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ASBMB TODAY

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

Destination: USA

The international scientists issue

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This issue of ASBMB Today is dedicated to René Fuanta, whose enthusiasm and inspired ideas made it a reality.

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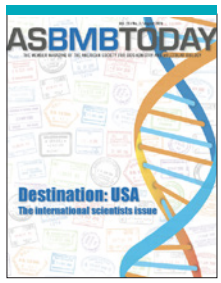

PERSPECTIVES

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

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Building on ASBMB's strong foundation together

A message from ASBMB's new president

By Joan Conaway

JOAN CONAWAY

It is a great pleasure to write to you, fellow members of the American Society for Biochemistry and Molecular Biology, in my new role as president.

I've been a member of ASBMB since 1988. I joined shortly after earning my Ph.D. and starting my first academic position. In the decades since then, my career has included several moves around the country, but throughout, ASBMB has been a critically important constant. I've been delighted to serve in many roles over the years, seeing the society's strengths from many vantage points, including through editorial board service and on the meetings and finance committees, among others.

These are exciting times for ASBMB and for our field, and I am honored to have been entrusted by you to lead the society at a time of so much scientific and organizational promise, as well as some challenges in our larger scientific society environment. As we all know too well, it has been a period of dramatic challenges and change in the larger community, with COVID-19, funding challenges and a vital focus on equity in health and research among those at the forefront.

Within the professional organization environment, all societies face dynamic emerging trends in publishing, funding, membership, education, and diversity, equity, accessibility and inclusion.

Yet, ASBMB has met these moments with strength and resilience, and I am so proud of what we've maintained and even built on through these years. The values-driven decision to move to open access was a particularly important moment for the society. And while it has changed many facets of our publishing work, I am deeply grateful for the leadership our editors and scientific journals continue to demonstrate in publishing outstanding fundamental science. We introduced our own Annual Meeting, which showcases emerging discoveries in biochemistry and molecular biology, writ large.

ASBMB's advocacy work has grown as well — serving as a leading voice for basic science funding, a top ASBMB priority — while

adding greater attention to the needs of emerging generations of scientists and the importance of ensuring the greatest possible access to the research workforce pipeline. Our education work also continues to shine, reaching across all career stages, including early career scientists and graduate and undergraduate students.

One of the benefits of having been with ASBMB for so long and having been involved in such different ways is being able to recognize just how far we have come. But, what motivates me to keep serving isn't our past achievements, though there are many. What keeps me engaged is our tremendous potential.

It's that potential — the possibilities! — that I want to focus on during my term as president.

In the coming weeks, we'll be launching a strategic planning initiative to guide the society's work over the next several years. With input from the membership, committees, editorial boards, fellows and more, we will seek to update ASBMB's vision for the coming decade, affirm our values and set primary goals and objectives for three to five years. Our outcome will be a forward-looking, sound and sustainable plan that can guide our work proactively and help us be nimble in light of continued evolution in our larger environment.

As noted, this all begins with input from our community. First, you will soon be receiving an invitation to participate in a member survey.

We want to know what your greatest needs are and how you think ASBMB can best propel your research and learning forward. We also need to know what you think the greatest challenges and opportunities facing the scientific research and education community are now and will be tomorrow.

ALLISON FRICK/ASBMB

Joan Conaway joined more than 20 other ASBMB members to advocate for science funding during the society's annual Capitol Hill Day in May. Here, she is pictured with Shantá D. Hinton, a member of the Public Affairs Advisory Committee, at a briefing the day before they visited legislators' offices.

Our committees will play an important role in this process as well. They know the work we do deeply, and they execute it with passion and care. ASBMB's leadership is eager to hear their top priorities, concerns and ideas.

We are fortunate that we are starting this planning period from a position of strength. We are 11,000 members strong. We are leaders in the open-access dissemination of research, standard setting for data collection and accessibility, excellence in BMB education, tailored professional development and advocacy for science.

In conclusion, I am proud of how much ASBMB does and how we serve science and scientists. I am deeply grateful to members of the Council and our hardworking committee members for their dedicated efforts, which have been instrumental in driving our initiatives forward. A special thanks goes to Ann Stock, my predecessor, whose strong and steady leadership over the past two years has greatly contributed to our progress. I am honored to continue building on their accomplishments and to look to the future, working with them and our members to ensure our scientific research agenda thrives. I'm looking forward to hearing from you about what you think we do well, could do more of, and/or could do better. And I look forward to supporting the extended ASBMB volunteer leadership in setting the course for a future as bright as our history.

Joan Conaway (Joan.Conaway@UTSouthwestern.edu) is a professor of molecular biology and the vice provost and dean of basic research at the University of Texas Southwestern Medical Center. She is ASBMB's president.

Leading ASBMB, serving science

By Mona V. Miller

When I was a child, my grandfather gave me a subscription to National Geographic. I waited eagerly each month for the delivery of the yellow-bordered magazine, and I pored over its pages, learning about all facets of life and the universe — from the tiny and aquatic to the gigantic and terrestrial, from the molecular and medical to the societal and psychological, and even stuff that was literally out of this world.

While I did not take an academic path to science, I've been fortunate to build a professional life as an advocate for science in other ways. I've spent my career advancing science and scientists, particularly the life sciences community and the solutions, therapies and cures that it makes possible. I've seen science through various lenses, including a health advocacy group, a U.S. senator and a major U.S. philanthropy. For the past 17 years, while serving in professional society staff leadership, I've seen it through members' eyes.

As I come aboard as the chief executive officer of the American Society for Biochemistry and Molecular Biology, I find it especially rewarding to see science through your eyes.

In my first 120 days, I've done a lot of listening to and learning from ASBMB members, volunteer leaders and staff — especially while attending the fantastic annual meeting in San Antonio. I've wanted to hear what you think makes ASBMB special, what science you think is hottest and on the horizon, what programs are most helpful to different parts of our community, and why you engage in society activities and renew your membership.

MONA V. MILLER

As ASBMB President Joan Conaway mentions in her column in this issue, we want to hear a lot more. The society is still rebounding from the challenges of COVID-19 and navigating an ever more complicated world, so we will be working to set a course for the future as an effective and efficient organization offering exceptional member value, and we want your input. In fact, be on the lookout this summer for the 2024 ASBMB Membership Survey — it's a chance to tell us what's most important to you.

As members, you know that professional societies are key to protecting and advancing the future of science, and I couldn't agree more. Collective action is crucial. My former boss, U.S. Senator Barbara Mikulski, used to say, "Each one of us can make a difference, but together we can create change." This statement has stuck with me throughout my career, and it is at the heart of scientific societies.

In good times and difficult ones, scientific societies are your place to convene, debate and learn, whether in the pages of the journals, in a webinar or at our annual meeting. ASBMB also supports the pipeline of future scientists who will take up the baton. And, finally, it's where you know people are advocating for you in Washington and communicating your achievements to the broader world. The message from ASBMB is focused on the indispensable role of fundamental science.

Scientists need ASBMB more than ever, and ASBMB supports its members. So, ASBMB needs you now more than ever to ensure we remain a leading voice serving the molecular life sciences. Together, we can continue to make a difference for science. I am honored to lead this community in close partnership with its volunteer leadership, and I look forward to working with all of you to build ASBMB's future together.

Mona V. Miller (mmiller@asbmb.org) is the chief executive officer of the ASBMB.

Meet the latest crop of MOSAIC scholars

The American Society for Biochemistry and Molecular Biology has welcomed 11 scholars to its third cohort for the Maximizing Opportunities for Scientific and Academic Independent Careers, or MOSAIC, program.

Through a cooperative agreement with the National Institutes of Health's National Institute of General Medical Sciences, ASBMB has developed a program to support postdoctoral fellows and new investigators from diverse backgrounds embarking on careers at research-intensive institutions.

Edwin Alfonzo, California Institute of Technology
Project: Unlocking new chemistries in extant enzymes for synthesizing bioactive molecules

Joanna-Lynn Borgogna, Montana State University
Project: A multi-omic and integrative longitudinal evaluation of the role of lipid, antioxidant, and osmoprotectant metabolites in the genitourinary syndrome of menopause by race and ethnicity

Timothy Hines, Jackson Laboratory
Project: Understanding the role of the integrated stress response in tRNA synthetase-associated Charcot-Marie-Tooth disease

Colin Hisey, Ohio State University
Project: Machine learning-enabled classification of extracellular vesicles using nanoplasmonic microfluidics

Emma Lessieur Contreras, University of California, Irvine
Project: Retina-derived extracellular vesicles in diabetic retinopathy: Their potential role in pathogenesis and therapy

Renato Navarro, Stanford University
Project: Catheter-injectable system for local drug delivery after myocardial infarct

Brian O'Grady, Vanderbilt Universoty
Project: Development of a 3D neurovascular unit for in vitro modeling of subarachnoid hemorrhage and screening therapies

Melissa Ramirez, California Institute of Technology
Project: Methods for enantioselective spirocycle synthesis and radical hydroamination of trisubstituted alkenes

Aleah Roberts, National Heart, Lung, and Blood Institute
Project: Investigating molecular mechanisms of endocytosis of the activated B cell receptor in health and disease

Kendrick Smith, University of Michigan at Ann Arbor
Project: Designing chemoenzymatic approaches to biologically active molecules enabled by enzyme library screening

Tigist Tamir, Massachusetts Institute of Technology
Project: Regulation of oxidative stress signaling by tyrosine phosphorylation of antioxidant enzymes

Read profiles of these scholars and learn about the program at www.asbmb.org/asbmb-today/people/topics/mosaic-scholars here:

ASBMB names 2024 JBC/Tabor Award winners

By Marissa Locke Rottinghaus

The American Society for Biochemistry and Molecular Biology announced the winners of the 2024 Journal of Biological Chemistry/Herbert Tabor Early Career Investigator Awards earlier this year.

George DeMartino at the University of Texas Southwestern Medical Center, a JBC associate editor, oversees the award selections. "The awardees were all first authors of high-quality, rigorous, impactful science that is the hallmark of JBC," DeMartino said.

Jenny Hogstrom is a postdoc at Harvard Medical School. In her paper, "Simultaneous isolation of hormone receptor–positive breast cancer organoids and fibroblasts reveals stroma-mediated resistance mechanisms." Her team developed a cell-culture model of hormone receptor-positive, or HR+, breast cancer. Using patient-derived organoids and matching cancer-associated fibroblasts, they showed that HR+ cancer-associated fibroblasts secrete cytokines that promote tumor growth and drive treatment resistance.

Hannah Kondolf is pursuing her M.D. and recently earned her Ph.D. at Case Western Reserve University School of Medicine. Her paper, "Protein engineering reveals that gasdermin A preferentially targets mitochondrial membranes over the plasma membrane during pyroptosis," showed that gasdermin family members cause cell death via distinct mechanisms. Specifically, gasdermin A preferentially targets mitochondria upon activation, unlike gasdermin D, which targets mitochondria and plasma membrane equally.

Edwin Gabriel Peña Martínez is a graduate student at the University of Puerto Rico, Río Piedras. His papers, titled "Prioritizing cardiovascular disease-associated variants altering NKX2-5 and TBX5 binding through an integrative computational approach," identified and prioritized potential cardiovascular disease-causing single nucleotide polymorphisms. Using chromatin immunoprecipitation data of two cardiac transcription factors, NKX2-5 and TBX5, they found five variants that alter transcription factor binding and may cause cardiovascular disease.

Jianchao Zhang is a research assistant professor at the Southern University of Science and Technology in China. His paper was titled "Single amino acid-based PROTACs trigger degradation of the oncogenic kinase BCR-ABL in chronic myeloid leukemia (CML)." His team used single amino acid–based proteolysis-targeting chimera, or PROTAC, a system that targets harmful proteins for destruction by hijacking the ubiquitin-proteasome system, to degrade the proto-oncogene BCR–ABL. This method reduced tumor growth in mice with BCR–ABL positive tumors and could be adapted for applications in targeted protein degradation.

Gabriela Dias Noske is a researcher at the Brazilian Nanotechnology National Laboratory at the Center for Research in Energy and Materials. Her paper, "Structural basis of nirmatrelvir and ensitrelvir activity against naturally occurring polymorphisms of the SARS-CoV-2 main protease," characterized how SARS-CoV-2 antivirals bind to the viral protease and how mutations in the protease affect their efficacy. They showed certain residues within the protease are critical for loss of antiviral potency.

Marissa Locke Rottinghaus (mlocke@asbmb.org) is the science writer for ASBMB.

Meet the 2024 ATP delegates

By Marissa Locke Rottinghaus

Ten delegates are participating in the American Society for Biochemistry and Molecular Biology's Advocacy Training Program this summer. This externship provides hands-on science policy and advocacy training and experience. The 2024 program includes sessions on the appropriations process and the role the executive branch in shaping science policies.

Elisabeth Marnik is the science education and outreach coordinator at the MDI Biological Laboratory. Marnik is also a contributing writer for ASBMB Today, Those Nerdy Girls and the Global Autoimmune Institute.

Cheyanne Frosti is a biomedical science graduate student at Boston University School of Medicine. She conducts research on extracellular matrix signaling in adipose tissue fibrosis and metabolic disease.

Chidinma Lucy Odili is a recent biochemistry Ph.D. graduate from Auburn University. She researched post-translational modifications of methyl coenzyme M reductase. Odili founded the Creativity Beyond Beauty Development Initiative.

Ecem Arpaci is a biochemistry undergraduate at Imperial College London. She is a student ambassador for the Biochemical Society and a research intern at Radboud University Medical Center. In 2023, she completed the ASBMB Art of Science Communication course.

Betty Du is a graduate student at Stony Brook University. Du performs research on fungal plasma membrane lipid raft composition using the model Saccharomyces cerevisiae.

Payel Ganguly is a postdoctoral fellow at Harvard Medical School. Ganguly investigates the mechanism of amyotrophic lateral sclerosis pathology using the model organism Drosophila.

Mowaffaq Adam is a postdoctoral researcher at San Diego State University studying how mutations in isocitrate dehydrogenase 1 affect its enzymatic activity during cancer.

Brendon Davis is a Ph.D. candidate at Johns Hopkins University. Davis studies asymmetric histone inheritance in Drosophila germline stem cells. He also serves as a science policy coordinator for the Johns Hopkins Science Policy and Diplomacy Group.

Sarah Herschede is completing her postdoctoral fellowship through the Oak Ridge Institute for Science and Education at the Biomedical Advanced Research and Development Authority, a division of the U.S. Department of Health and Human Services.

