016 Education Fellows reception during the ASBMB annual meeting in April in San Diego.

independent of institutional name recognition. As the accreditation program grows and its alumni move on to graduate schools and the job market, we are confident that the visibility and value of this rigorously earned certification will continue to rise.

2016 exam

This year, 637 students from 43 accredited programs took the ASBMB's 2016 certification examination. Of these students, 232 (36.4 percent) exhibited the breadth of knowledge and the depth of critical thinking necessary to qualify for ASBMB certification of their degrees. Among those who qualified, 65 (10.2 percent) were recognized as certified with distinction.

We had planned to administer the 2016 examination online. Unfortunately, during the first day that the online version was available, a potential technical glitch was discovered that caused us to shut down the online version and use paper evaluations instead. We would like to take this opportunity to thank the participating programs and their students for their understanding and assistance with this last-minute change.

Will the examination for 2017 be delivered online? Barring some unforeseen development, yes. We will be working with online vendors to remediate the problems we experienced this year.

Looking ahead

Accreditation is an evolving program that we are working actively to improve. The past three years have taught us much. Additional volunteers have enriched the program with new ideas and perspectives. As we look ahead to 2017, we have set our sights on constructing and validating additional questions and improving the online delivery of future assessment examinations.

Join us

The volunteers who participate in the ASBMB's accreditation program are not only vital to its success; they are stakeholders who help shape the program. For more information on accreditation, including a list of accredited schools, go to asbmb.org/accreditation/overview. To get involved in constructing future questions, scoring student responses and other activities in the program, please contact ASBMB's education department at education@asbmb.org.

Peter J. Kennelly (pjkennel@vt.edu) is a professor of biochemistry at Virginia Tech.

Stopping the tenure clock

By Peter J. Kennelly

The vast majority of colleges and universities in the United States have "stop the clock" or "tenure clock extension" policies. These policies are designed to ameliorate the impact of profound life events, such as childbirth or a serious illness, on a faculty member's progress toward academic tenure.

Although these policies are virtually universal, considerable confusion about the criteria and process by which someone can invoke a delay in the tenure-review clock exists among tenure-track faculty, their faculty peers, and — speaking as someone who served nearly 11 years as a department head — even the chairs of academic units. Moreover, while institutional "stop the clock" policies are generally similar in overall form, they may differ both in terms of the range of events covered by the policies and the mechanics of the application process. For example, some schools will allow a new faculty member to invoke a delay if promised equipment or facilities are not completed or acquired by the institution in a timely manner. Others do not recognize this contingency.

It is incumbent upon anyone with questions about eligibility for a delay in his or her tenure clock to be proactive in finding out about the specific policies and procedures in effect at his or her home institution:

Consult authoritative sources. Anecdotal information from friends and colleagues can be misleading. Don't be lulled into a false sense of security. Read the relevant section(s) of the faculty handbook, meet with your university human resources office, and especially, identify and meet with the person responsible for overseeing the review of applications for stopping the clock.

Act in a timely manner. As soon as a potentially eligible event occurs or you anticipate that one will come up, submit your application. The details will be fresh in your mind, and the timeline will show that your request is related directly to the event in question rather than a desperate attempt at a stay of execution.

Consider applying even if you feel comfortable that the event in question left you on track for meeting your original mandatory review deadline. Find out if a "stop the clock" authorization precludes the opportunity to be considered for early tenure at your institution. Also find out how long you can delay applying for a "stop the clock" on your tenure review. Determine if and how your institution informs and instructs both internal and external evaluators regarding a "stop the clock" event.

The latter is important, as research indicates that some evaluators confuse stopping the clock with a lengthening of the probationary period. Therefore, it is important that all faculty, not just tenure candidates, approach the "stop the clock" process in an informed manner.

Peter J. Kennelly (pjkennel@vt.edu) is a professor of biochemistry at Virginia Tech.

ASBMB STUDENT CHAPTERS

T-SHIRT DESIGN CONTEST

Share what being a part of the ASBMB Student Chapters means to you! All chapters can submit a T-shirt design related to biochemistry and molecular biology. The winning shirt will be sold at the 2017 ASBMB annual meeting in Chicago.

All T-shirt designs must be submitted by Nov. 1.

- T-shirts should not include any school's name
- All designs should relate to biochemistry and molecular biology.
- Designs should not be too specific to one event or institution
- Entries must be designed for the front of the shirt only

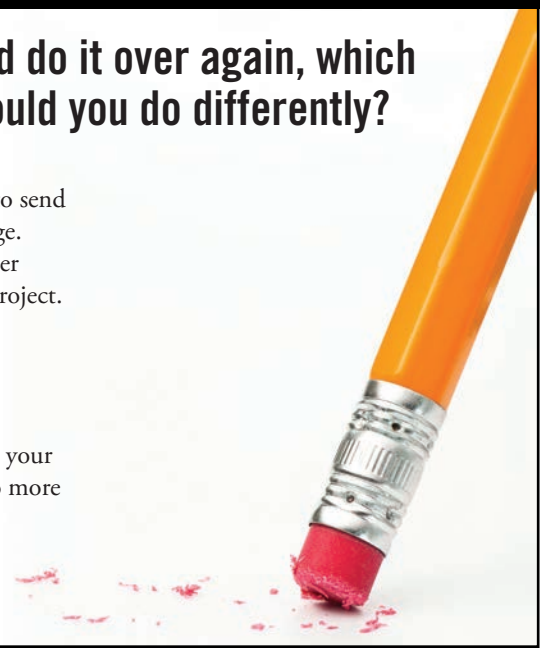
All design submissions can be emailed as JPEG (300 dpi) to education@asbmb.org
WWW.SUBSTRATE.ASBMB.ORG

The Do-Over

If you could erase a part of your life and do it over again, which part of your life would that be? What would you do differently?

For an essay series in 2017, ASBMB Today is asking its readers to send in essays about do-overs. Maybe you regretted your choice of college. Maybe you trusted someone who let you down. Perhaps you wonder what would have happened if you had picked that other research project. Whatever it is, be honest and true.

Essays must be unpublished and between 500 to 1,000 words. Submissions can be sent to **http://asbmbtoday.submittable.com/** submit under "The Do-Over." **Deadline: Dec. 1**. Please include in your essay a title, complete contact information and an author bio of no more than 50 words.



A good little girl

By Sydney Phlox

A few years ago, some paperwork was supposed to be submitted by a deadline as part of a large collaboration. I was stressing out about it. A senior collaborator mocked me for wanting to make the deadline "like a good little girl."

