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THE NEWSLETTER OF THE AMERICAN SOCIETY OF PLANT BIOLOGISTS

President's Letter

All Together Now

BY MAUREEN McCANN
ASPB President, National Renewable Energy Laboratory

It's a rare experience to sit for an hour on the second level of a parking garage with a growing sense of elation. This morning, I drove my husband Nick for his first shot of vaccine against SARS-CoV2. We sat in the queue of cars and thought of all the families that, in that single hour, shared the overwhelming relief of a family member protected, the feeling of community with strangers.



No surprise that *Science's* Breakthrough of the Year 2020 is the development of multiple safe and effective vaccines against COVID (Cohen, 2020). Thirty years ago, protein expression was demonstrated from direct injection of RNA constructs in mouse muscles (Wolff et al., 1990). A new field of investigation into RNA-based vaccines emerged, and in one example, a paper was published demonstrating that mRNA technology for antigens of pathogens causing lethal

Ebola, H1N1 influenza, and *Toxoplasma gondii* could be used to elicit an effective immune response with a single dose (Chahal et al., 2016). Both Pfizer and Moderna vaccines are based on structural analyses of coronavirus surface proteins that identified two critical amino acids in the spike protein that, if mutated, would stabilize the structure in the pre-fusion conformation that is

recognized by human antibodies. Innovations in delivery mechanisms were critical to protect the mRNA inside fat droplets for its passage from needle tip into human cells. Other vaccine developers have adopted more traditional pathways using attenuated strains or recombinant spike protein presented on the surface of other viruses.

However, the mRNA-based vaccines are a new wave of technology with the poten-

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PB21
PLANT BIOLOGY
Worldwide Summit
July 19–23

Are you ready for the
Plant Biology 2021
Worldwide Summit?

See pages 4–5
for more about
Plant Biology 2021
Worldwide
Summit

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NOTICE

It has come to our attention that ASPB community members are receiving email communications from organizations or individuals inviting participation in conferences whose titles, email addresses, and/or URLs appear to mimic those associated with the Plant Biology 2021 Worldwide Summit that is organized by ASPB.

ASPB does not sell or license its name or lists of its community members' email addresses to third parties for any purpose. We therefore cannot vouch that these are legitimate meetings, and we invite you to take care in assessing these communications. All official communications from ASPB, whether regarding the Plant Biology 2021 Worldwide Summit or not, will come from an @aspb.org email address.

Please whitelist this domain if you wish to continue receiving messages about the Plant Biology 2021 Worldwide Summit. And if you ever have any questions about the legitimacy of an email that appears to promote an ASPB-related conference or activity, please contact Jean Rosenberg at jean@aspb.org.

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Council members highlighted in blue also serve on the Board of Directors.

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The *ASPB News* is distributed to all ASPB members and is also available online. It is published six times annually in odd-numbered months. Its purposes are to keep membership informed of ASPB activities and to reinforce the value of membership. The *ASPB News* is edited and produced by ASPB staff from material provided by members and other interested parties.

Copy deadline is the 5th day of the preceding even-numbered month (for example, April 5 for May/June publication).

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PRESIDENT'S LETTER *continued from page 1*

tial for very rapid adjustment to new strains of SARS-CoV2 as they arise, and now with demonstrated efficacy in human populations. Although the Pfizer vaccine requires ultra-low-temperature freezers to preserve it, the Moderna vaccine is stable if refrigerated, suggesting that further innovation could overcome the requirement for specialized infrastructure. Beyond the current pandemic, there is huge potential for the application of mRNA-based vaccines to tackle a whole range of infectious diseases in both developed and developing countries. The speed of transition from genome sequence to shots in arms inside a year seems breathtaking, but it was powered by long-term research investment in fundamental biology.

The sense of community felt in a parking garage with our fellow citizens can be amplified a hundredfold within the global community of science. Some of you used your own expertise as biologists to work on improved diagnostic tests or the design of face masks; others contributed supplies and lab equipment to friends and colleagues working in the area of infectious disease. High-performance computing and synchrotron sources were used to solve crystal structures of SARS-CoV2 genome-encoded proteins and to identify drug targets for therapeutics. For biologists, this is a moment to be proud.