Natalie Reece is a medical assistant with Tampa Physician Housecalls as well as a hospice volunteer at AccentCare. Reece graduated from the University of Tampa, Florida, with a bachelor's degree in biochemistry. She previously worked as an undergraduate research fellow at UT.

Read more about the 2024 ATP delegates here:

Marissa Locke Rottinghaus (mlocke@asbmb.org) is the science writer for ASBMB.

Meet the 2024 SOC grant awardees

By Emmett Smith

The American Society of Biochemistry and Molecular Biology 2024 Science Outreach and Communication grants will go to five projects. Each grant supplies up to $1,000 for an outreach activity to promote a molecular understanding of life. The ASBMB Science Outreach and Communication Committee selected the recipients.

Investigating GMOs for a safer plate

Irfana Muqbil, assistant professor, Lawrence Technological University

Making science accessible for people of different backgrounds is at the core of this project, which brings biology techniques such as polymerase chain reaction and gel electrophoresis to high school students. Students learn about genetically modified organisms, or GMOs, and then select a familiar food, extract its DNA and perform PCR and gel electrophoresis to detect the presence or absence of a genetic modification. Students then discuss misconceptions and concerns about GMOs.

Glass half full or empty: Illuminating the human transcriptome

Theodore Nelson, undergraduate student, Columbia University

Undergraduates mentor underserved New York City high school students in an eight-week lab experience investigating novel RNA transcripts. The high schoolers perform research using long-read RNA-sequencing data. The course includes both wet and dry lab components, teaching primer design, polymerase chain reaction, gel electrophoresis and sequencing. The high schoolers present posters of their work to biological science undergraduates, graduate students and faculty.

Science communication: Now let's discuss medications

Amarachukwu Onoh, graduate student, Clemson University

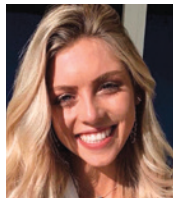
Designing a drug is a complex process. This program seeks to engage undergraduates in drug discovery, providing an experience that includes a keynote speech, hands-on learning to introduce drug-target interactions using simulations of molecular docking and a science challenge, with prizes awarded.

This one-day event reaches up to 200 University of Nigeria students and is open to any major or academic background. The goal is to enhance scientific literacy and appreciation of bioresearch.

A genetic masterpiece

Natalie Reece, graduate of the University of Tampa

This project aims to share the excitement of science with middle school students. An explanation of the structure and function of DNA is followed by comparing genetic traits such as tongue rolling and detached earlobes. Students will extract and precipitate their cheek cell DNA and create a helix-shaped necklace holding a bottle of their DNA. This program will be offered at a school with high minority enrollment and limited life science education.



Molecular world science fair

Alexa Veliz Rios, undergraduate student, Mount Holyoke College

This project aims to engage youngsters' curiosity. Children earn a stamp in a "molecular passport" for each science book they read at local libraries. A child with 10 stamps is invited to the "Molecular World Science Fair" at Mount Holyoke. The fair showcases research by undergraduates, who describe complex topics in simple terms, and includes hands-on activities such as a petri dish contest, lab scavenger hunts, science trivia and making slime.

Applications for the next round of SOC grants will be accepted starting in September. Learn more under "Education" at asbmb.org.

Read the full text of this article at asbmb.org/asbmb-today here:

Emmett Smith (smithem3@earlham.edu) is an associate professor teaching molecular biology and studying environmental and ancient DNA at Earlham College and a member of the ASBMB Science Outreach and Communication Committee.

Donald Jarvis and Kelly Ten Hagen received the Rosalind Kornfeld Award for Lifetime Achievement in Glycobiology, which the Society for Glycobiology presents to scientists who have, made significant contributions to the field.


JARVIS

Ten Hagen is a senior investigator, section chief and associate scientific director of the National Institute of Dental and Craniofacial Research, National Institutes of Health. She studies how sugar addition (O-glycosylation) is regulated and how it influences biological processes.


TEN HAGEN

Jarvis is a professor at the University of Wyoming. His laboratory focuses on glycoprotein biosynthesis in the baculovirus-insect cell system. His biotechnology company, GlycoBac, is refining and commercializing this technology.

Johannes Buchner received the Otto Warburg Medal from the German Society for Biochemistry and Molecular Biology for his fundamental contributions to protein structure formation and the role of chaperones.

Buchner is a professor at the Technical University of Munich. His research focuses on the cellular machinery of protein folding. He has made seminal contributions in his study of heat shock proteins, including Hsp90.

Ryan Jackson was named the R. Gaurth Hansen professor in the chemistry and biochemistry department at Utah State University.

Jackson is an associate professor at USU. His lab studies the structure and function of newly discovered CRISPR type IV and V systems. He recently published back-to-back articles in Nature detailing the structure and function of CRISPR type V nuclease Cas12a2.

Sanford R. Simon, a retired professor, has been honored with an annual endowed fellowship at Stony Brook University for a graduate student.

Simon's research focused on serine proteases and metalloproteases in neutrophils during inflammation. He developed inhibitors to control host inflammation during gum disease and after cardiopulmonary bypass.

Vincent Tagliabracci received the 2024 Edith and Peter O'Donnell Award in Biological Sciences from the Texas Academy of Medicine, Engineering, Science and Technology for his work on pseudokinases.


TAGLIABRACCI

Tagliabracci is an associate professor at the University of Texas Southwestern Medical Center and a Howard Hughes Medical Institute investigator. His lab studies unusual protein modifications, such as glutamylation, AMPylation and RNA capping by proteins that resemble kinases.

Enrique M. De La Cruz has been named the William R. Kenan Jr. professor of molecular biophysics and biochemistry at Yale University.

De La Cruz is a professor and serves as the head of Branford College, one of Yale's undergraduate residential colleges. His lab studies molecular motor proteins and the cytoskeleton. His contributions to biophysics include discovering the molecular mechanisms underlying actomyosin function, RNA helicase function and actin filament severing.

Donita C. Brady, Kivanç Birsoy and Katsuhiko Murakami were among 12 new Innovation Fund investigators named by the Pew Charitable Trusts. Birsoy and Brady will collaborate to identify components in cells that regulate or respond to transition metal homeostasis. Brady is an associate professor at the University of Pennsylvania Perelman School of Medicine. The Brady lab explores the role that copper plays in activating proteins that can drive tumor formation. Birsoy is an associate professor at Rockefeller University. His lab investigates metabolic changes that occur in cancer cells during tumor formation and metastasis.

Murakami and a partner will study transcription termination in cyanobacteria. Murakami is a professor at Pennsylvania State University and a faculty director of Huck Cryo-EM facility. His lab uses X-ray crystallography and cryo-electron microscopy to determine structures of cellular and bacteriophage RNA polymerases to understand RNA transcription and regulation.

Kazutoshi Mori and Peter Walter were among four researchers to receive the Frontiers of Knowledge Award in Biology and Biomedicine from the BBVA Foundation, a charitable arm of Banco Bilbao Vizcaya Argentaria.


MORI

Mori and Walter independently discovered the unfolded protein response, an intracellular quality-control system that detects misfolded proteins in the endoplasmic reticulum

and signals the nucleus to carry out corrective measures.

Mori is a professor at Kyoto University. His lab continues to study the biological and physiological importance of the unfolded protein response. Mori's work provides important insights on how to treat protein folding disorders, diabetes, heart disease, atherosclerosis and cancer.

Walter is a professor at the University of California, San Francisco.


WALTER

His lab identifies the machinery and mechanisms that ensure proper protein synthesis, folding and targeting as well as the pathways that allow organelles to communicate and regulate their abundance.

Stephen Benkovic will have the Chemistry Building at the University Park campus of Pennsylvania State University renamed in his honor. Benkovic is an Atherton professor and Eberly chair in chemistry in the Eberly College of Science at Penn State. He was among the first scientists to hypothesize that conformational changes outside an enzyme's active site were necessary for achieving maximal catalysis.

Denise Okafor was one of 19 early-career scholars to receive a 2024 Cottrell Scholar Award from the Research Corporation for Science Advancement.


OKAFOR

Okafor is an assistant professor at Pennsylvania State University. Her research focuses on the regulation of nuclear receptors, which play critical roles in metabolism, development, reproduction and other biological processes.

John Whitney received a new investigator award from the Canadian Society for Chemistry.


WHITNEY

Whitney is an associate professor at McMaster University. His lab studies the molecular mechanisms that underlie microbe–microbe interactions. His team recently published a study describing a barcode-like system that bacteria use to distinguish between beneficial and toxic molecules.

Fred Kramer, Ana Jaklenec, James Janetka and Niketa Patel were among the 2023 class of National Academy of Inventors fellows.

Kramer is a professor and the associate director of the Public Health Research Institute for Business Development at Rutgers University. His lab develops sensitive, multiplex polymerase chain reaction assays that use DNA fragments in blood samples to detect and quantitate rare mutations for cancer diagnosis, prognosis and therapy.

Jaklenec is a principal research scientist and principal investigator at the David H. Koch Institute for Integrative Cancer Research at the Massachusetts Institute of Technology. Her research projects include developing single-injection self-boosting vaccines, 3D printed on-demand microneedle vaccines and drug-delivery systems for cancer immunotherapy.

Janetka is a professor at Washington University School of Medicine in St. Louis. His lab develops peptidomimetic, glycomimetic and small-molecule inhibitors as drugs to treat cancer, bacterial and viral infections, and parasitic diseases.

Patel is a professor at the University of South Florida. Her research focuses on understanding the molecular mechanisms of obesity and diabetes and the metabolic pathways underlying neurodegenerative diseases, including analyzing genetic signatures of adipose-derived stem cells from lean and obese patients and mechanisms in wound healing promoted by exosomes derived from adipose stem cells.

Bil Clemons received the 2023–2024 Shirley M. Malcom Prize for Excellence in Mentoring from the California Institute of Technology. Clemons is a professor at Caltech. His lab studies membrane protein structures and biogenesis using biophysical methods, such as X-ray crystallography and electron microscopy. In addition, his team is interested in protein secretion and glycosylation.


CLEMONS

Stavroula Hatzios received a chemistry fellowship from the Alfred P. Sloan Foundation.

Hatzios is an associate professor at Yale University. Her research focuses on host–microbe interactions in the gastrointestinal tract and how infection-associated oxidative stress influences host signaling and microbial adaptation. Her lab develops probes and antimicrobials to detect and inhibit disease-causing gut bacteria.


HATZIOS

Andrew Wiemer received the 2024 Faculty Research Advising Award from the University of Connecticut

School of Pharmacy. Wiemer is a professor at UConn. His research leverages the human immune system for cancer therapy. The lab aims to discover new bioactive molecules targeting immune checkpoints for potential cancer therapies.

Paula Lemons was named a 2023–2024 University Professor by the University of Georgia in recognition of her influential vision and leadership.


LEMONS

Lemons is a professor and associate dean of Franklin College at UGA. Her lab researches how to support college biology instructors who use reformed teaching strategies shown to improve student outcomes. She also studies problem solving among undergraduate biology and biochemistry students.

Gustavo Silva was named a Paul T. Englund Emerging Scholar by the Johns Hopkins School of Medicine. This award recognizes scholars who demonstrate potential to forge scientific breakthroughs and to promote a creative, diverse and inclusive future in biochemical research.


SILVA

Silva is an assistant professor at Duke University. The Silva lab is interested in how cells respond to stressors that are common in inflammation and diseases. Silva also directs Black Think Tank, a program to support Black faculty at Duke.

Joanna Chiu received the Distinction in Student Mentoring Award from the Pacific Branch of the Entomological Society of America. Chiu is a professor and chair at the University of California, Davis. Her lab studies the molecular mechanisms that underlie animal circadian rhythm as well as how organisms sense seasons. She also aims to develop new strategies to control invasive insects.

James (Bert) Flanegan had a conference room and lounge at the University of Florida named in his honor. Flanegan's son and daughter-in-law financed the renovation of space to facilitate faculty and student collaboration that will enhance research, innovation and discovery.


FLANEGAN

Flanegan, a professor at UF, is an authority on the biochemical and genetic mechanisms regulating the replication of small RNA viruses, including poliovirus and coxsackievirus. He is committed to help eradicate polio and develop a noninfectious virus-like particle vaccine.

Gerry Wright received the 2024 Killam Prize in Health Sciences for his research on antimicrobial resistance.


WRIGHT

Wright is a professor at McMaster University. His lab aims to identify new antibiotics and antimicrobial strategies. He defined the concept of a pan-bacterial resistome, which encompasses all antibiotic resistance elements in microbial communities.

Ronald Breaker, Kirk Deitsch, Kyu Rhee, Hao Wu, Li Wu and Pei Zhou are among the 65 fellows elected by the American Academy of Microbiology to its class of 2024.

Breaker is a department chair and professor at Yale University. His lab investigates noncoding RNAs in bacteria, with particular interest in ribozymes, which catalyze chemical reactions, and riboswitches, which change conformation in response to binding of specific molecules.

Deitsch is a professor at Weill Cornell Medicine. His lab focuses on Plasmodium falciparum, a pathogen that causes malaria, to understand how it avoids the immune system of the host via gene regulation and antigenic variation.

Rhee is a professor at Weill Cornell Medicine whose lab pioneered the development of metabolomic technologies to study the intrabacterial pharmacology of drugs within Mycobacterium tuberculosis.

Hao Wu is a professor at Harvard Medical School and Boston Children's Hospital. Her lab studies the biophysics of molecular complexes involved in innate immunity, including signalosomes and pore-forming complexes such as gasdermin.

Li Wu is a professor and department chair at the University of Iowa Carver College of Medicine. His lab studies the mechanisms of HIV restriction by the host protein SAMHD1, an enzyme that regulates deoxynucleotide triphosphate homeostasis and maintains genomic stability.

Zhou is a professor at Duke University School of Medicine, where he studies Gram-negative bacterial cell envelope biogenesis and inhibition, microbe–host interaction and host immunity, translesion DNA synthesis and development of novel antibiotics.

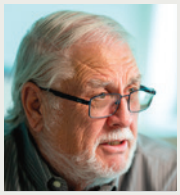
Look for more member news details here:

IN MEMORIAM

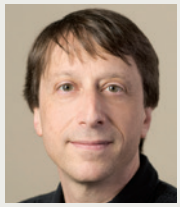
Michael Waterfield, a British biochemist and a pioneer in the cancer research field, died on May 11, 2023, at the age of 82. He had been an ASBMB member since 1996. Waterfield did groundbreaking cancer research at the Imperial Cancer Research Fund, and his findings led to development of anti-cancer drugs targeting the epidermal growth factor receptor family.