You know what? He was right. As a woman in science who's always done well in school, I always have been a good little girl who played by the rules. I see the same thing with the students in my undergraduate courses. Young women are very rare, but the average performance quality of the women is much higher than the average of the male students. The good female students follow the class rules, while many of the good male students do not. The good female students come to lectures, come to discussion and start their homework on time. With good male students, there are those who are "good little boys," but there are a number who really have atrocious study habits, who skip classes and then cram and bother me mercilessly right before the exam to try to make up for what they missed.

Even in my research group, the young women are uniformly the cream of the crop. They write the best-quality, well-commented code. They are more methodical and less sloppy in their research and generally follow instructions better than my male students.

With smart male students, I sometimes have to battle over the stupidest issues. Recently, I told a student to try something because the simulation wasn't working. He grumbled because he "knew" it wouldn't work; I said he had to do it anyway. Of course, it worked. I never have to put up with such crap with female students. If I ask that they do something, they go and do it; they also build upon it and develop it in different directions or augment it or try something new. There is never that step that's like pulling teeth to get them simply to do what I say. I am not saying all male students are disobedient — far from it; rather, if I have to pull my hair out because someone is obstinate, it's always a boy, never a girl.

I am sure these experiences have to do with how boys and girls are socialized. Across cultures, women are taught to be people-pleasers and to defer to authority. (Men from certain cultures are taught the latter as well, and it shows in how they respond to coaching.) The challenge is to get women to balance this deep-seated deference with speaking their own minds, developing and sharing their own ideas, and getting recognition for them.

Now, where am I going with this? Say a good little girl grows up and gets a faculty position. The good little girl is in danger of a) doing much more service than necessary, b) doing much more or more laborious teaching than the colleagues who are not good little girls, and c) generally being misinformed about what all that teaching and service really do for her career, because everyone expects her to act as a good little girl and, at the same time, thinks less of her for doing so.

I am definitely guilty of vastly overestimating how much certain service roles would benefit my career. For example, I sat on several panels by the same program manager at the National Science Foundation where I thought I eventually would get funding. I never did, and he left, so it was all just a waste of time.

Similarly, there were university awards that I felt my service on certain committees might help me get. I did get them. But when I saw my colleagues who completely eschew all service getting similar awards, I felt like I had wasted a ton of time for no good reason.

I review papers for journals because I feel that if I am to be entitled to thoughtful reviews of my own work, I should do the same for others. It turns out there are plenty of people who have high expectations for the reviews they receive but review very little themselves because they feel it's not a good use of their time. A colleague with a huge group literally laughed at me for reviewing a lot for a journal where we both publish. "You realize that's not going to help you get your own papers published, right?" he chuckled.

It is entirely possible to be very successful and completely selfish. These people are the ones who are happy to let the likes of me, the good little girls, who feel insecure about their belonging in the enterprise of science, do more than their fair share in a misguided attempt to be accepted.

Any recognition or warmth or fuzziness that your willingness to please and serve and make deadlines and generally play by the rules will produce for you, the good little girl, takes too much of your time that should instead be spent on activities that directly advance your professional agenda. If you feel excellent teaching and service are important and if you truly enjoy these activities, go ahead and do them. But please don't do more than your fair share because you think the sacrifice will benefit your

career, other than in a very small and indirect way.

Are you postponing working on your own papers or proposals, or not relaxing over the weekend, because you are constantly backlogged with service obligations and teaching? As someone who does that constantly, I am telling you: Just don't.

If you have tenure, follow this list:

• Go right this minute and put a "Not available to review" status at journals that often prompt you to review for them. Commit to rejecting all new review requests, no matter who sent them, for the next two months.

• Get off all committees that you were put on in the past month. Or the past six months. Cite a scheduling or personal conflict. Apologize profusely.

• Stop attending faculty meetings till the end of the semester. Cite a scheduling or, better yet, a research-related conflict.

• Write down (or pull up, if you have it already) a list of all papers you have in the works with your students, and write a revised, accelerated timeline for the submission of each. Meet with students at least once about each of those papers in the coming two weeks.

• Write down (or pull up, if you have it already) a list of all proposals you have in the works and write a revised, accelerated timeline for the submission of each.

• Decide on a small number of work trips you will take each year.

• Commit to two months of no work email on the weekends. (It can be done, or so I hear.)

• Commit to two months of reading one nontechnical book per week. (Or running. Or yoga. Or blogging. Or anything that you can do just for you.)

• Vouch never again to miss out on family fun (or quality time with your dog/marathon/whatever) because of stupid service.

People seem not to realize that good little girls become awesome grown women. Even the women seem occasionally to forget it. We could and should be just as self-centered as any mischievous little boy.

Sydney Phlox (sydney.phlox@gmail.com) is the pen name of a professor in a physical science field at a major research university in the U.S. Phlox blogs at http://xykademiqz.com, where this piece originally appeared on March 26, 2016. Phlox's book "Academaze" was published in 2016 by Annorlunda Books.

Staff scientists in the workforce

By Wes Sundquist & Bob Matthews

In this essay, which is part of the series entitled "Making the case for changes," we highlight the need for accurate data on the roles, funding and contributions of staff scientists within the U.S. biomedical research enterprise. In February, the American Society for Biochemistry and Molecular Biology Public Affairs Advisory Committee held the ASBMB Sustainability Summit meeting. One important outcome of the summit is that we have been urging the National Academy of Sciences to include a rigorous analysis of different laboratory staffing models, particularly the role of staff scientists, as the academy conducts a comprehensive study of policies affecting the next generation of researchers, as directed by the Consolidated Appropriations Act of 2016.

Although the U.S. biomedical workforce has been extremely productive, it is heavily dependent on the labor of temporary trainees — graduate students and postdoctoral scholars. This dependence has created a structural disequilibrium in which increased public funding of research leads to increased trainee numbers (1, 2). This disequilibrium ultimately may be producing significant inefficiencies, because many well-trained scientists are unable to pursue careers that take full advantage of their experimental skills.

To correct this imbalance and restore sustainability to the workforce, a number of groups have argued for greater reliance on staff scientists in lieu of trainees in academic laboratories (3). Here, we define staff scientists as academic researchers with Ph.D.s who are in nontraining, nontenure track positions, including staff members of core facilities and those who serve as senior researchers in one or a few laboratories (4). The heterogeneity of this group probably precludes any one-size-fits-all policy prescription. Nevertheless, it has been argued that shifting the composition of the research workforce toward greater reliance on staff scientists may produce a series of desirable outcomes, including savings on training, capitalizing on high-level experimental expertise, reducing personnel turnover, and attracting and retaining the highest-quality personnel. Young researchers also increasingly view staff-scientist positions as attractive career options. For example, leaders of the postdoctoral group Future of Research recommended continued creation of staff-scientist positions as one way to improve the postdoctoral experience (5). Similarly, surveys show overwhelming support for increasing the numbers of stable staff-scientist positions within the research enterprise (6).