It is also a moment to reflect on our past and future impact as plant biologists in the area of human health. I remember being inspired in the 1980s by the work of the Arntzen lab in developing edible plant vaccines for childhood diseases using bananas as the delivery system (Arntzen, 2015). Synthetic production of the anti-malarial artemisinin depended on isolation of the active compound from *Artemisia annua* by Nobel prize winner Youyou Tu and elucidation of its biosynthetic pathway (Chang et al., 2007). A decade ago, the anti-Ebola vaccine ZMapp used recombinant antibodies produced in tobacco plants (Qiu et al., 2014). And more recently, in partnership with GlaxoSmithKline, the biopharmaceutical company Medicago announced the start of Phase 3 clinical testing of their COVID-19 vaccine candidate, made by expressing spike protein in virus-like particles that can be harvested from tobacco plants (Medicago, 2021). These are just a few examples of how plant metabolic complexity and plasticity have enriched the arsenal of drugs and enabled new production platforms.

A decade has passed since an era of precision medicine was jointly declared by the U.S. National Academy of Science, National Academy of Engineering, National Institutes of Health, and National Science Foundation as it became possible to probe the interactions among genes, the environment, and lifestyle. The pandemic has highlighted the deep

divide in health outcomes by race, income level, and geography. Only policy changes can address the underlying inequalities that give rise to these divides. However, we can consider how our research might enable access to nutritious and affordable food as a tool in disease prevention, and to new medicines in disease treatment. With sharper tools in our tool kit, we can begin to dissect the gene–gene and gene–environment interactions among humans, the plants we consume, and human microbiomes. We can amplify products from natural pathways in plants, and we can develop synthetic and semisynthetic pathways in plants or using plant genes in microbial chassis. Let's engage in a conversation at the intersection of plant biology, precision medicine, and ways to develop plant-based technologies with accessibility and equity at front of mind.

This year we were forced to confront the nature of our connections with one another, as scientists and as global citizens. As the silos isolating disciplines of the life sciences continue to dissolve, I hope that we continue to use our training as plant biologists to contribute to research focused on human health and disease as biologists specialized in plants. I hope that we can tackle the planetary challenge of climate change with the same urgency and teamwork that was brought to bear on a tiny virus. I never want to forget that feeling of elation, sitting in a parking garage, separated in our cars and yet all together. ■

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PB21 PLANT BIOLOGY Worldwide Summit July 19–23

The Announcement You Have Been Waiting For: The Plant Biology 2021 Worldwide Summit

Are You Ready for the Plant Biology 2021 Worldwide Summit?

As we completed the final session of last year's Plant Biology 2020 Worldwide Summit, our thoughts quickly turned to this year and our excitement about gathering with you in Pittsburgh on July 19–23. The 2020 Worldwide Summit was a resounding success, with 2,700 participants from 56 countries. However, we all wanted to return to sharing that cup of coffee and accompanying conversation in person while walking from one session to another or enjoying a break. But as the months went by, that possibility faded as global health issues and travel bans persisted into 2021. In mid-January, ASPB's Board of Directors determined that the Plant Biology 2021 Worldwide Summit would also be fully virtual.

We recognize that you might be finding it challenging to make choices among the myriad digital content options vying for your time and attention. And we know you have many conferences to choose from. So for the Plant Biology 2021 Worldwide Summit, we are creating a program that will engage and enhance your participation even more than last year's meeting. We listened to your ideas and reviewed your feedback, and we are working to put on a program that retains the best of every annual Plant Biology meeting while adding new features that take advantage of the online venue.

Highlights Unique to the Plant Biology 2021 Worldwide Summit

- **Preconference networking** beginning two weeks before the conference. You will be able to access the meeting platform to build your profile and start making connections with attendees and speakers.
- **Customizable engagement opportunities** through an individual video chat feature that will allow you to set up one-on-one and small group discussions. Plan ahead to create your own coffee break time!
- **An innovative poster platform** that incorporates one-on-one video chat and the opportunity to feature posters by topic or presenter.
- **Additional networking opportunities** for undergraduate students.
- **Discussion sessions** after the plenary and concurrent symposia and poster sessions.
- **Child care subsidies** available through the Women in Plant Biology Committee and the Equity, Diversity, and Inclusion Committee, with support from the Romanoff Fund. Applications will be accepted for grants to help offset the cost of child care so attendees

with dependent children can fully participate in the Plant Biology 2021 Worldwide Summit. All ASPB members, regardless of country, will be eligible based on need, with additional consideration given to applications from early career scientists.