Ulrich auf dem Keller, a researcher and senior scientist at ETH, Zurich, and a leader in wound healing research and mass spectrometry-based proteomics technology, died Sept. 1, 2023, at the age of 49. He received a Herbert Tabor Young Investigator Award in 2011 for his studies of proteolytic events in the skin.

Charles Owen Rock, a faculty member in the Department of Host-Microbe Interactions at St. Jude Children's Research Hospital and a National Institutes of Health principal investigator, died Sept. 22, 2023. He was 73 and had been a member of the ASBMB for almost four decades. Rock methodically worked to solve the mystery of fatty acid production, identifying significant metabolic pathways, regulators and intermediates.



William Weis, former chair of photon sciences and structural biology at Stanford Medicine, died Oct. 13, 2023, in Palo Alto, California. He was 64 and had glioblastoma. Weis was a noted expert in X-ray crystallography; much of his work emphasized 3D structural composition of molecules in key regulatory pathways.



Darwin Johnson Prockop, a biochemist who held leadership positions at multiple institutions and was known for his contributions to adult stem cell biology and cellular biology, died Jan. 22 in Philadelphia. An ASBMB member for more than four decades beginning in 1966, he was 94 and had neuromuscular disease.

Daniel Edward Atkinson, an emeritus professor of chemistry and biochemistry at UCLA, a pioneer in the field of metabolic regulation and development of the concept of "energy charge," and a member of the ASBMB since 1957, died Feb. 2. He was 102. Atkinson served as an ASBMB Council member from 1979 to 1982, and he was a member of the Journal of Biological Chemistry editorial board from 1966 to 1971 and an associate editor from 1972 to 1977.

Henry Miziorko, professor emeritus at the University of Missouri–Kansas City whose research focused on the biochemical and structural basis of enzyme function, particularly in the mevalonate pathway, and an ASBMB member since 1989, died at home on March 17. He was 76.

Edith Clarke Wolff, an enzyme biochemist who studied the unusual polyamine-derived amino acid hypusine at the National Institutes of Health and a former longtime assistant to the editor of the Journal of Biological Chemistry, died March 24. She was 94 and had been a member of the ASBMB since 1986.

Bacon Ke, a physical chemist and pioneer in the field of photochemistry of photosynthesis, died May 20, 2022, in San Francisco, California. He was 101 years old and had been a member of the American Society for Biochemistry and Molecular Biology since 1968. He conducted research at the Kettering Lab, Standard Oil and Amoco Chemical.

Read news obituaries and personal retrospectives of ASBMB members here:

No oxygen? No problem.

Researchers show how electric fish survive in hypoxic streams for months at time

By Marissa Locke Rottinghaus

When most people think of electric fish, they picture electric eels, which use more than 800 volts to stun their prey. However, some fish in the Amazon River use weaker electricity exclusively to communicate and navigate. A recent study shows how these electric fish adapted to survive in low-oxygen waters, and the authors say their findings could be a step toward new ways to target aggressive tumors, which thrive in a low-oxygen microenvironment.

Life exists everywhere on earth, including places that are low in oxygen, or hypoxic, such as coastal fresh waters. Hypoxic areas, also known as dead zones, are caused by nutrient runoff, which induces algae populations to explode and suck up most of the water oxygen. With 75% less oxygen than normal waters, these areas are toxic to air-breathing organisms.

Hypoxic environments can even exist in humans, such as the tissue surrounding a tumor.

A group of researchers in Canada studies two types of Amazonian Brachyhypopomus electric fish, hypoxia-tolerant and hypoxia-intolerant, to figure out how the tolerant organisms survive in otherwise lethal, hypoxic environments. They hypothesized that proteins in hypoxia-resistant fish have uniquely adapted to survive in dead zones. However, the team noted that Brachyhypopomus' resilience in low-oxygen areas is independent of their electrical capacity.

Belinda Chang is a professor of ecology and evolutionary biology as well as cell and systems biology at the University of Toronto and supervisor of the research. "Studies of adaptation to tough environmental conditions, such as hypoxia, are challenging because responses to such environmental extremes tend to involve many cellular and systems processes," Chang said.

Ahmed Elbassiouny, a former Ph.D. student of Chang and Nathan Lovejoy, and first author of the study, compared Brachyhypopomus to "living batteries" with high metabolic demands.

"Some of these fish live in streams where the oxygen level is so low that it's almost anoxic, or zero percent oxygen, for a few months (per year)," Elbassiouny said. "However, within the same genus, a sister group only exists in well-oxygenated waters. It is a perfect comparative system where we can take closely related species that have different environmental adaptations and ask what drives that adaptation."

Lovejoy, a professor of biological sciences at the University of Toronto Scarborough, led multiple field expeditions to South America to collect hypoxia-tolerant and -intolerant Brachyhypopomus.

"In the field, we can fish for Brachyhypopomus by using instruments that detect the electric field produced by the fishes," Lovejoy said. "It's always exciting to detect the presence of an electric fish, and before catching the fish, we sometimes try to guess the species by the signal we detect. Of course, if we detect the signal of the electric eel, we need to be very cautious about our next steps."

After performing whole transcriptome sequencing on the field samples, the team used these and other genomic data to look for patterns associated with hypoxia tolerance.

"You can think of the computation methods as looking for adaptive evolutionary patterns of diversity in naturally occurring sequences," Chang said. "We basically use the sequences

CASSIE REN

Illustration of a Brachyhypopomus electric fish

as a natural experiment. In practice, that means we can mine genomic databases, as well as combining that with our own sequencing, to look at the diversity of any given sequence. This is a very powerful approach, because of the increasing number of sequences that are available in databases."

The team discovered that changes in the hypoxia-inducible factor 1 alpha gene may help Brachyhypopomus survive in dead zones.

In all vertebrates, HIF1α acts like an oxygen mask on a plane in response to low-oxygen conditions by providing the body with an alternative way to create energy. Elbassiouny called HIF1α a "bottleneck" transcription factor, whose activation ramps up cellular pathways, such as energy metabolism, angiogenesis and apoptosis, to increase tissue oxygen.

However, Chang said that finding statistically significant patterns didn't prove adaptive evolution. That's where Elbassiouny's experiments came in. According to Chang, he designed novel assays to show that mutations in the HIF1α gene changed its protein function using CRISPR–Cas9 to express the Brachyhypopomus hypoxia-tolerant and -intolerant HIF1α genes in human cell lines.

"We overcame a lot of challenges because HIF1α is an inherently disordered protein, so it is hard to even predict how these changes in the protein could affect function," Elbassiouny said. "We had to knock in and knock out the gene in one step because HIF1α is a critical gene for survival."

After further probing HIF1α's function in the lab, the team found that HIF1α, in hypoxia-tolerant fish, contains two small ubiquitin-related modifier, or SUMO, interacting motifs that increase its activation in response to low oxygen. The team said these results show that HIF1α is a hotspot for adaptive evolution. They published their results in the **Journal of Biological Chemistry**.

The team said that Brachyhypopomus likely adapted to hypoxic environments to maintain its ability to communicate and navigate through electric signals, which require a lot of energy.

Elbassiouny, now a postdoctoral research fellow at the British Columbia Cancer Research Institute, plans to use his expertise in hypoxia to understand how tumors survive and thrive in hypoxic microenvironments. Like the algae in dead zones, tumors hoard oxygen, making their local environment toxic to other human cells. Tumors have such high metabolic demands that they can outgrow their oxygen supply, necessitating ways to survive without oxygen.

"The way cancer cells respond to hypoxia in the tumor microenvironment is one of the determining factors of how resistant to cancer therapy it is," he said. "I believe our approach in this article of 'learning from our natural world about novel molecular designs' can offer a fresh perspective on how HIF1α is regulated in cancers and how it could be targeted for therapies."

DOI:10.1016/j.jbc.2024.105727

Marissa Locke Rottinghaus (mlocke@asbmb.org) is the science writer for ASBMB.

More journal news online

Look for these articles about papers in ASBMB journals at asbmb.org/asbmb-today.

JOURNAL OF BIOLOGICAL CHEMISTRY

How a gene spurs tooth development

By Meric Ozturk

University of Iowa researchers find a clue in a rare genetic disorder's missing chromosome.

Iron could be key to treating a global parasitic disease

By Ankita Arora

A study at the Indian Institute of Science Education and Research has found that leishmaniasis causes body-wide changes in iron balance, leading to red blood cell damage.

JOURNAL OF LIPID RESEARCH

Understanding the fat science

By Arti Dumbrepatil

Researchers at UCLA investigate lipid remodeling in the liver for energy generation.

MOLECULAR & CELLULAR PROTEOMICS

Cows offer clues to treat human infertility

By Farah Aziz Annesha

A team at the Estonian University of Life Sciences has found that decoding the bovine reproductive cycle may increase the success of human IVF treatments.

Small protein plays a big role in viral battles

By Anna Crysler

Extracellular vesicles, or EVs, play an important role in communication among cells. Almost all cells can release EVs, which carry content that varies according to the cell type. In response to viruses, immune cells will release EVs containing information that can help the body fight viral replication and infection. But what happens when a complex pathogen hijacks this system?

Luis daSilva's research group at the University of São Paulo in Ribeirão Preto studies the endomembrane system of cells with particular interest in the molecular mechanisms of human immunodeficiency virus, or HIV. Viruses can take advantage of this system and impair the immune system's ability to prevent infection. Researchers have thoroughly studied and characterized HIV's specific proteins, and they recognize HIV accessory proteins as important virulence factors for HIV-1 pathogenesis.

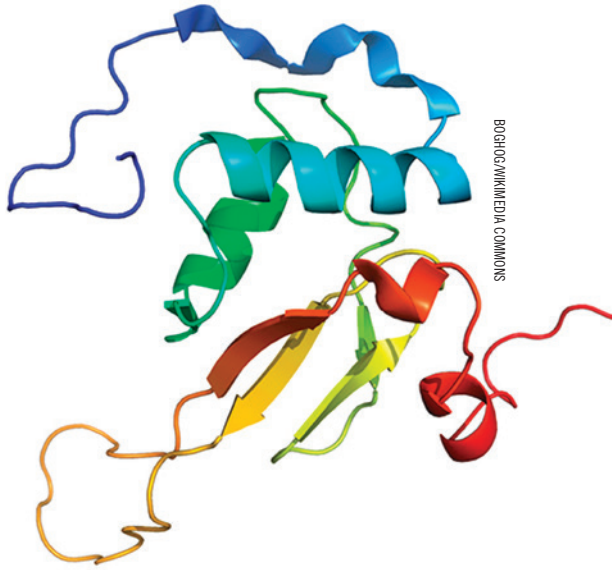
In a recent paper in **Molecular & Cellular Proteomics**, the daSilva group writes about their work studying the HIV accessory protein negative regulatory factor, or Nef, in the context of EVs. Nef allows easier viral replication and spread in host cells, and it also modifies the host's EVs. The authors investigated the impact of this manipulation by Nef through a proteomic analysis of EVs derived from lymphocytes known as T cells.

Mara Elisama da Silva Januário is the first author of the paper. "Our study unveils the influence of Nef on the protein content of EVs released from T lymphocytes, cells that play a major role in the body's defense," she said. "Our recent findings highlight Nef as a global modulator of EV proteome."

Specifically, Nef downregulates proteins in EVs that are important in the body's antiviral response to HIV-1, including interferon-induced transmembrane proteins, or IFITMs. When IFITMs are reduced in EVs, key antiviral activities are mitigated. These proteins are among several whose expression is disrupted by Nef in HIV-1 infection.

The researchers found that Nef could modify the levels of more than 35% of the proteins identified in EVs, and among the decreased proteins were three members of the IFITM family. These proteins are pivotal in the body's antiviral response against viruses including Zika, dengue, influenza and HIV.

"By decoding these intricate cellular dialogues, our work contributes a small but significant piece to the broader narrative of scientific discovery surrounding HIV-1 infection, offering potential avenues for advancements in medical interventions," da Silva Januário said.



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The HIV accessory protein negative regulatory factor, illustrated here, allows easier viral replication and spread in host cells.

Unraveling the biological significance of altered proteins in EVs in relation to viral infection and replication are important next steps, she said. "We anticipate that further exploration in this direction will provide valuable insights for the field, shedding light on the intricate processes influenced by Nef and contributing to a deeper understanding of the broader implications for viral dynamics."

DOI: 10.1016/j.mcpro.2023.100676

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Rare mutation in Amish linked to high cholesterol

By Farah Aziz Annesha

Low-density lipoprotein, or LDL, is commonly called "bad" cholesterol since high levels of LDL increase risk of coronary heart disease.

A recent study conducted on Amish individuals, who are genetically unique due to their isolation from the general population, showed an association between a novel mutation in the SORT1 gene and LDL levels. SORT1 encodes the protein sortilin, which may influence LDL levels. However, functional studies on the gene yielded contradictory results.

In collaboration with the University of Maryland Amish Research Clinic, this study, led by Kelly Mitok at the University of Wisconsin–Madison, is the first to establish a direct link between the SORT1 gene and LDL cholesterol levels.

"Every discovery that is made, including ours, is being added continuously to a library of information about the effect each genetic mutation has on humans," Mitok said. "So when a patient has a SORT1 gene mutation, the doctor can suggest preventative treatment to help reduce their risk of coronary heart disease, because now they know that this SORT1 mutation is linked to LDL levels."

In Alan Attie's lab, Mitok began her work on SORT1 by studying links between SORT1 mutations and Type 2 diabetes. However, her progress hit a roadblock. After speaking with colleagues at the Amish Research Clinic, she learned about the link between SORT1 and LDL.

The researchers collected blood samples from clinical trial participants at the clinic and conducted whole exome sequencing. This technique is used to locate mutations within the exomic, or coding, region of the genome. They also measured patient LDL levels. Mitok and her team analyzed these data sets, looking for conclusive evidence for any links between the two.

COURTESY OF KELLY MITOK

Researchers working on this study were invited to dinners in the homes of the Amish study participants.