Despite these strong voices in support of enhancing the staff-scientist position, a series of critical yet poorly understood factors surround their expanded use in academic research laboratories. One important issue is the relative costs and productivity of different laboratory staffing models. Staff scientists and technicians, which are full-time positions, must be compensated commensurate with skill and experience. Laboratories that rely

more heavily on staff scientists and technicians likely will incur higher costs on a per-capita basis than those based primarily on trainee labor. However, a number of factors must be considered in the calculation of trainee labor, including tuition, training and turnover costs. It also will be important to evaluate other factors, including the relative productivity of different staffing models; the best practices for utilizing, supporting and developing the careers of staff scientists; the numbers of staff scientists that the enterprise can and should accommodate; and the implications for overall reductions in trainee numbers. We have compiled a more complete list of issues that we believe should be analyzed, which can be viewed on the ASBMB public affairs blog, the Policy Blotter (7).

We note that many different laboratory staffing models already exist and can be analyzed. The models range from academic laboratories that rely heavily on trainee labor to laboratories that rely more heavily on permanent staff, such as the National Institutes of Health's intramural program and many domestic and foreign research institutes. We also applaud the NIH for experimenting with new programs that fund staff scientists directly, such as the new National Cancer Institute R50 Research Specialists Award (8). We are not aware, however, of any rigorous, data-driven, systematic assessment of the costs and benefits of alternative laboratory staffing models. Such data would help academic laboratory heads to determine how best to maximize productivity while minimizing labor costs, assist those considering staff-scientist positions in evaluating career paths, and aid policy makers in implementing funding mechanisms that incentivize best practices.

The ASBMB PAAC joins with other groups in endorsing the general concept that we should rebalance the biomedical research workforce toward increased reliance on staff scientists. However, we believe that choosing the optimal strategy requires more concrete and relevant data. Fortunately, the U.S. Congress recently has asked the NIH Director to partner with the National Academy of Sciences in performing a comprehensive study of policies that will affect the next generation of researchers. We have contacted members of Congress, the NIH and the National Academy of Sciences to urge them to include staff scientists in this analysis. The positive responses we have received indicate that this will happen. In short, we believe that having a better understanding of the roles, costs, benefits and best practices for staff scientists will advance biomedical research excellence and sustainability.

REFERENCES

1. Ghaffarzadegan, N., et al. *Systems Research and Behavioral Science* 32, 402 – 405 (2015).
2. Teitelbaum, M.S., *Science* 321, 644 – 645 (2008).
3. Pickett, C.L., et al., P*roc Natl Acad Sci USA* 112, 10832 – 6 (2015).
4. http://www.sciencemag.org/careers/2012/06/hidden-academic-workforce
5. McDowell, G.S., et al., *F1000Research* 3, 291. doi: 10.12688/f1000research.5878.2 (2015).
6. Powell, K., *Nature* 520, 144 – 147 (2015).
7. http://bit.ly/1TNS93v
8. http://grants.nih.gov/grants/guide/pa-files/PAR-16-025.html

Wes Sundquist (wes@biochem.utah.edu) is chairman of the ASBMB Public Affairs Advisory Committee and co-chair of the department of biochemistry at the University of Utah School of Medicine.

Bob Matthews (c.robert.matthews@umassmed.edu) is past chairman of the ASBMB PAAC and chairman of the department of biochemistry and molecular pharmacology at the University of Massachusetts Medical School.

The ASBMB Student Chapters outreach grant program

By Geoff Hunt

All outreach is local. This mantra has fueled the efforts of the American Society for Biochemistry and Molecular Biology's Public Outreach Committee since its inception. In keeping with this mantra, for the past two years, the POC has partnered with the ASBMB Student Chapters Steering Committee, known as the SCSC, to oversee the Student Chapters Outreach Grant program.

The grant program makes available up to $500 per year for individual student chapters. There are no specific instructions on how funds can be used, but chapters are required to submit detailed applications, which are reviewed by members from both the POC and the SCSC.

"A partnership between the POC and Student Chapters committee makes sense," says Universities at Shady Grove professor and POC member Ed Eisenstein. "Local (ASBMB members) have a much better understanding of the opportunities and needs of the various student chapters, while the POC has a good perspective on effective outreach activities and assessment tools in a number of environments."

PHOTO COURTESY OF UNIVERSITY OF ARIZONA STUDENT CHAPTER

Middle-school students at the University of Arizona's 2016 Summer Science Camp BlastOff!

San Francisco State University chapter adviser Teaster Baird Jr., who has served on the POC and the SCSC, agrees: "The POC benefits from the experience and established network of the ASBMB Student Chapters. The Student Chapters benefit from the concentrated focus of the POC and the expertise of its members."

PHOTO COURTESY OF MICHAEL CARASTRO

Alaina McDonnell (second from right) helps high-school students in Tampa, Fla., make DNA necklaces.

The quality of the Student Chapters Outreach Grant applications has become the program's defining feature. "The single most impressive part of the program is the diversity of outreach activities that the program supports," says Baird. "The student chapters that have applied have come up with creative and impactful ways to reach out to the greater community." (See box for examples.)

In total, the program has handed out 20 awards since 2014; the outreach activities collectively have reached more than 2,000 K–12 students in 14 states. Nearly every chapter supported by the grant program has continued its outreach efforts beyond the life of the grant, with several chapters inspired to come up with new ideas for outreach activities.

A secondary benefit has been the effect on the chapter members themselves. The grant program "has provided the opportunity to students to be truly active in our chapter and

PHOTO COURTESY OF MADELINE HANSEN

The Cal Poly-SLO Student Chapter promotes the club's science program at a California elementary school.

not just members in name only," says Wisconsin Lutheran College chapter adviser Andrew Mundt. Students help with putting together the grant applications and are involved intimately with the design and organization of the outreach activities. Several chapter members have presented their outreach activities at the ASBMB annual meeting outreach poster session. Some even have contributed articles about their efforts for publication. As Eisenstein sees it, these experiences will have an effect on the students for years to come. "Once students get involved in outreach activities, they are more likely to continue to promote and engage in them throughout their careers," he says.

Where does the Student Chapters Outreach Grant program go from here? According to Baird, "the part (of the program) that needs the most work is getting more Student Chapters to apply!" University of Arizona chapter adviser Jim Hazzard, who serves on the SCSC, agrees. "The ASBMB Student Chapters faculty advisers should make greater use of this program," he says. "I am totally amazed that these grants go undersubscribed every year and that chapter advisers do not try to obtain as much money as they can for their chapters in order to engage in meaningful outreach to their communities."