- **Greater accessibility** through CART captioning services for all scientific sessions. See <https://www.hearingloss.org/hearing-help/technology/cartcaptioning/> for more information.
- **More scientific content than in any other Plant Biology meeting**, with ample opportunities for discussions with speakers in both plenary and concurrent symposia.
- **Thirty-two interactive workshops** put together by organizers from around the world in three key thematic tracks:
 - Equity, Diversity, and Inclusion
 - Professional Development
 - Technology and Innovation
- **More topical hallway hangouts** organized by the community.
- **Short training videos** on how to make the most of the platform and your time during the meeting.

<https://plantbiology.aspb.org/>

Plenary Organizers



Maureen McCann

National Renewable
Energy Laboratory,
ASPB President



Kris Niyogi

University of California,
Berkeley



Xuemei Chen

University of California,
Riverside



George Kantor

The Robotics
Institute Carnegie
Mellon University

Best Features of Past Plant Biology Meetings

- **Registration discounts** for ASPB members, additional discounts for early bird registration, and the group rates for small and large groups that were so popular last year
- **Great science** in emerging and innovative research areas
- **Superb plenary symposia** organized by
 - **Maureen McCann**, ASPB President, National Renewable Energy Laboratory
 - **Kris Niyogi**, University of California, Berkeley
 - **Xuemei Chen**, University of California, Riverside
 - **George Kantor**, Carnegie Mellon University
- **Virtual social gatherings**
- **Opportunities to reunite** with old friends and colleagues
- **Searchability of abstracts and posters** by author

- **Exhibit hall and sponsor activities**, including a scavenger hunt with prizes
- **Information about opportunities for you** through ASPB
- **On-demand content** available beyond the dates of the meeting
- And of course—the **conference T-shirt!**

Although the pandemic continues to cause major disruptions, it is also defining the state of the art for holding virtual meetings and redefining what a scientific conference will look like in the postpandemic world. We plan to take advantage of every opportunity offered to ensure that Plant Biology 2021 will provide the best experience possible for our members and the greater community of plant scientists.

We hope to see you at the Plant Biology 2021 Worldwide Summit! In the meantime, please keep your eye out for more information in your inbox and at plantbiology.aspb.org, and follow us on Twitter at #plantbio21.

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ASPB Supports PUI Plant Scientists

BY LEEANN THORNTON and JON MONROE

If you have ever presented at an ASPB meeting, you have seen the abstract question, “Was this research done at a primarily undergraduate institution (PUI)?” What does that question mean, and why does it matter?

In the United States in particular, students can earn a bachelor’s degree from highly varied institutions. Some, of course, are large, research-intensive (R1) universities that grant doctoral degrees and support postdoctoral training. But there are also thousands of institutions that focus on undergraduate education and grant no, or very few, PhD or MS degrees—these are PUIs. PUIs vary in size and emphasis, but many have programs in which faculty members carry out research with undergraduate student colleagues. Teaching and advising are a large portion of PUI faculty jobs, but research that is externally funded and regularly published is also important. Most PUI plant biologists earned their PhD and did postdoctoral work in large R1 institutions. They then chose to continue their work in an environment dedicated to undergraduate education, and they recognize that engaging students in original research is one of the best ways to teach them how to be a scientist.

The transition from a research-intensive environment to a PUI requires preparation and support. Most PUI plant scientists are in departments in which they are the only plant biologist, so they rely on their external networks to stay informed and share ideas. ASPB’s annual Plant Biology meetings have become a lifeline for plant

scientists who feel isolated at their institutions. The ASPB annual meetings used to be focused primarily on research presentations, but they now also include workshops, networking events, and career coaching to better serve a diverse community of plant scientists eager to talk about their research and build professional skills and connections.

In the early 1990s, Mark Brodl was teaching at Trinity College and was a regular ASPB conference attendee. He was part of a consortium of small liberal arts colleges working with the University of Chicago and Washington University called the Pew Midstates Science and Mathematics Consortium. The plant scientists in the consortium gathered at ASPB meetings to discuss how to advance plant biology in the undergraduate curriculum and develop more robust undergraduate research programs. The group enjoyed their discussions and generated ideas that helped them promote undergraduate research at primarily undergraduate institutions. They began considering how to expand their efforts to involve more ASPB members from PUIs.