Their findings, reported in an article in the **Journal of Lipid Research**, showed that one coding mutation in the SORT1 gene, K302E, led to higher levels of LDL cholesterol in the Amish. However, mice studies with this mutation showed contradictory results. An explanation for the contradiction could be due to the difference in metabolism between the two species. This invaluable study will be crucial in informing future research on SORT1 gene and its effect on human LDL cholesterol.

This discovery will also inform physicians, especially those who practice precision medicine. Like clothing that is custom-made to fit a person according to their measurements, precision medicine provides tailored treatments according to an individual's unique genomic data, environment and lifestyle.

Mitok traveled to the Old Order Amish community in Lancaster County, Pennsylvania, where she presented her team's findings to researchers at the Amish Research Clinic and members of the Amish community.

"The most rewarding aspect was how this went beyond just getting some data for research," Mitok said, "It was how the Amish community trusted us like family, inviting us to dinners at their homes and actively participating in the study. This is due to the strong personal connections … built with the Amish community from the start."

DOI: 10.1016/j.jlr.2023.100468

Farah Aziz Annesha (azizannesha98@gmail.com) is an aspiring science writer. She recently graduated from Yonsei University Underwood International College with a B.S. in biotechnology and a B.A. in comparative literature. She is an ASBMB Today volunteer contributor.

From the journals

We offer summaries of papers recently published in the **Journal of Biological Chemistry**, the **Journal of Lipid Research** and **Molecular & Cellular Proteomics**.

Linking plasma lipid profiles to cardiovascular health

Cardiovascular disease remains a top killer worldwide as scientists try to understand the genetic drivers of lipid abundance that increase this disease risk in humans. Using techniques such as ion mobility spectrometry and genetic linkage, a new study published in the Journal of Lipid Research mapped and identified the region of DNA affecting lipoprotein abundance and function from the plasma lipoprotein subfractions from 500 Diversity Outbred mice (genetically diverse mice used to identify genetic drivers of disease). Tara Price and colleagues at the University of Wisconsin–Madison cross-referenced these lipoprotein subclasses to the human genome to link mouse and human data, identifying genes that might drive lipid accumulation.

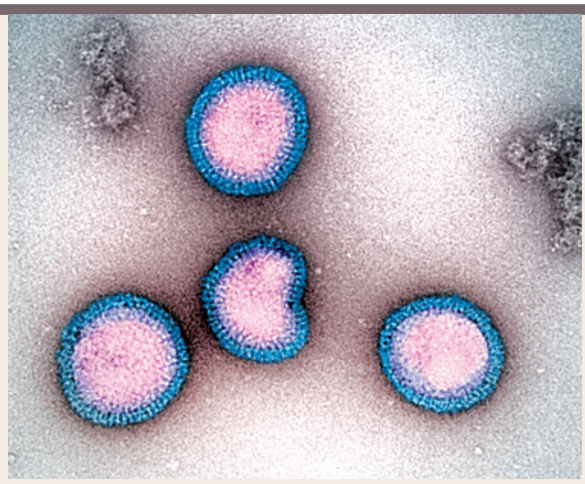
Read more news from ASBMB journals here:

Novel antiviral factor fights flu

The Centers for Disease Control and Prevention estimates that influenza virus makes more than 10 million sick per year in the U.S. During viral infection, the innate immune system is the first line of defense. This system comprises nonspecific receptors that recognize pathogen-associated molecular patterns. Activation of these receptors triggers downstream signaling cascades that drive expression or activation of antiviral factors, such as antiviral gene interferon-induced transmembrane protein 3, or IFITM3.

Despite more than 50 years of research, scientists know little about the effectors that regulate innate immunity. Therefore, Moiz Munir at the University of Texas Southwestern Medical Center and U.S. collaborators performed a genome-wide CRISPR–Cas9 activation screen to identify novel antiviral genes. They found a novel antiviral factor, JADE3, and published their results in the **Journal of Biological Chemistry**.

Most CRISPR–Cas9 screens used to identify antiviral effectors have focused on loss-of-function phenotypes. However, the researchers used a new approach, CRISPR activation, or CRISPRa, to identify factors that antagonize influenza in cultured HeLa cells. After the CRISPRa screen, they identified 10 novel genes that, when activated, conferred resistance to influenza infection. The team further investigated the candidate JADE3, since other researchers recently showed it can inhibit SARS-CoV-2 and norovirus infection. JADE3 is a member of a family that drives histone H4 acetylation, which regulates gene transcription. However, neither JADE1 nor JADE2 could protect against influenza infection, indicating that JADE3 possesses unique functions. After performing RNA sequencing and Western blots, the researchers found that JADE3 induces expression of IFITM3, an antiviral molecule important for restricting influenza, via nuclear factor kappa-light-chain-enhancer of activated B cells, or NF-κB.



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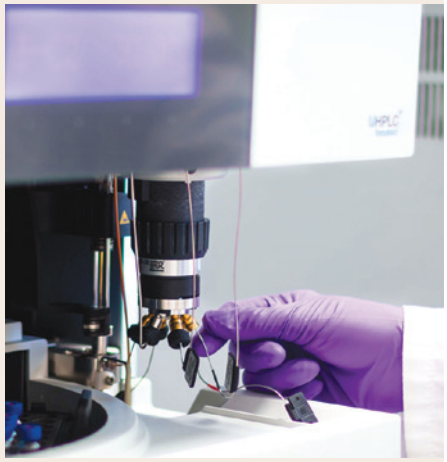
This study provides novel insight into the factors that regulate viral infection and could help researchers create antivirals that augment expression of JADE3. Future studies will investigate the molecular mechanism by which JADE3 regulates NF-κB.

DOI: 10.1016/j.jbc.2024.107153

— **Marissa Locke Rottinghaus**

Analyzing secreted proteins

Cells communicate via signals in response to environmental changes. Proteins can act as signaling cues, and proteins released into the extracellular space are known as the secretome. Secreted proteins play an important role in many diseases, such as cancer and cardiovascular diseases, and are potential targets for drugs and diagnostics. Researchers study the secretome using liquid chromatography-mass spectrometry, or LC-MS, or secretomics. LC separates compounds within a sample, while MS measures the mass-to-charge ratio of molecules present in compounds, which helps quantify and identify proteins.



In a recent review paper in **Molecular & Cellular Proteomics**, Sascha Knecht and a team from GlaxoSmithKline and the Technical University of Munich explored the challenges, approaches and applications of LC-MS–based secretomics. They noted that obstacles to achieving accurate results include cell death, serum proteins in cell culture studies, posttranslational modifications, unconventional secretion events and a high background signal due to intracellular proteins.

The three approaches to LC-MS-based secretomics are serum-free secretomics, metabolic labeling and proximity labeling. In serum-free secretomics, proteins are directly quantified from serum-free cell culture supernatants. In metabolic labeling, secreted proteins are labeled with affinity tags to selectively separate them from serum proteins. In proximity labeling, engineered enzymes are used to tag and enrich secreted proteins.

The authors explained that each approach has been applied in various biomedical research studies. For example, serum-free secretomics analysis has been used to study secreted proteins in macrophages, cellular communication in the immune system and cell death modes that contribute to inflammatory diseases. Metabolic labeling has been used to identify proinflammatory and immunomodulatory proteins as well as adipocytes. Proximity labeling has been used to track protein secretion in mouse blood plasma.

In summary, the authors stated that LC-MS–based secretomics gives an unbiased and comprehensive view of the secretome. With continued advancement, the authors noted that it may become a standard tool for studying secreted proteins in health and disease and ultimately in therapeutics.

DOI:10.1016/j.mcpro.2023.100636

— Jessica Desamero

The study noted a gene encoding neutral ceramidase, Asah2, a novel candidate driver linked to large high-density lipoprotein particles known as HDL-2b, which are good predictors of human heart disease. To understand the role of Asah2, the researchers characterized mice that had been genetically altered to lack Asah2 and found that various lipoproteins in these mice were affected, as opposed to unaltered mice; specifically, HDL levels increased among mice lacking Asah2.

This method could be used to study other candidate genes, which might widen understanding of lipoprotein abundance and open avenues for treatment of cardiovascular diseases.

DOI: 10.1016/j.jlr.2023.100471

— Poornima Sankar

High cholesterol: two screens are better than one

According to the Centers for Disease Control and Prevention, familial hypercholesterolemia, or FH, affects one in 250 people in the general population. The likelihood of having coronary heart disease, or CAD, at a younger age increases with an FH diagnosis. In a fasting individual, very high levels of low-density lipoprotein cholesterol, or LDL-C, are usually associated with a clinical FH presentation. Early confirmation of FH, particularly in young individuals, could allow for better disease management and a more positive prognosis.

In a recent **Journal of Lipid Research** study of more than 1,000 individuals in Portugal, Ana Margarida Medeiros of the National Institute of Health of Doctor Ricardo Jorge and her team characterized the genetic background of individuals with FH. The researchers confirmed FH at the genetic level, classified FH variants

according to the latest guidelines and identified genotypic variants of diseases similar to FH, such as polygenic hypercholesterolemia. This data suggests that a combined approach using the biochemical profile and genetic background of individuals with FH may be the first step in managing the disease.

DOI: 10.1016/j.jlr.2023.100490

— Sephra Rampersad

Imaging mass spectrometry for clinical use

Imaging mass spectrometry, or IMS, is a technology that combines mass spectrometry with spatial analysis to provide an unbiased, highly specific 2D map of the molecules that make up tissues. In a recent paper in **Molecular & Cellular Proteomics**, Jessica L. Moore and a team of researchers at Vanderbilt University reviewed the potential of matrix-assisted laser desorption ionization IMS, a subtype of IMS, for clinical diagnostics and prognostics.

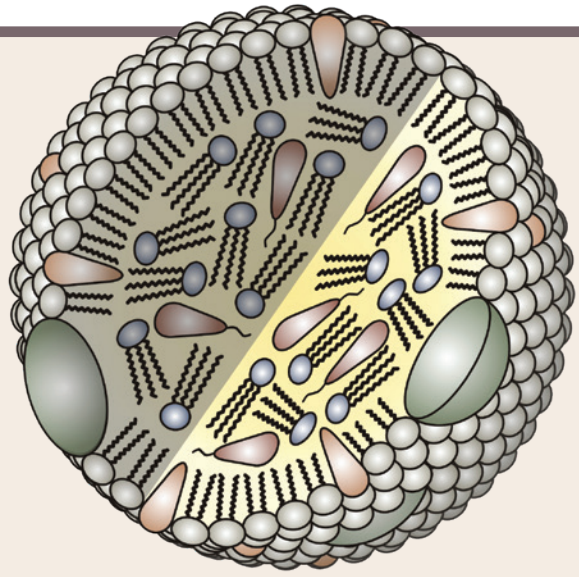
IMS allows researchers to probe tissue directly without the use of costly antibodies, and recent advances have significantly reduced the time needed for experiments. The authors explained that combining IMS with microscopy, which has high spatial resolution, enhances molecular visualization, increases mapping accuracy and gives IMS even greater potential as a standard pathology tool. However, clinical IMS assays often require bioinformatic analysis. Therefore, the authors noted that the technical knowledge needed for analysis as well as the government approval process for clinical use, which hinges on proof of valid and efficient assay performance, may delay clinical adoption.

Finally, the authors stated that IMS is a useful tool for studying the molecular makeup of diseases. With continued IMS advancements, this technology could become better suited for clinical applications such as diagnostics.

DOI:10.1016/j.mcpro.2023.100576

— Jessica Desamero

What can you do with artificial lipoproteins?



Adiposomes are engineered lipid nanoparticles comprising a neutral lipid core surrounded by a monolayer phospholipid membrane. In a recent study in the **Journal of Lipid Research**, Zen Cao at the University of the Chinese Academy of Sciences and collaborators detailed how they used adiposomes to generate artificial lipoproteins, or ALPs, novel nanoparticles that mimic naturally occurring lipoproteins. They then characterized ALP functions in biological systems, validating their use as tools for research and medicine.

The authors explored the feasibility of generating ALPs and characterized how they compare with naturally occurring lipoproteins. They showed that cells take up ALPs via clathrin-mediated endocytosis and the ALPs degrade like native lipoproteins. After confirming ALP viability in culture, the team injected fluorescently labeled ALPs into the tail veins of mice. In the heart, lung, kidneys and skeletal muscle, ALPs were metabolized like native lipoproteins.

Apolipoprotein E-coated ALPs have a long lifespan and promote degradation of the low-density lipoprotein receptor. The authors noted that the physiological functions of ALPs were similar to naturally existing lipoproteins, such as improving glucose tolerance in mice and preventing apolipoprotein degradation when the ALPs were synthesized and exposed to trypsin. This suggests ALPs could be used to regulate lipoprotein function because researchers can precisely generate them with specific lipids and apolipoproteins.

ALPs could also be a useful drug delivery system. Agents such as liposomes have aqueous cores, but the ALPs' hydrophobic core is ideal for housing hydrophobic drugs. The clathrin-mediated endocytosis pathway that the authors identified for ALPs would ensure reliable drug uptake.

DOI: 10.1016/j.jlr.2023.100436

— Joseph Heath

Coming soon: Stellar science in the Second City

An interview with the co-chairs of the 2025 ASBMB Annual Meeting

By Marissa Locke Rottinghaus

The 2025 ASBMB Annual Meeting will be held April 12–15 in Chicago, and the two scientists running the show are hard at work making sure the program is filled to the brim with exhilarating science and captivating speakers.

The co-chairs — Donita Brady of the University of Pennsylvania Perelman School of Medicine and David Pagliarini at Washington University School of Medicine in St. Louis — talked to ASBMB Today about the cutting-edge science they're eager to showcase, how to make your annual meeting experience worthwhile and why they think it's important for investigators and trainees alike to attend.

Their conversation has been edited for length, clarity and style.

Donita Brady is an associate professor of cancer biology, the assistant dean for inclusion, diversity and equity in research training and the vice chair for inclusion and equity of cancer biology at the University of Pennsylvania Perelman School of Medicine.

Q: Who should attend this meeting?

Pagliarini: The ASBMB meeting can be a profound learning experience for scientists at all career stages. I think this meeting should be attractive to trainees as well as investigators.

I believe that the breadth of this meeting is one of its strengths. It's a great way to zoom out and experience the broad landscape of biomedical science. Attendees can get exposed to so many topics they would not see at more focused disciplinary meetings.

For me, the meeting always leads to new ideas and new directions. While running our laboratories, it's easy to get stuck in our lanes. We all need to periodically switch gears and seek out new directions.