The POC and the SCSC are working on developing standardized evaluation rubrics that can be used by chapters to assess the impact of their activities. In addition, the POC is looking to work with individual chapters to develop partnerships with local organizations, such as biotechnology companies and civic groups, that will ensure that their outreach efforts can be expanded and sustained within their communities.

For more information about the grant program, including instructions on how to apply, visit asbmb.org/Outreach/Grants/StudentChapters/. The next deadline to apply for grants is Nov. 15.

Geoff Hunt (ghunt@asbmb.org) is the ASBMB's public outreach manager. Follow him on Twitter at twitter.com/thegeoffhunt.

Examples of outreach activities supported by the Student Chapters Outreach grant program:

• University of Arizona chapter's "Camp BlastOff!"
An annual, weeklong summer camp for middle-school students in which chapter members lead attendees through a series of hands-on science experiments

• Marymount Manhattan College chapter's "Give Us Your Organs"
Chapter members help organize an organ donation awareness drive that registers organ donors

• Otterbein University chapter's "Starry Night"
This annual STEM-themed festival in Westerville, Ohio, features a hands-on biology activity booth organized and run by chapter members

• Wabash College chapter's "Science Club to Science Club Initiative"
Chapter members take part in a series of regular visits with a local elementary school science club to provide hands-on biology demonstrations

• Wisconsin Lutheran College chapter's "Synthetic Biology Camp"
A weeklong summer camp organized by chapter members provides immersive learning about synthetic biology

More examples can be found at asbmb.org/Outreach/Grants/StudentChapters/Recipients.

Pointers for those curious about careers in industry

By Rajendrani Mukhopadyay & Angela Hopp

This is the last article in a three-part interview series with Kenneth I. Maynard of Takeda Pharmaceuticals International Inc. about what it takes to launch and propel a career in the pharmaceutical industry. The first piece appeared in the August issue of ASBMB Today and gave tips on how to begin looking for industry positions. The second part appeared last month and discussed how a trainee can best prepare for a career in industry. This third part delves into the differences between doing research in academia and industry.

Maynard previously worked for Sanofi, Aventis Pharmaceuticals, Massachusetts General Hospital and Harvard Medical School. He is a member of the National Institutes of Health Common Fund's External Scientific Panel for the Broadening Experiences in Scientific Training program. This Q&A has been edited for length, style and clarity.

What are some considerations for working in the pharmaceutical industry that may not be obvious to those working in academia?

You get to collaborate with top scientists and clinicians. World-class scientists are frequently interested in how their work could help the advancement of medicine and the treatment of patients. Many world-class scientists develop consulting

MAYNARD

relationships with companies. Through these consultancies, the scientists within these companies sometimes have direct access to discuss or collaborate with top-notch scientists.

You don't need to write grants, but you still have to sing for your supper. For startup companies, much time is spent seeking funding to move the science or technology forward, at least in the beginning. You may spend much of your time writing Small Business Innovation Research and Small Business Technology Transfer grants to the National Institutes of Health as well as presenting and trying to convince various organizations, such as venture capital firms, angel investors and health care and technology startup accelerators, to fund your idea and company. In big pharma, you probably will not need to do that, but areas of interest within a big pharma company can disappear quickly purely due to business reasons. You are secure as long as it makes good business sense to continue funding R&D efforts in an area, but, once it becomes a financial drain on the company, it is not long before transformation hits and the area or indication can be de-emphasized.

You get a whole new world of career options. One thing that I was completely oblivious to while in academia was the number of career options in the pharmaceutical industry. Bench scientist, clinical scientist and group leader are probably well-known positions, but there are also scientific/medical writing, program management, marketing, market access, regulatory, outcomes research, intellectual property, business development — the list goes on. Once you get into big pharma, there are many options, including staying with a scientific or clinical path or pursuing a management or even a business path.

Benefits can be extensive. Financial benefits can be significant. However, there are innumerable other benefits, including career enrichment and recognition incentives; health screens; opportunities for your children, such as scholarships and cultural exposure in foreign countries; and access to a subsidized cafeteria. You get regular performance reviews. Individual development plans include promotion strategies and sometimes even tuition reimbursement for graduate degrees, such as MBAs.

In larger pharmaceutical companies, retaining top talent, reducing absenteeism, enhancing morale to help improve performance, productivity and efficiency, and promoting the company image in the eyes of society are important company goals. Employees sometimes can reap huge benefits from programs dedicated to addressing these aims. Employees are being offered flexible working conditions, which could include working from home, adaptable hours and work rotations. If you accept a position at a pharmaceutical company, typically it will offer a relocation package to help you move your family and household

items if your home is more than 50 miles away from your place of work. Depending on your level of seniority, these packages can be quite extensive and even include help for your family to find schools for children and opportunities for acclimatization into a new community. Other personal benefits may be available, such as on-site nursery and day care facilities that are subsidized. In a building where I once worked, there was a full cafeteria, postal services, a fully furnished gym with various classes at low cost and incentives to join (free Fitbits!), a bank and a big-chain drugstore. You almost did not need to leave the building!

Larger companies sometimes offer time off to employees to help those in need independently or working with traditional national charitable organizations. For those for whom charitable giving is important, many companies match your giving up to several thousand dollars. I doubt that most people realize that many pharma companies do extensive philanthropic work, especially when there are natural disasters. They respond with drugs, logistics and funds that amount to several millions of dollars sometimes even for one event. Frequently, the employees of the company are the ears, hands and feet on the ground to help those in need.

Because of the need to keep employees motivated and to respond to their needs, time off can take many forms, not just for charitable purposes. Vacations are encouraged. Sometimes, a certain number of unused days can be rolled over to the next year so that you don't lose all your vacation days if you are particularly busy one year. Your vacation allowance typically also increases based on loyalty, so the longer you are with the company, the more vacation days you receive. There is not only maternity but also paternity leave, time off for bereavement and floating holidays to allow you to make unplanned doctor visits or to deal with emergencies.

Two big challenges for academic principal investigators are funding and overcommitment. What are the biggest challenges for industry PIs?

As I said earlier, funding is a challenge for startup and biotechnology companies.

Productivity is the key challenge both in academia and in the pharmaceutical industry in order to be successful. With the current exorbitant costs of R&D and high failure rates along the R&D cycle, delivering drugs in a timely manner is critical for every company. At least part of the reason for company dissolutions and mergers is failure to send drugs to the market quickly enough to pay for this high cost of R&D. This pressure is passed along the R&D cycle at every step. If programs do not advance, they can be cut. If areas of R&D have high failure rates, then entire R&D sectors within a company can be cut, transformed, outsourced or approached in some other manner, including external innovation approaches.