In 1995, Mark collaborated with Pam Green, who was on the ASPB Meetings Committee, to plan a PUI networking event for Plant Biology 1996. At that first event, in San Antonio, about 30 people gathered to share stories, challenges, and successes. Mark remembers the attendees being genuinely glad to meet other PUI faculty members and eager to gather again the next year. These events became regularly scheduled

breakfast meetings at the annual conferences with a rotating leader who guided a discussion of best practices in PUI research and resources for success.

One frequent discussion at the annual breakfasts was about the importance of involving students in research early in their undergraduate years. Getting them started early makes it more likely that they will choose a career in plant biology. Research funding for undergraduates is limited at institutions of all sizes, and the PUI group felt that support from ASPB could be instrumental in addressing this problem. PUI leaders took this idea to the ASPB Executive Committee in 2000, and thus the ASPB Summer Undergraduate Research Fellowship (SURF) was born. Initially, the program supported fewer than 10 students annually using Good Works funds, but later it grew to 15 students and became part of ASPB’s annual budget. SURF awards are distributed among students at PUIs and R1 institutions depending on the proportion of applicants from each category. Some of the students who were supported early in the SURF program are now heading labs around the world.

So why does ASPB ask presenters whether their research was performed at a PUI? In 2011, ASPB leadership recognized the importance of identifying PUI members and getting them more involved. With the support of the Membership Committee, the PUI breakfast became a more extensive faculty development workshop. The PUI group obtained NSF conference funding to support

PUI plant scientist travel to a preconference extended workshop in 2015 in Minneapolis. Since then, the group has obtained three more conference grants from the USDA National Institute of Food and Agriculture (NIFA) and NSF to continue supporting a preconference workshop geared toward networking and training related to PUI plant science.

At the same time, ASPB leadership and PUI members began discussing the benefits of forming an ASPB section dedicated to PUI plant scientists. In 2017, a group of PUI members began writing a proposal for a PUI Section and communicating with the ASPB membership at large about interest in this new career-related section. As a section, these members committed to regular career-related conference workshops and mentoring as well as year-long efforts to support PUI plant biologists and increase ASPB membership. We convened our first PUI Section business meeting in 2018 in Montreal. We committed to the immediate goal of developing a leadership structure and constitution as well as initiatives that support PUI plant scientists and encourage them to engage in ASPB activities.

In January 2021, the PUI Section held a virtual networking event to celebrate our new permanent section status and share stories of how ASPB has influenced our careers. The group included aspiring PUI faculty members and some of the attendees of the first ASPB PUI networking event. Many attendees shared the sentiment

that ASPB PUI connections are important to our feeling that we belong to a community of scientists with similar challenges and triumphs. Karen Hicks, the current chair of the PUI Section steering committee, shared that she was struggling with graduate and postdoc colleagues questioning her choice to pursue a faculty position at a PUI. The PUI Section event helped provide a sense of community with others doing research at a PUI.

We also discussed how ASPB has helped us through many transitions in our careers. As undergraduates and graduate students, we found that presenting our work at a national or regional ASPB meeting was more rewarding than intimidating because there were so many friendly and supportive people interested in our work. Many of us collected friends in the ASPB community as we moved through our careers and got advice for navigating transitions. Amanda Storm, a PUI Section steering committee member, shared that attending PUI networking workshops as a

postdoc helped her figure out how to navigate the job search process and find a faculty position.

Over the years, ASPB members from PUIs have benefited from the support and encouragement of so many people. Multiple program officers from NSF and USDA NIFA have encouraged our efforts to get more PUI faculty engaged in the plant science community. They listened to our workshop and travel grant ideas and supported our activities with conference funding to bring new PUI scientists to the meetings and into other ASPB activities. The funding officers also encouraged us to apply for Research Opportunity Awards and supplemental awards to help us do projects that are beyond the scope of our typical lab work. As we chatted about ASPB's support for PUIs over the years, a regular theme was, "These are my people."

We all are grateful to our PhD and postdoc mentors who encouraged us to prepare for careers as PUI scientists. The PUI community has many supporters from larger research institutions. It makes a big difference

when leaders in the plant biology community recognize that PUI faculty members are training undergraduates who come to their programs for grad school, and we are providing career support for grad students who want a job at a PUI. We appreciate the effort that ASPB members and staff have put into understanding and supporting plant scientists who work at primarily undergraduate institutions. Our permanent section status in ASPB was secured through the engagement of both PUI members and PUI plant science advocates!