Brady: One of the special features of the ASBMB meeting for a trainee is the opportunity to be exposed to different areas of science — especially if you are starting to think about those next steps in your career. If a trainee is unsure about what they want to pursue postgraduate school — a postdoctoral fellowship or a position in academia or industry — they can start to explore that by being exposed to the breadth of science that will be presented at the 2025 ASBMB meeting.

One of the reasons we added some new themes, such as synthetic biology and chemical tools, is to give attendees the opportunity to apply these tools in their typical areas of research and start to think about them in a new way.

Q: Tell me more about the themes you've selected for the symposia.

Pagliarini: First, we thought a lot about scientific areas related to our own interests and expertise. A couple of themes are very near and dear to my heart, such as metabolism and biosynthesis, interorganellar communication and molecular movement. We also thought about fields that are rapidly developing because we want these events to be helpful for attend-

ees. We recognize that chemical tools and synthetic biology have broad and expanding utility in the biomedical sciences.

Of course, we also thought about foundational fields with a longstanding presence at the ASBMB meeting.

Brady: When thinking about how to incorporate epigenetic modifications to the genome this year, we decided to focus specifically on the context of cancer biology. We now really appreciate that epigenetic alterations are fundamental to the biology of tumors and avenues for therapeutic targeting.

Q: How did you select the symposia organizers?

Brady: We tried to identify people who have been longstanding leaders in their fields and people who are at the forefront and making new, groundbreaking discoveries.

Pagliarini: We set our sights on theme leaders who are not only excellent scientists but also charismatic, energetic and broad-minded. Any one of these themes could be a multiday stand-alone meeting. There's so much breadth and ground to cover. We encouraged the organizers to think broadly about how to sample across the full spectrum of their themes.

Q: Do you have any advice for poster presenters?

Pagliarini: It can be hard to know what to expect. You are in a sea of posters and may worry about how to stand out. Just realize that one or two substantive interactions at poster sessions are the big difference-makers. Focus less on trying to promulgate your work to many people and more on fostering a few in-depth conversations that may give you fresh eyes on your science.

Q: What advice do you have for grad students and postdocs planning to attend?

Brady: For the first time, this year we're going to have a daylong symposium for graduate students and postdocs on the Saturday of the meeting. This event is being organized by our journals' early-career reviewers and will highlight the research of our next generation of scientists, in particular those who will soon be on the job market. Graduate students and postdocs chosen based on their abstract submissions will present their research at the podium and will have the opportunity to receive feedback from peers. This event will also include a panel discussion covering career paths in academia and industry.

Many of us made our very first professional connections and built cohorts as a result of our participation at ASBMB annual meetings, and we want rising stars in the BMB field to make meaningful connections with fellow researchers that will endure for years to come. So we encourage all graduate students and postdocs to start thinking about their abstract submissions as the annual meeting in Chicago provides more presentation opportunities than ever before. You'll hear more about this event as well as the many other opportunities to meet and network with new and seasoned researchers at poster sessions, meetup events, interest groups sessions and workshops in the coming months.

Pagliarini: Trainees should never hesitate to approach speakers. I remember when I was a trainee, and even a new assistant professor, I'd go to meetings and see well-established speakers gathering together. At first, I felt somewhat excluded. But then I realized,

About the 2025 co-chairs

DONITA BRADY is an associate professor of cancer biology, the assistant dean for inclusion, diversity and equity in research training and the vice chair for inclusion and equity in the cancer biology department at the University of Pennsylvania Perelman School of Medicine. She's also an associate editor for ASBMB's Journal of Biological Chemistry.

The Brady lab studies metalloallostery. They're defining the mechanistic features of copper-dependent kinases to target them in cancer via drug repurposing or development.

DAVID PAGLIARINI is a professor of cell biology and physiology at Washington University School of Medicine in St. Louis.

The Pagliarini lab is working to define the functions of uncharacterized mitochondrial proteins, identify new gene mutations that underlie human diseases and explore new molecular therapeutics to rectify mitochondria-based disorders.

Dave Pagliarini is a professor of cell biology and physiology at Washington University School of Medicine in St. Louis.

after having a lab for a while, these are just people who are happy to see their colleagues. These meetings are a chance for them to reconnect. But, once you break in, they're delighted to talk to you. They want to help and welcome you. Often, by taking that brave first step to introduce myself, I began to form connections.

Q: When did you attend your first ASBMB meeting, and what was that experience like?

Pagliarini: My first ASBMB meeting was back in 2003. I was a graduate student in Jack Dixon's laboratory. Jack is a former president of the ASBMB, and he was at the meeting to receive the William C. Rose Award. It was the first time I went to a big international meeting. It was inspiring to see my adviser winning an award, and it really reinforced the importance of the society and why Jack had been so passionate about it. It was why we had often published in ASBMB journals.

Brady: My first ASBMB meeting was in 2021 when I was invited to give a talk. I really loved the meeting because of the breadth of the science it featured and the way it connected to so many areas of research. That's what I loved and why I continue to come back.

Q: It's been almost eight years since the meeting was last held in Chicago. What should readers know about the location?

Pagliarini: It's a beautiful, vibrant city. And it is home to many prominent institutions. I think Chicago is quite a gem of the Midwest. It definitely won't disappoint.

Brady: I am really excited about it as a destination. It's centrally located, so I hope it will be attractive for those in the Midwest, on the coasts and outside of the United States.

Chicago has a beautiful culture and museums as well as some of the world's leading institutions. This location will provide an opportunity for the undergraduates in Chicago to attend their first meeting, catch the bug of what it means to be a scientific researcher as well as present their research on a world stage.

Q. For the past couple of years, ASBMB has invited local students to the meeting for Community Day. Any thoughts on doing it in Chicago?

Brady: It's our responsibility, as researchers and scientists, to provide that outreach to the public. Any meeting like this, no matter the location, can give back to the community. I think that connection to the area is something Dave and I would love to see as a part of the meeting. There's an opportunity for us to make a difference in the Chicago community.

Marissa Locke Rottinghaus (mlocke@asbmb.org) is the science writer for ASBMB.

2025 thematic symposia

Chemical tools to reveal new biology
Organizers:
George Burslem, University of Pennsylvania
Yael David, Memorial Sloan Kettering Cancer Center

Enzymes and pseudoenzymes
Organizers:
Shantá D. Hinton, College of William and Mary
Vincent Tagliabracci, University of Texas Southwestern Medical Center

Host–pathogen interactions
Organizer:
Tamara O'Connor, John Hopkins School of Medicine

Interorganellar communication and signaling
Organizers:
Navdeep Chandel, Northwestern University
Isah Jain, Gladstone Institute-UCSF

Lipids and membranes
Organizers:
Gerry Hammond, University of Pittsburgh
Judith Simcox, University of Wisconsin

Metabolism and biosynthesis
Organizers:
Lydia Finley, Memorial Sloan Kettering Cancer Center
Gerta Hoxhaj, University of Texas Southwestern Medical Center

Metals of life: From microbes to medicine
Organizers:
Sabeeha Merchant, University of California, Berkeley
Amit Reddi, Georgia Tech

Molecular movement and compartmentalization — Contacts, transporters and nanodomains
Organizers:
Nora Kory, Harvard T.H. Chan School of Public Health
Tim Levine, University College London

Oncogenic hubs: Transcriptional and epigenetic complexes in cancer
Organizers:
Cigall Kadoch, Harvard University
G. Greg Wang, Duke University School of Medicine

RNA biology
Organizers:
Sergej Djuranovic, Washington University in St. Louis
Olivia S. Rissland, University of Colorado School of Medicine

Structural biology of proteins and subcellular structures
Organizers:
Christopher Barnes, Stanford University
Breann Brown, Vanderbilt University

Synthetic biology
Organizers:
Vatsan Raman, University of Wisconsin–Madison
Danielle Tullman–Ercek, Northwestern University

Empowering futures: The transformative power of mentorship in science
Organizers:
Nisha Cavanaugh, Sanford Burnham Prebys Medical Discovery Institute
Orla Hart, Purdue University
Reinhart Reithmeier, University of Toronto

Maximizing access through diversity, equity, inclusion and accessibility
Organizers:
Carlos Lopez, Altos Labs Inc.
Teresita (Tere) Padilla-Benavides, Wesleyan University

The visa voyage

International scientists fight through red tape and regulations for a chance to train and work in the U.S.

By Marissa Locke Rottinghaus

Belarusian native Maksim Dolmat spent hundreds of hours and thousands of dollars learning English, completing his visa application and studying for exams for a chance at his American dream. He is now a green card–carrying postdoctoral fellow at the University of California San Diego.

Andrea Pereyra viewed the U.S. as the mecca of higher education, so she pursued a postdoctoral fellowship outside her homeland, Argentina — and constantly faced the pressures of the visa renewal process. Seven years later, Pereyra, now assistant director of postdoctoral life design at Johns Hopkins University, was recently awarded her green card.

Ankita Arora came to the U.S. from India in pursuit of a postdoctoral fellowship and has been waiting for a green card for almost a decade. She wants to be a science writer, her true passion, but feels stuck as an experimental scientist.

When Ese Ekhator arrived in North Carolina, she found the climate much colder than her native Nigeria, and American food made her ill. She overcame these challenges to obtain a Ph.D. and is now a postdoctoral fellow at the University of Pittsburgh School of Medicine.

Anna Serquiña earned her M.D. in the Philippines more than 20 years ago, and then sought more training and a better life in the U.S. Like many female immigrants, she endured both racial and sexual discrimination. Serquiña is now a U.S. citizen, a mother and a research scientist at the National Institutes of Health.

Immigrant scientists make up more than half of the science, technology, engineering and mathematics graduate students and the doctoral-level scientific workforce in the U.S. However, changes to the visa process, such as increased fees and unprecedented wait times, may threaten these researchers' ongoing contributions.

"People say the current immigration system is broken, and that's an understatement," Steve Springer, director of regulatory practice liaison at the National Association of Foreign Student Advisers, said. "However, the current administration is friendly toward immigration and has been trying to make some meaningful changes."

From Belarus to Birmingham

Seven years ago, Maksim Dolmat stood outside the tall gates of the U.S. embassy in Belarus, a small country bordered by Russia, Poland and Ukraine. He wore his best clothes and carried little more than his passport and visa paperwork.

"I was so scared," Dolmat said. "I didn't tell anyone because I knew my chances of getting to America were so low."

When he decided to pursue his studies across the Atlantic, Dolmat did not speak English and had no family members in the U.S. He took a leap of faith and contacted a Russian immigrant who was a principal investigator at the University of Alabama at Birmingham.

He emailed her in both his native Russian and English, hoping she would respond in Russian. To his distress, he received a reply in English.

That exchange began a six-year partnership.

After an informal virtual interview, the professor promised to advocate for Dolmat if he applied to the graduate program at UAB. He spent hundreds of dollars on an English tutor and a flight to Moscow just to take the Graduate Record Examinations.

"The GRE is pretty challenging," Dolmat said. "I was so afraid to take it because I had spent so much money, and there was a chance for me to fail. When I saw my (preliminary) score on the screen, I almost cried."

His admission to the graduate program at UAB was the beginning of another steep learning curve.

"During my first outing with the lab, I maybe said two sentences the

THE UNIVERSITY OF ALABAMA AT BIRMINGHAM

Maksim Dolmat graduated from the University of Alabama at Birmingham, wearing his doctoral cap and gown over traditional Belarusian clothing.

entire time," Dolmat said. "It's one thing to take a test in English, and it's another to speak with Americans who jump around conversation topics constantly."

F is for fine

Most graduate students like Dolmat come to the U.S. to study on a university-sponsored F-1 visa, which is valid for up to five years. However, with STEM Ph.D.s now taking an average of 6.4 years to complete, these limits are becoming outdated.

The F-1 system worked relatively well for Dolmat, he said, as long as he didn't leave the U.S.

Some countries, including Belarus, only issue students a one-year F-1 visa. After that, students are allowed to stay in the U.S. on a valid I-20 form, a "Certificate of Eligibility for Nonimmigrant Student Status." However, if they want to leave the country to visit family or attend a scientific conference, they must renew their F-1 abroad before returning to the U.S., which can take months.

Dolmat never returned to Belarus during his Ph.D. "I was too scared of the processing times."

Embracing the English language was a challenge for Dolmat. So was adapting to the scale of the science and the workload. Belarus only had two nuclear magnetic resonance machines in the country, he said; at UAB alone, he had access to five.

"As an international student, you can get trapped in this bubble thinking 'I'm here, I need to get a green card, but to get a green card, I need a publication and to get certifications,'" Dolmat said. "So, you have this constant load on you that you need to work more and more and more, but it's not always true. You can easily burn out."

Dolmat earned his Ph.D. and transitioned from an F-1 visa to a self-sponsored green card based on his extraordinary scientific achievements. The visa application process took him over two years and thousands of dollars in immigration and lawyer fees.

He considered leaving the U.S. to pursue a career elsewhere.

China, Canada, the United Kingdom and Australia boast programs to attract and retain scientific talent. Immigration lawyer Paul Herzog said scientists are likely to have more success immigrating to Canada rather than the U.S.

Authorities judged Dolmat's green card application on the number of papers he published and their impact, measured in citations, during his Ph.D. He was lucky that his field, nanotechnology, is booming, he said. From 2003 to 2023, the number of papers published on nanotechnology increased twelve-fold.

For researchers in smaller labs or fields, like Ankita Arora, a science writer and researcher in Colorado, demonstrating extraordinary ability on a green card application can be nearly impossible.

"You have to be competitive in terms of the number of papers and citations you have," Arora said. "My background is in RNA. Right now, the field is picking up, but that was not the case 10 years ago."

Argentinian in America

After completing his Ph.D., Dolmat moved across the country to pursue a postdoc at UC San Diego. As a green card holder, he has the freedom and flexibility to pursue the career he wants.

Most immigrants do not enjoy the same autonomy.

Andrea Pereyra first visited the U.S. as a Ph.D. student to work temporarily in a collaborator's lab. She liked it so much that she decided to pursue postdoctoral training in the States.

"The U.S. is a kind of mecca for higher education, science, technology,

COURTESY OF ANDREA PEREYRA

Andrea Pereyra wears a souvenir pin in the shape of an empanada, one of Argentina's staple foods, and a ribbon in the national colors, that she purchased from a market in Buenos Aires.

advancement and progress," Pereyra said. "I felt like the U.S. matched my pace, and I liked the hardworking environment. The U.S. has a very data-oriented and data-driven spirit. It was a new place for me, and everything was new and shiny."