From a scientific perspective, reproducibility in R&D can be challenging. It is exciting to find a novel approach in science. But reproducing these findings is important, because without reproducibility there is little confidence in moving forward with a project, as there is too much at stake in terms of resources. Reproducibility of results in terms of safety and efficacy is paramount, both from the company perspective and from a regulatory perspective. Consequently, safety studies typically are done in at least two different species of animals. A potential drug must be shown to be safe, tolerable and without toxicity before being allowed approval for testing in humans. Without this high level of reproducible scrutiny, compounds do not make it to clinical testing in humans. With regard to efficacy, reproducibility in the clinic is achieved both in phase II during so-called proof-of-concept studies and phase III studies, which are often done as two studies to show convincing and reproducible efficacy in humans.

The capacity to show translation of scientific results from animal models to patients is another significant challenge for industry PIs. In order to test hypotheses before entering clinical studies in humans, much work needs to be done in animals, including obtaining convincing safety and efficacy data. The ability to show that our research results in animals translate to what we find in clinical development in humans is a major hurdle. It is responsible for high failure rates in phase I and phase II trials, which focus primarily on safety and efficacy in humans. There is much pressure on both scientific and clinical PIs to show convincing data to support translatability in the pharmaceutical industry.

Any final thoughts?

There are many benefits and challenges for both academic and industry PIs. Any decision to transition from academia to industry needs to be very carefully, strategically and intentionally thought through. Ultimately, the question is not whether you should work in the pharmaceutical industry or not. The decision to pursue a career in the industry, similar to the consideration of a career in academia, should be, in my opinion, based on what it is you are passionate about and what contributions you wish to make. Answer that question first, and the rest becomes easier.

Rajendrani Mukhopadhyay (rmukhopadhyay@asbmb.org) is the managing editor for ASBMB Today. Follow her on Twitter at twitter.com/rajmukhop.

Angela Hopp (ahopp@asbmb.org) is the ASBMB's communications director and ASBMB Today's executive editor. Follow her on Twitter at www.twitter.com/angelahopp.

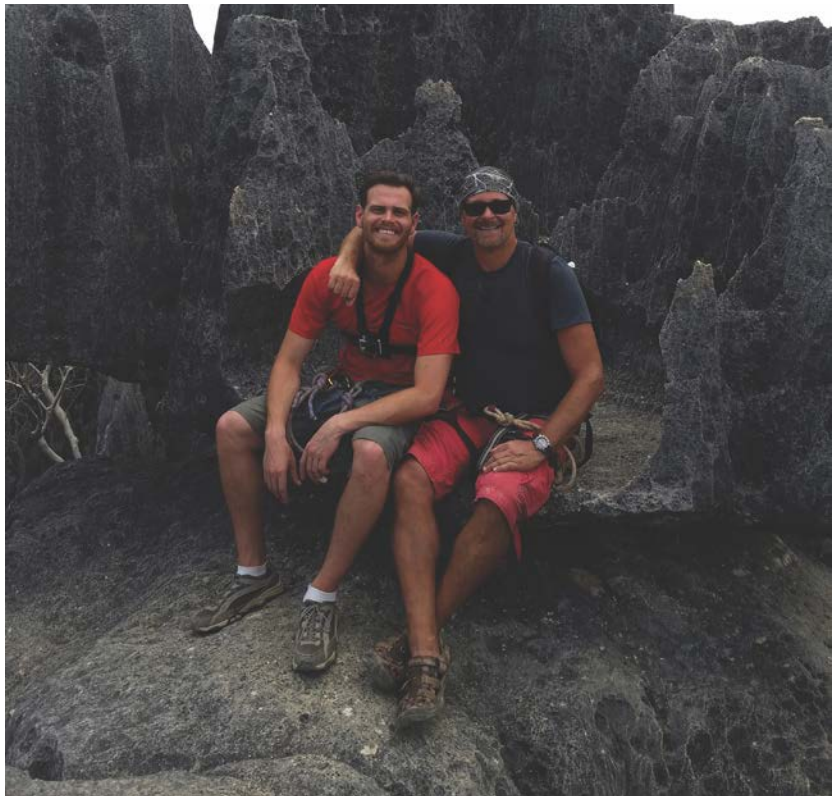
‘I just don’t want to be lonely’

By Floyd “Ski” Chilton

On an August morning almost a year ago, I was struggling with a particular chapter in my upcoming book, “The Rewired Brain.” Toothbrush in hand, I stared at my reflection, mystified at what had possessed me to place a chapter entitled “What it means to be human” in the middle of my book proposal. Now it was time to write the chapter. How could I even begin to address the multifaceted aspects of our human condition in a 5,000-word chapter?

My iPad was tuned to Pandora’s “Old Soul Radio” station. Even though I grew up far away from Detroit, in a small tobacco farming community at the foothills of the Appalachian Mountains in North Carolina, I love Motown. My daddy, a tobacco farmer, introduced me to the heaven that is rhythm and blues. During the evenings of my childhood, we were serenaded by the smooth voices of the Temptations, Otis Redding, Aretha Franklin, Marvin Gaye and the Supremes from a large stack of 45 rpm records playing on our RCA Victor record player. These days, when I get ready to head to work, I still blast the classic soul and R&B Pandora stations.

In the middle of my frustration on that August morning, a desperate refrain from a 1974 song covered by the band Main Ingredient repeated itself incessantly: “I just don’t want to be lonely.” As I brushed my teeth, I thought about the complexities and struggles of our human existence, and my mind centered on the question “Why is life so hard?”



PHOTOS COURTESY OF SKI CHILTON

Chilton in Madagascar with his son Shane (left), who completed a stint with the Peace Corps in East Africa.

In the midst of my musings, the previously dulled melodies of this first song of the day sounded louder than my introspection. Suddenly, the significance of the song, and particularly the refrain, “I just don’t want to be lonely,” came into focus. What it means to be human is to struggle with painful isolation, to have a desperate need to be in relationships and to journey on an often-volatile path to find a solution to that loneliness.

As a scientist, I aspire to understand “first principles” or the “central premise” as the National Institutes of Health now requires in its grants. The famed inventor Elon Musk has said, “You boil things down to the most fundamental truths and then reason up from there.” Aristotle defined a first principle as “the first basis from which a thing is known.”

No matter how intellectually sophisticated we are — and I know the audience I am writing for is very smart — I believe a first principle of our human condition is simply and elegantly stated in the Main Ingredient 1974 song “I just don’t want to be lonely.” Most of us spend our

View of a village in South Sudan.

lives trying to overcome the prison of our loneliness through connections and relationships with others in both healthy and unhealthy ways. We search for meaning. We explore the mysteries of things we can't measure or prove. We come face to face with the looming shadow of our own death. All these aspects of our humanity drive us to find answers or solutions that will relieve our pain. I had spent years unsuccessfully resolving my fear of loneliness and related depression; it had, in many ways, played an important role in two failed marriages and my inability to move past a devastating family tragedy.