If you would like to learn more about our activities or join the PUI Section, please visit us at <https://pui.aspb.org/> and on the Plantae networking page at <https://community.plantae.org/organization/pui-section/dashboard>. The PUI Section steering committee has staggered appointments so that one or two new members can be added each year, and we regularly need assistance on initiatives such as planning workshops, running networking events, and commu-

nicating with a broad audience. Please contact any of the current leaders if you would like to get more involved; their contact information can be found at <https://pui.aspb.org/section-officers/>.

About the Authors

Leeann Thornton is on the PUI Section steering committee and is the PUI representative to the ASPB Council and the Membership Committee. She has served on the Membership Committee and helped expand the PUI networking event to a workshop with external funding. She began studying plants as an undergrad with Jon Monroe at James Madison University and is currently an associate professor at The College of New Jersey.

Jon Monroe was one of the first people to join the PUI networking group and helped Mark Brodl start the SURF program. Jon has served ASPB as treasurer, Mid-Atlantic Section representative, and member of the Board of Trustees, and he received the Excellence in Teaching Award in 2001. He is a professor at James Madison University. ■

Call for Mentors!

We are all thankful for the mentors in our life. Pay it forward and become a mentor yourself.

ASPB has a mentoring platform through the Plantae Job Center. This platform allows plant science professionals to find mentors familiar with their career development goals, interests, and

needs. In addition, experienced professionals have the opportunity to share their wisdom with the next generation of plant scientists. Our hope is that the platform will not only help close the gap in career development opportunities for underrepresented groups, but will also serve as an effective

vehicle for cross communication, interaction, and collaboration.

For the mentoring platform to continue to grow, we need to recruit more mentors with diverse backgrounds, expertise, and experience. Having a strong pool of mentors ensures that mentees can find a good match

based on their career goals and professional development needs. As part of the sign-up process, you can indicate the type of mentoring you are interested in providing, your areas of expertise, and the amount of time you have available to devote to mentoring. ■

Sign up to become a mentor at <https://jobs.plantae.org/eMentor/>. You can also sign up to find a mentor!

Season 5 of the Taproot: These Unprecedented Times



The Taproot is the award-winning podcast that digs beneath the surface to understand how scientific publications in plant biology are created. In each episode, cohosts Liz Haswell and Ivan Baxter take a paper from the literature and talk about the story behind the science with one of its authors. Collectively, the episodes have been downloaded nearly 100,000 times. You can find this podcast on Plantae (<http://bit.ly/TapRootSeason5>) or subscribe and listen to it on iTunes (<http://bit.ly/TapRootPodcasts>), Stitcher (<https://www.stitcher.com/show/the-taproot>), or Spotify (<http://bit.ly/TapRootSpotify>).

In Season 5, Liz and Ivan talk to five members of the plant biology community about how they handled the many unprecedented events of 2020. These guests, from a range of career stages and a variety of plant biology research institutions, have much to teach us about reacting to challenges with introspection, truth telling, and decisive action.

Questions, feedback, suggestions?

Contact taproot@plantae.org. The Taproot team thanks Jo Stormer for providing transcripts for all episodes. Twitter: @TaprootPodcast, @ehaswell, @baxtertwi

Episode 1

Finding Strength in Diverse Scientific Communities: A Conversation with Dr. Tanisha Williams

Tanisha is an impressively accomplished early career researcher whose work has ranged from population genomics to the use of herbarium specimens to track climate-induced changes in flowering phenology, all with a central thread of preserving plant diversity. She received her PhD from the University of Connecticut Department of Ecology & Evolutionary Biology, and now she is the David Burpee Postdoctoral Fellow in the Conservation, Genetics, and Ecology & Evolution

of Plant Reproduction Group at Bucknell University. Currently, Tanisha works with Chris Martine on rare Pennsylvanian plant conservation, Australian *Solanum* taxonomy, and the ways the Martu people of Australia interact with plants. Tanisha was inspired this summer by the simultaneous rise of the pandemic and the civil uprising against police brutality to draw Black botanists together for a social media event called #BlackBotanistsWeek, as she discusses in this episode.