When she secured a postdoctoral position at Purdue University, the university offered her a J-1 visa, which is renewable for up to five years, and Pereyra thought nothing of it.

"A J visa is the easiest way to come to the U.S. as a scholar–scientist," Pereyra said. "I didn't know better at the time. I trusted the university."

Pereyra soon realized that her J-1 visa was going to cause her a lot of stress. It was only valid for 365 days, based on her one-year postdoc contract with the university. If she wanted the freedom to travel outside of the U.S., she had to take time off her research each year, go back to her home country and renew her visa on her own dime.

Sarina Neote, public affairs director for the American Society for Biochemistry and Molecular Biology, says this visa system hurts the U.S. economy. "This process squanders the substantial investment made in these scientists by the U.S. research enterprise and contradicts their tremendous value to U.S. competitiveness and innovation."

According to a recent National Science Foundation report, a rising number of U.S. citizens with Ph.D.s in the biomedical sciences are not pursuing postdoctoral positions. This comes on the heels of a "postdoc shortage" in academia. These statistics underscore the need for international scientists, Neote said.

Nonimmigrant intent

A J-1 visa, also known as a nonimmigrant visa, is designed for an individual to engage in temporary knowledge exchange in the U.S. Each time Pereyra returned to Argentina to renew her visa, she had to prove that she planned to return to her homeland after completing her postdoc.

"You feel like you're being evaluated like you're seven years old again, and you're being given a test in front of all your schoolmates in another language," Pereyra said.

Proving nonimmigrant intent is the only time in the U.S. legal system that someone is guilty until proven innocent, Springer said.

"When you go to the U.S. consulate, it is your duty to prove to them that you do not plan to emigrate," Springer said. "It's really hard to do, especially if you are 18 years old."

Pereyra had learned English when she was six years old, but she said she still felt uncomfortable at the embassy.

"You see people getting denied because they don't have enough ties to Argentina, and (the immigration officials) fear that you might be at risk of illegally immigrating or overstaying your visa," she said. "You feel safe because you are sponsored by the university, but you never know what (the officials) are going to say."

Springer advised having an elevator pitch about your plans ready for the immigration officer at the embassy.

Even after getting a visa stamp at the U.S. embassy, immigrants can still be denied entry at the U.S. border, Pereyra said.

"A visa is just a ticket to come knock on the border," she said. "The officer at the border has the ultimate decision on whether or not to let you in."

Both Pereyra and Arora advise trying to avoid a J-1 at all costs. Unlike a student on an F-1 visa, who can be granted a grace period to find work, once a postdoc with a J-1 visa completes their position, they must return home for a minimum of two years. Getting a waiver is possible, but extremely difficult and time-consuming, said Arora.

Immigration alphabet soup

After almost five years, Pereyra grew tired of jumping through hoops to renew her J-1 visa; she petitioned her university for H-1B sponsorship. An H-1B visa is available to those in a specialty occupation, such as science, and allows immigrants to consider permanently moving to the U.S.

Pereyra had married a U.S. citizen, so a dual intent visa better suited her needs.

"I had to be very adamant on my request," she said.

Universities always offer postdocs a J-1 visa because it is cheaper and easier for them to file, Springer said.

After eight months, Pereyra finally got her H-1B, putting her one step closer to officially immigrating. However, she was still subject to a one-year renewable contract. As with her J-1,

every year Pereyra had to travel abroad to a U.S. embassy to renew her visa.

Herzog advises advocating for a three-year work contract to qualify for an extended visa; thus, avoiding the annual pressure to go home and renew.

The U.S. Department of State recently announced a pilot program allowing H-1B visa holders to renew domestically, which could eliminate the need for excessive trips abroad.

When it came time for Pereyra to apply for her green card, she wanted to complete the process based on her own merits, rather than using a marriage-based sponsorship, she said. However, her lawyer advised her to apply for a family-sponsored green card, based on time, complexity and cost.

"My lawyer told me to swallow my pride," Pereyra said.

She took the path with fewer obstacles. After 18 months, this Argentinean M.D./Ph.D., finally got her green card.

It matters where you come from

Belarus and Argentina are small countries, with populations of 9.5 million and 46 million, respectively, so Dolmat and Pereyra faced relatively short waiting times for their visa renewals.

India has a population of 1.4 billion, and millions of Indians come to the U.S. each year for school or work. For them, legal permanent residency can be a life-long pursuit.

Arora immigrated to the U.S. more than eight years ago and has been fighting the system ever since, she said.

After "getting stuck" in a J-1 visa for five years, Arora said she struggled to find a job for her to remain in the U.S. Eventually, her husband, an engineer with a master's degree, applied for a green card with Arora listed as a dependent, even though she has a successful, independent scientific career.

That was in 2014. They still face years of wait time.

Each country is allowed 7% of the 140,000 employment-based green cards awarded by the U.S. per year. The number of Indians that apply each year dwarfs the number of green cards awarded.

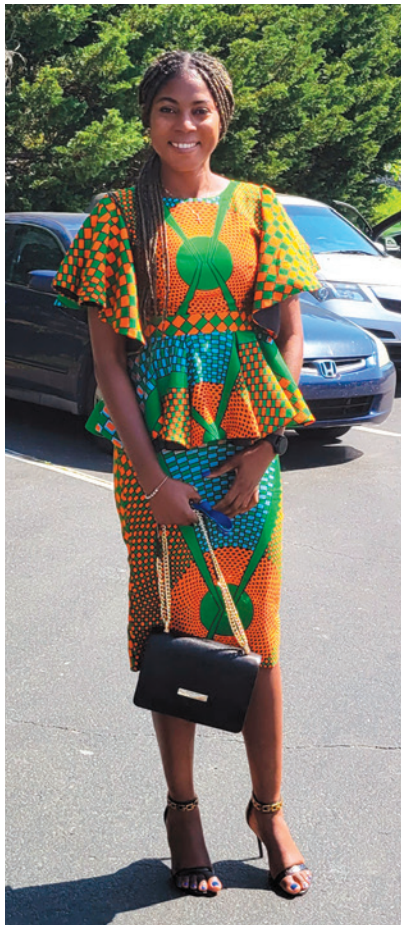
"The system is discriminating against people based on the country they are born in, which they have no control over," Arora said.

Like Dolmat's, Arora's family green card application is judged on merit. However, as Indians, Arora and her

COURTESY OF ANKITA ARORA

Ankita Arora visits the Golden Temple in India.

Immigrant scientists make up more than half of the science, technology, engineering and mathematics graduate students and the doctoral-level scientific workforce in the U.S.



COURTESY OF ESE EKHATOR

Ese Ekhator attends church in North Carolina wearing custom-made, traditional African attire. "I usually wear this when I miss home because it makes me feel connected," she said.

husband face intense competition.

"The yardstick that they're measuring us with is different than the yardstick they're measuring somebody else with," Arora said. "And all of this would not be an issue if I wasn't from India."

Arora is now considering filing for her own green card. Because she has a Ph.D., her application will be placed in a smaller pool than her husband's. However, even for Indians with extraordinary ability and the highest education, estimated wait times for a green card can be more than three years.

If a person from India applied today, they could die before receiving their green card; wait times surged last year to 134 years. A staggering 1.1 million Indians are waiting for a green card, and only 8% of those individuals will be awarded one this year.

Recently, the United States Citizenship and Immigration Services, or USCIS, increased the fees that employers, such as universities and companies, pay to file an H-1B visa. The agency said these increases will help reduce the backlog of applications. However, Springer said major reforms are needed.

"The last major updates to this system were 50 years ago," he said. "It was created for a world where people weren't moving around like they are today."

Walking on eggshells

While they wait, green card applicants must continuously prove their importance to the U.S. scientific enterprise and do nothing to lower their chances, Arora said; a person cannot change jobs or even think about changing fields.

"This is definitely an area where immigration law has not caught up with the way the world works," Herzog said.

Arora, an ASBMB Today contributor, wants to pursue a career in science writing, she said. However, such a career switch would set off red flags with USCIS.

"Once you have your green card, you can switch fields," Arora said. "A green card allows you that freedom. But until you cross that hurdle, you are in some ways forced to be within a straight-line career path."

A narrow path

Ese Ekhator emigrated from Endo State, Nigeria, where she was pursuing a master's degree at the University of Benin, Nigeria. Through this program, she met a professor who offered her an opportunity to do research in the U.S.

"I was so scared because we didn't have a lot of money, and I didn't know how I was going to sponsor myself," Ekhator said.

Her adviser let her start out as a research assistant, earning a salary to support her new life in the U.S.

When she arrived at North Carolina A&T University in January 2018, she didn't have the right clothing for the Carolina winters.

"When I first moved here, I cried a lot," Ekhator said. "The food was different; the weather was different; everything was just different. I was really suffering."

After working as a research assistant for a few months, Ekhator transitioned to a Ph.D. program.

There were moments when she considered moving back to Nigeria, Ekhator said. Her advisers helped her cope.

In 2024, Ekhator successfully defended her thesis. She said she dreamed of a job in industry. However, few of the positions she was inter-

ested in would sponsor immigrants, Ekhator said.

According to a recent report in PLOS One, U.S. citizen status significantly influences career choice. Non-U.S. citizens are more likely to pursue a research-intensive career. Arora said this may be because immigrants need to prove their scientific worth.

"It became a real problem for me," Ekhator said.

After speaking with her adviser, she decided an academic postdoc would be her best option.

"Maybe someday I will find my way back to industry," she said.

Most companies willing to sponsor an H-1B visa are on the coasts, where the cost of living can be a hindrance, especially for immigrants who have additional expenses.

With H-1B fees rising, fewer companies, especially small and midsize startups, may be willing to sponsor immigrant scientists.

The American Dream

Anna Serquiña is a Filipino research scientist at the National Institutes of Health, who immigrated to the U.S. to pursue a Ph.D. At the time, she could only afford to apply to four programs; but eventually obtained her Ph.D. from the University of Massachusetts.

For many women, including Serquiña, immigrating to the U.S. is a major milestone, and they take pride in overcoming challenges.

On Serquiña's trip home after interviewing for Ph.D. programs, she was racially profiled.

"I was pulled off the airplane, and an officer rifled through my purse, asking me questions," she said. "It was so scary … He accused me of being a 'mail order bride.'"

COURTESY OF ANNA SERQUIÑA

Anna Serquiña poses for a photo after becoming a U.S. citizen in 2015.

Almost 15 years later, Serquiña still struggles to find her identity as a Filipino in the U.S.

However, she said all the challenges associated with immigrating were worth it. When she obtained her U.S. citizenship, she said she felt a weight had been lifted from her shoulders. She was able to train in a specific field, become technically proficient, publish papers and collaborate with world-renowned scientists.

"I'm actually living a career path I only dreamt about before," Serquiña said. "So, in a way, that's my American dream; it's being able to survive on what I earn and have a car and a roof over my head. I never would have been able to afford these on my own in my home country."

Pereyra, who describes herself as a "proud daughter of Argentina's public education system from kindergarten to graduate school," is still finding out where she belongs in the U.S.

"I'm still trying to figure out what the American Dream is," Pereyra said.

Dolmat is on his way to becoming a U.S. citizen while working as a postdoc. He has a surfboard and a framed journal cover showcasing one of his best scientific papers in his California apartment. This year, using the money he has made in the U.S., he is gifting his parents a trip to Italy.

"America is great for opportunities," Dolmat said. "There is no doubt about that."

Marissa Locke Rottinghaus (mlocke@asbmb.org) is the science writer for ASBMB.

Will Congress revive the 'China Initiative'?

By Dulce Hiraci Gomez

A controversial 2018 policy designed to counter threats of economic espionage, known as the China Initiative, ended more than two years ago. However, in the first version of an appropriations bill for fiscal year 2024, policymakers included language to re-establish the program.

On March 3, after a request from the Congressional Asian Pacific American Caucus, the House and Senate Appropriations Committee removed the language for the program, but not before reviving concerns among activists and scientists.

The Asian Americans Advancing Justice is a national affiliation of five leading organizations advocating for the civil and human rights of Asian Americans and other underserved communities. Joanna YangQing Derman is the director of anti-profiling, civil rights and national security at AAAJ.

DERMAN

"While the China Initiative was terminated two years ago," Derman said, "it is too early to perceive this time frame as 'post China Initiative' with policies at the state level and bills percolating in Congress today."

The Asian American Scholar Forum is a nonprofit organization promoting academic belonging, openness and equity. Gisela Perez Kusakawa, the executive director at AASF, emphasized the importance of killing efforts to revive the initiative.

KUSAKAWA

"Ending of the China Initiative was a necessary step in the right direction for our country," Kusakawa said. "Our country is made stronger when Asian Americans and immigrants can contribute freely without fear of discrimination, and we continue to address the lasting chilling effect caused by the China Initiative and advocate for policies that cultivate talent and open science."

In a press release, CAPAC leaders stated that the China Initiative "failed to meaningfully safeguard national security" and stated that they would continue to "fight for laws that respect the equal rights of all Americans and our country moving forward."

How it started

The Department of Justice launched the China Initiative in 2018 as the first program focused on countering threats of economic espionage from a specific country. The initiative reflected the DOJ's priority of countering Chinese national security threats and reinforcing the President's national security strategy.

Science and advocacy organizations expressed concerns about racial profiling when a majority of defendants accused under the policy were of Chinese descent or nationality. Beginning in 2019, several cases brought charges against scientists on research integrity issues, the most prominent being a failure to disclose relationships with Chinese institutions on federal grant applications for funds from the Department of Energy, National Science Foundation, NASA and National Institutes of Health.

Under the China Initiative, federal prosecutors openly investigated 150 U.S.-based academic scientists, and 24 were prosecuted on criminal charges. During the program, 85 scientists resigned, retired or were fired due to cases of grant fraud.

Concerned about racial profiling and Asian Americans being viewed as "perpetual foreigners," Rep. Ted Lieu, D-Calif., and 90 members of Congress sent a bicameral letter to Attorney General Merrick Garland in July 2021 requesting a Department of Justice investigation.

"It's important to link the concept of the 'perpetual foreigner' to discourse around national security,"

Derman said. "If we were to reflect on the exclusion, traumatization and scapegoating of our communities, we'll see that Asian Americans and Asian immigrants have been unfairly characterized as national security threats."