Enter Africa. A decade ago, during a particularly difficult period of my life, I took my first trip to Africa. The trip was organized by a charitable organization, and our team traveled to eight locations in a huge shantytown in South Africa. This was a time when HIV/AIDS had wiped out large numbers of young parents, so we were taking food, water, shoes and deworming medications for nearly 2,000 orphans.

I am almost embarrassed to admit that before leaving the U.S., I had not given the trip much thought. After all, I kind of had been roped into the trip by friends at a local church who were looking for folks to complete their mission team. In the end, I reasoned that I had never been to Africa and this trip was a great excuse to check one more thing off my bucket list.

After 30 hours of travel by air and van, we found ourselves in South Africa at a small Bible college surrounded by a 15-foot-high barbed wire fence in the middle of a very large "city" of shacks called Masoyi, made of plywood, corrugated metal, sheets of plastic and cardboard boxes. Following a few hours of sleep, we were welcomed with a hearty breakfast and a devotional by Manny Ohonme. Manny, a huge man with an infectious smile, was originally from Nigeria. He had moved to the U.S. to play college basketball, had become a very successful businessman, and now was president of a nonprofit organization called Samaritan's Feet.

Though I can't remember much about the devotional, I will never forget what Manny said to me right after it. We had not yet been introduced formally, but for reasons I did not understand at the time, he picked me out of the crowd and walked straight toward me. Looking me square in the eyes, Manny said, "You are about to be messed up!"

Taken aback, I stared back at him as if he were crazy. I had no idea what he meant by his bold statement. Who did he think he was? Obviously, he did not know who I was, an NIH-funded scientist with well over a hundred manuscripts and faculty positions at prestigious institutions such as Johns Hopkins University and Wake Forest University.

Two days later, Manny's prophetic words became reality. Our group traveled to a banana plantation. I cannot explain what happened the moment I stepped off the bus and my feet touched down on the red African soil, but I immediately sensed my life would forever be changed at this time and by this place. As I turned my head to scan the landscape, my eyes first fell on the hundreds of children confined behind a tangled and rusty barbed wire fence. The rich owner of the banana plantation had been "kind" enough to provide a former feed lot for animals to house these orphans.

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The older children stuck their heads through the sharp coils to get a better look at the rich Americans walking toward them.

Off in one corner of the lot, there was a group of about 50 infants and young children sitting in muddy, parasite-infested sewer water. Some were playing, others splashing, but most were crying, wailing at the top of their lungs.

I was inexplicably drawn to one particular child who appeared to be about 2 years old. His eyes were deep yellow from liver failure as a result of disease, perhaps AIDS or tuberculosis. His face was badly distorted by a birth defect and the ravages of malnutrition. He was crying but only halfheartedly, as he had cried for so long without anyone paying attention. I asked the older woman in charge of the smaller children the name of the child. She shook her head and shrugged. She didn't know. At that moment, I realized that most of the hundreds of children in this animal feed lot did not have names. This thought took my breath away and completely broke my heart.

Staring at the tearful baby, my instinct was to scoop him up in my arms. But as we locked eyes, I thought with fear, "I can't hold him. There's too much of a risk." As a biomedical researcher, I knew the risk of contracting a disease from fluids seeping from every part of this child's body.

In that moment, for the first time in my life, I felt a powerful yearning. Let me say, especially to this audience, that I had always been the one in the crowd who scoffed with scientific arrogance whenever I heard someone say that she or he heard the voice of God. But standing there, staring at a malnourished, crying baby in the sweltering African heat, I sensed two questions: "Who are you?" And then, "Whose are you?"

I believe those two questions changed my life forever.

Chilton visiting with children in South Sudan.

I believe the situation and the questions were a reminder to me of my connection to humanity. I was linked to this child through the family of the human race in ways I could not possibly comprehend. In showing love to this child and others roaming around the banana plantation and this shantytown, I realized that I was showing love to the entire human race, and that included myself. The question "Whose are you?" prompted me to step up to a life of action that moved well beyond mere words, theology and religious tradition. I instantly knew that I had a responsibility to provide unconditional love to the universe, and somehow I realized that if I did, the universe — or, if you are a person of faith like me, the maker of the universe — would give me immense love back. I believe this ultimately was the first principle that provided the key to free me from my prison of loneliness.

I picked up the child from the muddy water, wiped his face with my shirt and pressed his face against mine. Holding his emaciated body tight, I softly sang the same lullaby my mom had sung to me, "Bye oh baby, oh bye, oh baby." Almost immediately, the little guy stopped crying and looked right into my eyes. My perspective that everything was meaningless dissipated, and, in its place, a new one of purpose stepped in. My dear African brother Manny was right. I was messed up — messed up in the most meaningful way possible.

For the past 10 years, I have participated in nonprofit organizations in the U.S. and throughout Africa. I am currently president of the not-for-profit Heroes Helping Heroes and the chairman of the board of the Persecution Project Foundation. Heroes Helping Heroes provides mentoring as well as health and wellness solutions to orphans and foster children in the U.S. and Africa. The Persecution Project Foundation brings crisis relief, education and hope to victims of civil war, genocide and religious persecution within Sudan. While this may sound impressive and very heroic, I always remember the critical lesson Africa has taught me: I need Africa much more than Africa needs me.

Floyd (Ski) H. Chilton (schilton@wakehealth.edu) is a professor of physiology and pharmacology at Wake Forest Baptist Medical Center. Chilton is also an author of five books. His latest book, "The ReWired Brain," was published in August by Baker Books. This essay contains a short excerpt from the book.

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Pride through my science side

By Akshat Sharma

In the U.S., the summer months are usually when the lesbian, gay, bisexual, transgender, queer, intersex and asexual community celebrates Pride. It is a powerful, self-affirming statement of refusing to be shamed for being oneself. This summer was a bit of a breakthrough for me when it comes to Pride, because I finally am proud of myself. All it took were, well, fluorescently labeled T cells!

My first year in graduate school came with its challenges: moving to a new city, a new department, a new lab and a project that seemed straightforward. But then my project became a stolid, immobile thing for a good year or so. Also, someone outed me to my dad. This was, to use one of my favorite words, problematic.

I come from a north Indian Brahmin family, an upper-caste line of Hindus who, according to the scriptures, are protectors of knowledge and learning. My father, steeped in conservative values, was not pleased with this new information about me. A lot of regrettable things were said, including my father telling me the typical "This sort of thing is not in our culture." Details aside, what had happened was that I had failed. I, the eldest male child, who was supposed to do great things, had deviated from the plan and become a stereotype. For my dad, years of negative tropes associated with gay men coalesced. I went from being his pride to becoming something sordid.