The program ended on Feb. 23, 2022, after several cases resulted in dropped charges, dismissals or acquittals due to insufficient proof by the prosecutor.

Effects on the scientific community

Foreign-born talent makes up about one-quarter of the U.S. science, technology, engineering and mathematics workforce and more than half the nation's postdoctoral community. China has supplied a significant number of U.S.-based scientists for more than two decades. In 2020, 46% of Ph.D. recipients in STEM fields were temporary visa holders, with 37% of these coming from China.

While it has been two years since the termination of the China Initiative, the program had a chilling effect on international collaboration within the scientific community while hampering academic freedom. Researchers and scholars of Chinese descent report fear of conducting research.

Scientists in STEM fields reported increased concerns about U.S. government investigations with the DOJ's perception of "sensitive" information in their line of work. This fear climate has already pushed talented scientists to leave the U.S., endangering the nation's ability to attract talent from China and around the world. In 2020 alone, more than 1,000 Chinese researchers left the country.

The AASF conducted a national academic climate survey from Dec. 2021 to March 2022 of 1,300 scientists of Chinese descent employed by U.S. universities in tenure-track positions to "provide data that demonstrates the wide-spread fear and its impact," Kusakawa said. "It's a powerful tool in highlighting the critical issues and calling the much-needed attention."

The survey reported 42% of the scientists were fearful of conducting research and 65% were worried about collaborations with China. It also reported that 45% of scientists who have obtained federal grants now wish to avoid applying, and 61% have thought about leaving the U.S.

An analysis of the NSF merit review system also reported a 17% drop in overall grant application submissions between 2011 and 2020, with a 28% decline in proposals from Asian investigators.

"It is critical that federal agencies and academic institutions work with Asian American and scholar communities to come together towards genuine solutions and a system that allows us to retain and attract talent and enhance a safe and welcoming academic environment," Kusakawa said.

Updated federal policies

Research in the U.S. benefits from international collaboration and attracting scientists from around the world. The China Initiative appears to have weakened and ultimately slowed scientific progress due to concerns about racial profiling and unequal treatment.

Protecting research security is important, however, and advocacy organizations have encouraged policymakers to allow federal agencies, led by scientists, to tackle these issues in-house.

"It is important to continue pushing rigorous oversight on training curriculum for law enforcement agents on racial profiling, transparency in reporting across federal agencies and dismantling the perpetual concept associated with the Asian American community," Derman said.

In Dec. 2020, the U.S. Government Accountability Office released recommendations for six federal funding agencies to safeguard U.S. research from foreign threats. A month later, the White House Office of Science and Technology released a memorandum aimed at restoring scientific integrity in the federal government.

Prior to the report and memorandum, each federal agency had different reporting requirements and guidance, making it difficult for scientists to navigate grant applications for multiple funding agencies.

Since then, federal agencies such as the NIH and the NSF have significantly improved their policies to provide clarity and security to the research community.

But the attempt to return the China Initiative in this year's appropriations bill has kept advocates vigilant, including Durman, who said, "It is important that advocacy and science organizations continue working together to dismantle programs and policies that reinforce harmful stereotypes of Chinese researchers and damage the advancement of the scientific enterprise."

Dulce Hiraci Gomez
(dgomez@asbmb.org) is ASBMB's policy analyst.

Science across borders

PROLAB brings the next generation of international researchers into North American labs

By Ankita Arora

During the summer of 2022, Horacio Martín Pallarés often spent time in the Stowers Institute for Medical Research library, playing piano and making new friends to unwind after a fruitful day at the bench. Pallarés, who recently earned his Ph.D. at the Leloir Institute Foundation in Argentina, considers his three months learning ribosome profiling at Ariel Bazzini's lab at Stowers to be instrumental in his career progression, and he's preparing to return as a postdoc in Bazzini's lab.

Pallarés' first stay at Stowers was made possible by the Promoting Research Opportunities for Latin American Biochemists, or PROLAB program, a joint initiative of the American Society for Biochemistry and Molecular Biology, the Pan-American Society for Biochemistry and Molecular Biology and the International Union for Biochemistry and Molecular Biology. For more than a dozen summers, PROLAB has given more than 100 biochemists and molecular biologists travel grants so they could gain exposure to new scientific technologies at collaborators' labs in the U.S. and Canada.

In 2005, Judith Bond, then ASBMB's president, traveled to the PABMB annual meeting in Buenos Aires, where she was impressed by the work presented by students and postdocs.

"The science was of high quality, even though some of these countries are experiencing political unrest and variable economies," Bond said.

She could foresee many benefits from increased collaboration between North and South American scientists, with researchers in the U.S. looking south for untapped talent.

Joined by their shared vision to foster international collaborations, four former ASBMB presidents — Bond, Bettie Sue Masters, Heidi Hamm and Susan Taylor — submitted a proposal to the ASBMB Council to provide funding for the program.

Along the way, IUBMB and the PABMB provided additional support, expanding the program to include international scientists from Spain and Portugal.

ASBMB has continually renewed PROLAB since its inception, based on the excellent feedback the Awards Committee has received from both the trainees and the trainees who take them into their labs.

Host–virus interactions

As a Ph.D. student, Pallarés found that the Zika virus counteracts the host cell's antiviral response by modulating the translation of antiviral genes. To verify this observation, he needed to use a high-throughput approach such as ribosome profiling, which measures gene expression at the transcriptome level.

"I wanted to do ribosome profiling, and not many laboratories do that kind of science here in Argentina,"

Horacio Pallarés (standing, third from right) hangs out in the gym with the Stowers volleyball team in 2022.

Pallarés said. "Actually, there are none."

He heard about PROLAB from Diego Alvarez, a professor at the University of San Martin, Argentina, who had sent students from his lab to the U.S. with the program.

"I got very excited," Pallarés said.

Ariel Bazzini, an expert in gene expression, especially in RNA stability and translation, and a pioneer in adapting ribosome profiling in a whole zebrafish embryo, was a perfect fit for what Pallarés was looking for.

Pallarés applied the technology to answer critical questions for his thesis project; his findings will soon be pub-

lished in a leading scientific journal. He also brought his new skills back to Argentina, where he mentored peers and started performing ribosome profiling.

"Sometimes, we don't realize that one Ph.D. student goes to another lab and learns something, and when he goes back, he can teach that to the entire community," Bazzini said.

A perfect match

Bazzini, also originally from Argentina, benefited from a year in the U.S. as an undergraduate, and he wants to give others similar experiences.

"PROLAB presents a great opportunity to meet a scientist," he said. "It's a way for us to give people who don't know about the Stowers Institute a chance to work in a different type of institute for a couple of months, and then they can leave and spread the word of how we work."

As a postdoc, Pallarés wants to continue his work on Zika and see if similar mechanisms of altering the translation of host genes occur in other viruses transmitted by mosquitoes, such as dengue or yellow fever.

"I want to study how the genomes of the viruses are translated as well," he said, "if there are viral small open reading frames that could be translated and impact the host cell."

He also hopes to learn other techniques, such as mass spectrometry, and eventually return to Argentina and open a laboratory implementing these techniques.

"Horacio brings with him a lot of virology experience," Bazzini said. "Now, we can apply molecular tools that we've developed in the lab to understand how thousands of genes are regulated during viral infection . ... He's bringing different expertise and problems to the lab's table and expanding our research direction. We're very excited."

A career in reproductive biology

Ferran Barrachina, now a senior scientist at a clinical-stage startup, Gameto, received a PROLAB award as a Ph.D. student at the University of Barcelona, Spain, in 2019 to visit Sylvie Breton's lab at the Massachusetts General Hospital and Harvard Medical School. Barrachina's research focuses on reproductive biology, from understanding sperm maturation in the epididymis to the role of immunology in male infertility and, most recently, developing therapies to improve female reproductive health.

During his PROLAB fellowship, Barrachina learned techniques such as flow cytometry and high-resolution confocal microscopy and performed animal studies, allowing him to finish key experiments for his thesis work. After defending his thesis in Spain, Barrachina returned to Breton's lab for his postdoc.

"Those two months were extremely productive," Barrachina said. "I managed to publish a paper and present a seminar and two posters. … I also improved my language skills and got well-versed in a different culture."

At Gameto, Barrachina is helping build a cell-engineering platform that can differentiate human induced pluripotent stem cells into different types of ovarian cells.

"We're trying to mimic an ovary on a dish, and then we can use this platform to improve the efficiency of current in vitro fertilization processes," he said.

Barrachina said his PROLAB and postdoc experiences helped him transition to industry and use his skills to improve women's reproductive health.

Life comes to a full circle

In the spring of 2012, Maria Jose Iglesias, a Ph.D. student at the University of Mar Del Plata, Argentina, was rushing to gather documents to apply for a new fellowship, PROLAB, before the deadline. A few months later, she learned that all her running had borne fruit.

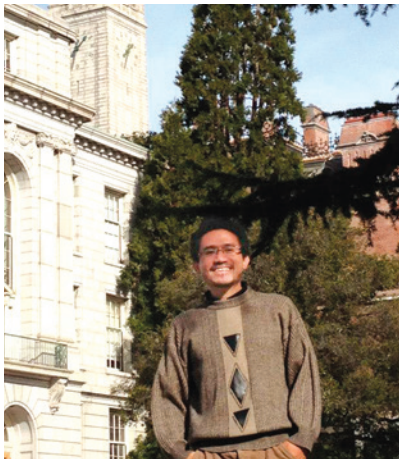
Iglesias spent three months at Mark Estelle's laboratory at the University of California San Diego, studying how

Ferran Barrachina works in an office overlooking Boston during his 2019 PROLAB summer in Sylvie Breton's lab at Massachusetts General Hospital and Harvard Medical School.

Patricia Becerra (left) and members of her lab in 2018, including PROLAB recipient German Michelis (third from left).

nitric oxide increases auxin signaling through protein modification of auxin receptors. She then returned to Argentina, finished her Ph.D. and moved to Bueno Aires for postdoctoral research. She was recently appointed a group leader at the Instituto de Fisiología, Biología Molecular y Neurociencias, CONICET-UBA, Bueno Aires, and continues her work on how protein modifications help plants adapt to changing environments.

"It was a lot of years ago, and since then, I've had short research experiences in Spain and Germany," Iglesias said. "But I still remember my short time in San Diego. It was very significant, and the city is great."



Omar C. Herrera stands in front of the Campanile on the University of California, Berkeley campus during his PROLAB summer in 2013.

What made her stay so significant? "Firstly, the ability to perform a lot of experiments and collect data in a few months that improved the quality of my thesis and journal articles," she said. "Secondly, it was my first experience in a world-class university. You have a lot of bright, brilliant scientists in the same place. In Argentina, we face difficulties in buying reagents and supplies; almost everything must be imported from the U.S. or Europe. … Everything is harder."

Working abroad can provide perspective on improving the system at home, she said. "One should try to establish new collaborations between scientists internationally, nourish previous collaborations and try to give exposure to trainees and students in Latin America to visit labs in the U.S. or Europe."

That is precisely what Iglesias is planning. She wants one of her students to apply for the PROLAB fellowship to work on a new project in Estelle's lab.

"We are returning to a scientific collaboration," she said. "This time, not as a student but as a Ph.D. supervisor. So, it's like a full circle."

Roadmap for the future

Omar C. Herrera, a 2013 PROLAB awardee from Peru, worked in Carlos Bustamante's lab at the University of California, Berkeley. Now a scientist at AxBio, Inc., he noted the program's ongoing benefits.

Without PROLAB, "I wouldn't be able to initiate the collaboration between the lab in Berkeley and the lab in Peru," Herrera said. "That collaboration gave me the opportunity to do my Ph.D. at UC Berkeley and be exposed to a collaborative environment, to a different culture, to the state-of-the-art science. It's like a perfect butterfly effect."

S. Patricia Becerra, a senior investigator at the National Eye Institute and a three-time host of PROLAB fellows, said the program builds strong reciprocal ties.

"All three fellows' stays … strengthened the relationship between the labs in their home countries and my lab," Becerra said. "For us, we learn quite a bit of what they are doing, and for them, they learn whatever we are doing here."

Judith Bond and Bettie Sue Masters have proposed a formal analysis of PROLAB, measuring benefits for both the trainees' home labs and those they visit.

"If the results are as good as I think they will be from our hearsay, I think the ASBMB might consider other types of programs like it," Bond said. "This is geared to South America, but there are other countries and emerging areas that might also benefit from something like this."

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Immigrants in the sandwich generation

Stories of three scientists wedged between science and family

By Arti Dumbrepatil

"Can you join us for a lab dinner get-together?"

The simple email in my inbox triggered chaotic thoughts. My husband and I were invited to an evening of fun and laughter, but I had to apologetically decline. We live thousands of miles from our extended families, so it is difficult to find reliable childcare. Because it was a weekend, we needed to be available to talk to our parents back in India. And to top it off, we were buried in paperwork for a visa extension.

This single email made me think about how immigrant scientists get sandwiched between raising a family and taking care of parents, all while juggling a demanding career and visa complexities.

We are the sandwich generation of immigrant scientists; we must care for both older and younger family members at once across continents and oceans. When I was struggling to cope as a new parent isolated from family and friends, I found that adjusting to new work routines was a challenge.

In addition to day-to-day activities with a baby who seemed never to sleep, the stress of visa paperwork and job assignments left my husband and me tired. I tried explaining these difficulties to our families, but they were unable to understand. We were shaken when my father-in-law developed a new illness. We felt helpless, and the burden of not being able to care for our parents darkened our thoughts.

I was determined not to let my personal or professional life suffer, so I pushed harder and harder, trying to achieve it all. I felt physically and emotionally drained. While talking to my friends and family, I started to think how difficult it is for immigrants to build a career in science as well as raise a family and care for extended family. How could I do it? Had anyone ever succeeded?

VIKAS YADAV

Arti Dumbrepatil with her daughter and husband

My questions led me to two scientists with experiences much like mine.

Shared struggles

Sandra Gabelli, executive director of Discovery Chemistry and head of Protein and Structural Chemistry at Merck & Co., immigrated to the U.S. with her husband and two daughters in 1992. She is of Italian descent but was born and raised in Argentina, where she left behind a comfortable and familiar support system. Just like us, her family experienced a seismic cultural shift and the first few years in the U.S. were stressful. Like me, she struggled to find proper childcare while I also dealt with the cultural stigma of leaving children with strangers. These similarities made me realize that thousands of immigrant scientists face such struggles.