I envy the scientists who check their emotional baggage at the door. I am not one of them. This crisis with my dad infected everything I did: Suddenly there were mislabeled mouse cages and forgotten positive-control conditions. My boss, who patiently had been watching this play out for a while, finally had a talk with me.

After I gasped out the story, my boss said, "Does your father know about the sort of work you do? Why don't you show him some of the movies you're making?"

I was beginning to get into live-cell imaging. It involved deriving dendritic cells or T cells from whole blood, labeling them with fluorescent dyes and imaging them doing their job. Anyone who has done time-lapse microscopy can tell you that it is beautiful. The cells, all lit up, crawl around, interacting with each other, perhaps flashing light.

"Show him your science side!" said my boss. Honestly, I didn't understand how it would help, but I decided to try. Through WhatsApp, I sent my dad movies of T cells labeled with Cell Tracker Red darting around on integrin-coated surfaces.

"Did you do this?" asked my dad.

"Yes, Daddy. I sorted the cells and everything!" I said, checking that "Please like me!" plea in my voice.

"Well, what are they?"

And so we talked as we hadn't in a long time. We talked about adaptive immunity and the roles of T cells and what I was hoping to learn by observing them. (The work is now a part of a study in the journal Cell Reports.)

For me, science did what science does best: It challenged preconceived notions and replaced stereotype with nuance. For my father, seeing my science side dispelled the awful, media-trained idea of what gay men are, in which if we're not dying poignantly of AIDS or violence, we are the token hot gay friend or the bitter queen who exists solely to quip. My science side changed that idea for my dad. My science side changed me, too. In answering my father's questions about science, it hit me that I actually was doing something significant and that everything these movies revealed to us was brand-new information. I was proud of this work and of myself for doing it. My father began to relearn to be proud of me.

This story doesn't have a neat, happy ending. In some ways, this is a "coming out" for my dad, too. We still argue and struggle to look for clear, loving ways to talk about an issue that may come easy to some families but not so much to mine. Like those T cells crawling on the sometimes unexpected integrin combinations, our path is not straight but circuitous, new and beauteous in its own right.

But my dad still asks about the T cells. Recently, he mentioned how a magazine article that had the word "interferon-gamma" in it made him think of me.

It's not perfect, but it's better. It almost seems ignoble to ask for more right now.

Akshat Sharma (asharma28@wisc.edu) is a graduate student in the department of medical microbiology and immunology at the University of Wisconsin-Madison.

The DNA of a Nobel Prize-worthy CV

By Allison Frick

Aziz Sancar at the University of North Carolina School of Medicine received part of the 2015 Nobel Prize in chemistry. He, along with Tomas Lindahl at the Francis Crick Institute and Clare Hall Laboratory in the U.K. and Paul Modrich at the Duke University School of Medicine and Howard Hughes Medical Institute, won the prize "for mechanistic studies of DNA repair," according to the Nobel Prize 2015 press release. Sancar earned a third of the prize for his work on the nucleotide excision repair pathway.

Sancar flanked by Steven McKnight of UT Southwestern (left) and Natalie Ahn from the University of Colorado, Boulder (right).

Sancar is an editorial board member for the Journal of Biological Chemistry, which is published by the American Society for Biochemistry and Molecular Biology. He has co-authored more than 80 papers in the JBC.

Sancar spoke with the ASBMB's print and digital media specialist, Allison Frick, at the 2016 ASBMB annual meeting in San Diego. Here's what Sancar had to say about the meeting and the JBC and his advice for early-career scientists who are trying to publish their work and stand out in the fiercely competitive area of biomedical research. The interview has been edited for length and clarity. The entire interview can be found online at www.asbmb.org/asbmbtoday.

What do you like about the ASBMB meeting? What draws you to it?

You get to meet old friends, people who review your papers and other members of the editorial board. One of the most exciting parts is interacting with students and young scientists who ask for guidance (and) advice.

What or who would you consider to be the most significant influences on your success as a scientist?

My parents instilled in me a very strong work ethic. My father was the strongest, hardest working man I've ever known. Stan Rupert, my Ph.D. adviser (at the University of Texas at Dallas), has had the … strongest influence throughout my career. He was a great mentor, and he kept up with my research after I became an independent investigator. He has been my role model.

You publish consistently in the JBC and currently serve on its editorial board. What about the journal inspires your loyalty and service?

When I was a graduate student and postdoc, publishing in the JBC was a dream. My first really important study

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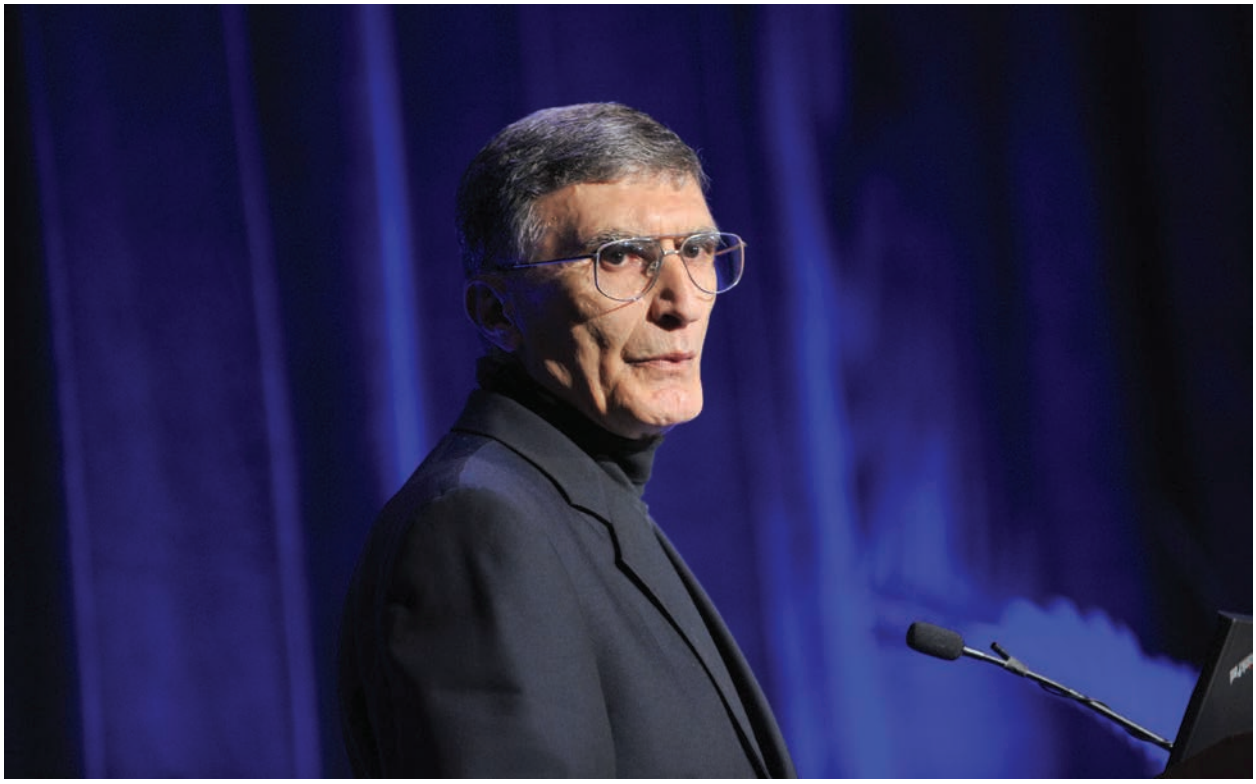

Sancar gave a lecture at this year's ASBMB annual meeting after winning the Bert and Natalie Vallee Award in Biomedical Science.

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as an independent investigator was published in the JBC, and I've continued ever since. I have more papers in the JBC than in any other journals.

I think I am probably, of my generation, the only one in biological sciences who's gotten the Nobel prize for work published in the JBC and I'm very proud of that. I think this should be an example to young investigators who are obsessed with publishing in this or that journal.

What advice would you have for scientists who are thinking about submitting their work to the JBC?

I would say publish your best work in the JBC, because it has a vast editorial board. We have reviewers who cover the entire field of biochemistry and molecular biology. You cannot find that in any other journal. You're sure that your paper will get good reviews by people knowledgeable in your field. You don't always get it in other journals, so I think that's a major advantage of the JBC. You get a decision within three weeks, usually. If there are things to fix, you fix them, and it's processed rapidly. The JBC is like the New York Times of (scientific) publishing.

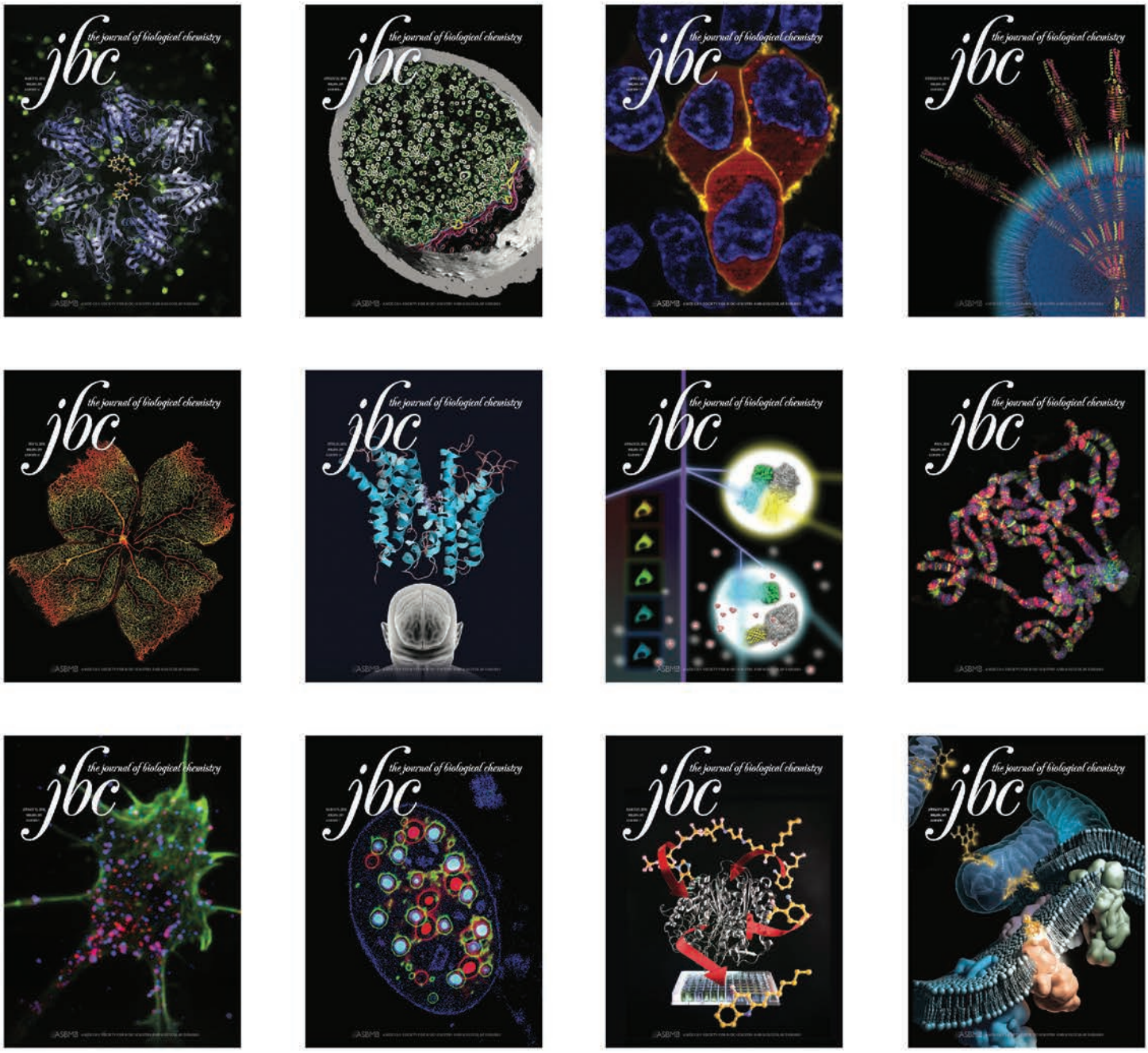
You have many commitments. How do you balance everything?

Work hard is No. 1. There are no shortcuts. Secondly, to the extent that it's possible, pick an important subject to work on. I always tell my students and postdocs you should ask yourself every single day: "Is work I'm doing going to end up being a sentence in a biochemistry textbook?" You should always ask yourself that, because that's the criterion of the significance of the work you're doing. Don't get sidetracked with minutia. Finally, it's really important to have supportive and nurturing mentors.

Do you have any final thoughts that you would like to share?

I can't thank the ASBMB and the JBC enough. The JBC made my career, and the JBC got me the Nobel prize. I think the JBC enabled me to publish my work and disseminate research to the scientific community in a timely manner. Over the long period, (our work) was recognized by the scientific community as well as other organizations like the Nobel (prize committee).

Allison Frick is the ASBMB's print and digital media specialist.



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