"Understanding how child care works here was difficult," Gabelli told me. "Also, coming from Argentina I was clueless about the appropriate and safe hiring process for child care, and I almost ended up hiring the wrong person. In the end, I decided to take care of my girls at home while I was preparing for my graduate school admissions."

Immigration status dictates personal and professional life choices for many scientists, including Rajendra Upadhya, an assistant research professor of molecular genetics and

COURTESY OF SANDRA GABELLI

Sandra Gabelli and her family

microbiology at Duke University. He completed his Ph.D. at the University of Mysore, India, and came to the U.S. as a postdoctoral associate.

"After initially arriving on an H1B visa in 2004, I found myself confined by its limitations," Upadhya said. "Changing fields or labs required my PI's approval, and visa extensions were stressful and expensive, detracting from my personal and professional life. Balancing work and family life was incredibly challenging, especially without any family members around."

Upadhya's situation eventually improved, but not without making sacrifices.

"Fortunately, when my daughter was born, I was in a supportive lab where I had the flexibility to work at any time, allowing me to manage both work and family responsibilities smoothly," he said. "However, my wife and I made the decision not to have more children as we recognized it would hurt my research commitments and my family."

Finding support

Every immigrant scientist experiences a learning curve, balancing a career and family. We lack the luxury of calling on family for help. We struggle to care for our children and try to build a future in an unfamiliar land. We are unable to care for our aging parents when they are sick. We miss family functions when we can be together with all our relatives. We lose touch with childhood friends, and it can be challenging to talk to colleagues about personal issues. It is tough to keep going.

"My father passed away the week that I was taking my comprehensive exam," Gabelli said. "During my Ph.D. and postdoc at Hopkins, I learned to adapt and that shaped me into who I am today.

"My friends here became aunts and uncles, and my dear neighbors went for 'grandparent's day' to my kid's school. Friends would come to my rescue when I needed them to pick up my kids if I was sick at home. Attending a friend's wedding became attending a family's wedding. Following my passion for science with support from my new family enabled and empowered me as a mom."

Upadhya also stressed the importance of supportive academic mentors.

"As a scientist having a mentor who grants you ample freedom, ensuring you stay focused on your short- and long-term goals, is paramount," he said. "But it is important to look for a mentor who not only guides your scientific endeavors but also is understanding of your family situation. With such mentors, the lab atmosphere is positive, helping build great friendships with colleagues who become your family away from family while you are making positive contributions to the scientific field."

We all agree that it is important to acknowledge that you are not alone on this journey. Gabelli gave me my new mantra: "You may have a plan in life but be assured that life has a plan for you. Embrace it, appreciate the small joys, a good meal, a passionate discussion with your loved ones, a walk in the neighborhood and keep moving forward. In the end, it is these moments that will matter and be remembered as successes and not the struggles."

COURTESY OF RAJENDRA UPADHYA

Rajendra Upadhya with his wife and daughter

Arti Dumbrepatil (artidumbre@gmail.com) is a freelance science writer and communicator. With her academic training plus expertise in science communication, she transforms complex, jargon-filled science into enjoyable and comprehensible content. She is an ASBMB Today volunteer contributor.

Visa issues? PIs can help.

By Mark Rasenick

If you're a principal investigator, there's a good chance you've had international students and postdocs in your lab. At least one of them has probably had visa or immigration problems. You might think there's nothing you can do for them, but that's not true.

I want to share my own experience and, in doing so, show PIs how they can help these trainee scientists.

First, a bit of background. In 1999–2000, I was a Robert Wood Johnson health policy fellow working in the Senate Health Committee under the tutelage of the late, and sorely missed, Sen. Edward M. (Ted) Kennedy. Unlike many RWJ fellows, I returned to my lab even as I continued to dabble in policy.

When I got back to Chicago, one of my postdocs was being threatened with deportation to China. I don't recall the precise details. However, Sen. Kennedy's immigration staffer was a consummate pro, and I reached out to her. The problem was fixed in a few days.

There must have been a vibrant network among postdocs, as shortly after this, I received a series of calls and emails from colleagues at other Chicago institutions that could be summarized as "I heard you can do wonders with immigration; can you help my student/postdoc?"

Of course, I had to tell them no, Sen. Kennedy couldn't help them; his office had helped me as a favor to a former staffer. However, I did suggest they reach out to the local offices of Illinois senators or representatives, and I heard back that, for the most part, this was successful.

Constituent service is an important job for members of Congress, and they will help even people in their state who cannot vote, as long as those people are making a meaningful contribution. Members have access to specific persons in the Departments of State or Homeland Security who can help solve visa problems.

Granted, some members of Congress are more effective than others. Some aren't very good at constituent service, but those members tend to have a shorter half-life in office. Many offices are quite adept.

When I was working on the Hill, I got a call from a friend at Duke who asked for help with his wife's immigration status (they were originally Canadian). I told him someone would call him. He called the next week to tell me that someone from Sen. Jesse Helms' office had contacted him. Helms was a conservative noted for his opposition to civil rights, and my friend said he was not fond of the senator (I doubt that many North Carolina academics were). I reminded him the only thing that mattered to the senator was that he was a constituent. The issue was resolved in less than two weeks.

Many universities wish to limit their faculties' contact with members of Congress. However, with visa and immigration questions, you are asking only for you and your trainee, and the only relevance to the university is that your research benefits. If you live and work in an urban area, the person who represents the university may not be the one who represents you as a resident. Your senator or representative's staff are providing assistance on your behalf. They want to help you because they hope you will tell your friends and relatives that their office fixed the problem. And when they do, everybody wins.

Mark Rasenick (raz@uic.edu) is a distinguished professor of physiology and biophysics and psychiatry at the University of Illinois College of Medicine and a research career scientist at the Jesse Brown Department of Veterans Affairs Medical Center.

A scammer almost derailed my studies in America

By Ishita Ghosh

I am a person of calm and decisive mind. I have never indulged in impulsive purchases or investments; rather, I am cautious of every expenditure.

Leaving home for the first time in 2016 was a hard decision for me as well as for my widowed mother. The bright side was obtaining a Ph.D., which is held in high esteem in every middle-class Indian academic-oriented family.

My father had died the year before, and my two siblings and I were managing our emotions and finances at the same time. My elder sister spent her hard-earned savings on fees for my attempt at the English language exam required to apply to U.S universities. I consider that a supportive family is a true blessing.

Thankfully, my test scores were decent, and I made it to the biochemistry department at Louisiana Health Science Center–Shreveport. During my first month in the U.S., I survived on cash provided by my mother. I had to pay rent, pay utilities and buy food. Shreveport had no public transport, and Louisiana weather was unpredictable. I had to learn to drive and get a license by enrolling in a driving school and paying a humongous sum of money.

One day, I was distracted by a disagreement with my roommate when suddenly my phone rang from an unknown number. A serious voice on the other end said he was calling from the Internal Revenue Services because they had found my ID card from the site of a car accident involving a drug dealer. He provided his IRS ID number, which I Googled; it existed.

COURTESY OF ISHITA GHOSH

Before leaving India for the U.S., Ishita stands with her mother, Kakoli Ghosh, outside the airport.

This man paralyzed my mind saying that the drug dealer has compromised my bank account and I could preserve my savings only if I listened to him. My heart raced to think about how I could regain control of my bank accounts. He suggested that the only way is to put the money in Google Play cards.

I jumped to my feet and headed to the closest store. As per his instruction, I kept my phone connected the whole time until I purchased $2,800 in Google Play cards and gave him activation codes. He hung up saying that he would recharge and return the money to my account.

Later that evening I re-dialed his number to check if he had transferred the money to me. It never rang. A few days later, it landed on me like a thunder out of a blue sky when my mentor told me I had been scammed. I had lost my and my family's hard-earned savings after I had just started my education in a country far from my home.

I couldn't admit my ignorance to my family, and I didn't have enough information to make a police report. I called my credit card company, but since I purchased the Play cards, they could not reimburse or stop the transaction.

I now believe that embassy and university orientation sessions should warn students to ignore unknown callers and tell them that the IRS does not call for any matter.

Looking back, this experience taught me who I should rely on and that I learn lessons from every action I take. For example, if someone calls from an unrecognized number posing as an authority, then disconnecting the call is not offensive. Rather, it is a way to protect your sanity and safety.

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Standing out and fitting in

By Andrea Lius

I was halfway through my junior year of high school when I moved to the United States. When people found out that I wasn't from here, they'd cock their heads, amused.

"But your English is perfect — you have no accent."

I'd blush, beaming with pride, thinking, "I just got here, and they already think I belong. How about that?"

Then they'd ask me if I grew up speaking the language.

"No," I told them, "I just watch a lot of movies and listen to a lot of songs in English. And when I do, I try to mimic how people sound."

In retrospect, I can't quite remember why the question about where I was from came up as often as it did.

When people asked me where I was from, I'd make them guess. I took delight in the fact that it puzzled them.

"Hmm, I'm not sure. You look mixed," some would say.

I'm not mixed, but again I would blush, beaming with pride. Back home, my extended family admired my pale complexion, which I got from my dad. It blew their minds that my parents would let me play outside in short sleeves and risk getting darker.

"I'm ethnically Chinese," I blurted out to my boyfriend a few months ago when we were on a road trip.

I never go out of my way to hide who I am, but in the 10 years since I first moved to the U.S., it was the first time I'd said those words out loud.

Growing up, I never felt particularly proud of either my Indonesian or Chinese identity. I never felt like I belonged back home in Indonesia. I constantly got into trouble at school because I was too liberal. Or because I asked too many questions. After I left, all I longed for was to fit in.

As a scientist, on the other hand, I loved being different. I wanted to stand out. I chose the only proteomics lab in my department as my thesis lab. While my peers were busy choosing their favorite protein to study, I envisioned a thesis project that mostly focused on method development.

When I was a rotation student, I worked closely with a senior postdoc in our lab who was developing a chemical proteomics approach to identify interaction partners of protein kinases. As proof of concept for our method, I phenotypically characterized one of the kinases we had identified in our screen.

Andrea Lius has lived in the U.S. since she was 16 years old and still wrestles with her Chinese Indonesian heritage.

In the first two years of my graduate studies, I worked on multiple projects — a follow-up on this kinase being one of them. However, I always viewed the kinase project as a side project. Then suddenly, two weeks before my candidacy exam, my advisor urged me to present it as my main thesis project.

"Your committee will appreciate how far this story has developed," he said. "You're a second author in this paper, after all."

As I scrambled to shift my focus to a project that I never planned to prioritize, the last thing I expected was to fall in love with it.

Over the years, this interest has taken an unexpected turn. I grew fascinated by the origins of organismal complexity. How is it that so many signaling pathways are so well conserved, yet living organisms are so diverse? I have always found evolution an interesting subject, but I was drawn to experimental techniques in molecular biology and biochemistry. Where does all this take my future science? Ask me again in five years. Maybe 10.

Since passing my candidacy exam, I found myself repeating the same line at meetings and conferences:

"I'm in a proteomics lab, but my project is not very proteomics focused."

At first, I took pride in this. After all, as a scientist, I loved to stand out from the crowd. I had formulated hypotheses that pushed me well out of my (and my lab's) comfort zone, and that takes guts. Yet, the more I said it, the lonelier I felt. I questioned whether I had made the right choice.

I questioned whether I was good enough. On many days, I felt ready to throw in the towel and quit.

"We won't let you quit. You've come too far," my friends told me.

I smiled and said a little too seriously, "Well, that's just the sunk cost fallacy."

While the fourth-year rut is apparently common, I'd be lying if I said that the logistical limitation posed by my immigration status wasn't a major force that stopped me from quitting. Being on a student visa meant that I had much more to lose if I decided to give it all up. So, I went through the motions, looking for a new reason each day to get me excited to go to the lab. I never cared about the title or the money, so "but I'm so close to getting my Ph.D." wasn't enough to get me going.

I've always dreamed of finding a job that I truly love. I dream of loving my job so much that I wouldn't ever consider retiring. I dream of loving my job so much that I would (theoretically) do it for free. And, one day, I realized one pivotal thing: When I picture myself as anything other than a scientist, I feel an overwhelming sense of loss. I have never identified with anything else so strongly. I am as much a scientist as I am a Chinese Indonesian, and I love being a scientist.

My ethnicity, on the other hand — I never planned on volunteering that information. And yet here we are. I am a Chinese Indonesian as much as I am a scientist. Maybe someday I'll learn to love this side of me, too.

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MORE ONLINE

Read more stories of immigrant and international scientists studying and working in the U.S. at asbmb.org/asbmb-today.

Advancing science through adventure

By Yamini Dalal

"Everyone around me assumed that the privilege and support of my family, coupled with my natural proclivity for science and writing, would lead me inevitably to biomedical science. And so it has."

Seeking refuge in science

By Minh Bui

"Be it our racial background, upbringing or gender, diversity helps advance science by filling in gaps. Each person alone is not equipped to address every question."

'I can do it without making a face'

By Betty B. Tong

"My memory of that first letter from my parents is hazy, but I recall clearly that it started with 'My dearest daughter.' I burst into tears reading those words, weeping while I walked down the corridor."

'Who am I?' Finding yourself in a different country

By Carmen Morcelle

"In my first acting class, I had to read aloud, and I realized I was the only foreigner in the room. Reading a theatrical text for the first time in front of an audience is not easy, especially if it is not in your first language. I was terrified."

Illuminating the path to permanent residency

By Jessica Desamero

Natalie Chernets and Paola Cepeda each came to the U.S. to pursue a Ph.D. Now they both help international postdocs navigate the ins and outs of immigration.

The language barrier: Daily struggles of an immigrant in science

By Thiago Pasin

"Because I'm afraid of being misunderstood or judged for my accent or grammar mistakes, I sometimes hesitate to speak up in meetings or share my ideas with colleagues."

Shades of cultural difference

by Humphrey Omeoga

"I was perplexed … my greetings frequently went unacknowledged. In Nigeria, people are always willing to accept and return greetings, especially from a foreigner."

Being on the outside of the inside

By Alan Attie

"I'm somewhere between South American, American, Middle Eastern, and Sephardic–Spanish … This made it challenging for me to fully melt into the American melting pot."

Following my own path

By Krishnakoli Adhikary

"The chance to start from scratch doing something I've always been passionate about is the perk I associate with interdisciplinary research in the U.S. — something I will always be grateful to this country for."

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