Tanisha Williams

Episode 2

Multiculturalism Matters in the Rhizosphere— and in Academia: A Conversation with Dr. Adán Colón-Carmona

Adán is a professor of biology at the University of Massachusetts Boston. He received his PhD from the University of California, Irvine, and he did postdoctoral research at the Salk Institute and the University of California, Davis. His research currently focuses on plant–rhizosphere interactions, abiotic stress response, and the cell cycle. As a Mexican-born immigrant to the United States, Adán describes how the Society for Advancement

of Chicanos/Hispanics and Native Americans in Science (SACNAS) has positively influenced his life. Additionally, he points out the value of multiculturalism, explaining how he has relied on his own multiple identities to empathize with, teach, and mentor students whose lives have become increasingly challenging during the COVID pandemic.



Adán Colón-Carmona

Episode 3

Prestressed Conditions: Epigenetics and Life as a Black Academic: A Conversation with Dr. Thelma Madzima

Thelma is an assistant professor of cell and molecular biology at the University of Washington Bothell. A native of Zimbabwe, she received her PhD in plant molecular and cellular biology from the University of Florida and completed a postdoc with Karen McGinnis in the Department of Biological Science at Florida State University. Her research currently focuses on epigenetic

regulation of gene expression in plants using maize (*Zea mays*) as a model organism. Thelma talks about living in a U.S. epicenter of the pandemic and how she is coping with the new “normal” as a professor at a primarily undergraduate institution. She discusses the setbacks that the pandemic has created for tenure track professors, including those that are specific to PUIs. Additionally, as

an immigrant from Zimbabwe, she knows firsthand the hardships immigrant students face and what recent changes have meant to international students. As one of the few Black professors working in academic plant molecular biology in the United States, she discusses the changes that need to come about in order to encourage the inclusion of Black scientists in the scientific community.



Thelma Madzima

Episode 4

Interacting with Plants, Pathogens, and the Public: A Conversation with Dr. Kevin Cox

Kevin earned his PhD at Texas A&M University before returning to his hometown of St. Louis, Missouri, to do a postdoc with Blake Meyers at the Donald Danforth Plant Science Center. Kevin has won numerous awards and grants and was recently awarded a Howard Hughes Medical Institute Hanna H. Gray

fellowship. Kevin shares his path to plant science and describes how his exposure to new courses and research experiences led him to a career studying plant pathology. He discusses how he uses multiple online and in-person platforms to share his passion and bridge communication gaps between the science community and

the public. He also talks about how the pandemic has affected his work as a postdoc and how he was able to balance work responsibilities while supporting his young daughter’s online schooling during the early stages of the pandemic.



Kevin Cox

Episode 5

STARTing Out as a PI, Pivoting During COVID, and Advocating for Change: A Conversation with Dr. Aman Husbands

Aman is originally from Canada and got his undergraduate degree from the University of Toronto. After completing his PhD at the University of California, Riverside, he moved to Cold Spring Harbor Laboratory. In 2018, he moved to the Department of Molecular Genetics at The Ohio State University, where he is an assistant professor. Aman’s research

group focuses on uncovering the properties that allow complex biological processes, such as development, to occur reproducibly. He talks about why it is important to tune in to the projects one enjoys doing and discusses the responsibilities PIs have to their labs and to the people who come next. Aman says that it is important to deliberately create a productive atmosphere within

the lab, clearly communicate priorities, and foster collaboration and communication within the group. He talks about the value of connecting with and getting feedback from those outside one’s immediate research area. Aman also shares some of the ways he is working to address racism and equality on both the individual and the systemic level. ■



Aman Husbands

As the years churn on, many esteemed members of ASPB have passed the torch to their younger colleagues and stepped out of the limelight to allow others to bask in its glory. Yet, many continue their good works to the benefit of plant biology and the world. Edited by Rebecca Dickstein, University of North Texas, “Where Are They Now?” is part of the *ASPB News* suite of columns focused on the personal and scientific life and insights of ASPB members at all stages of their career. This column offers a look into the current activities of influential members of ASPB who continue to make a positive mark on our Society. We hope you all enjoy this addition to your newsletter.

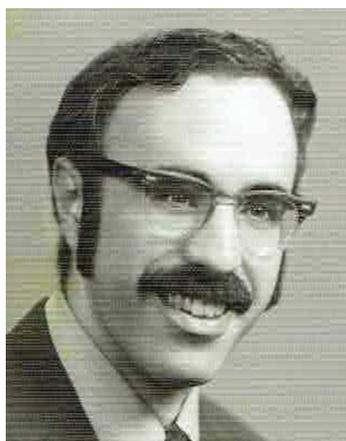
Please feel free to submit your own article to “Luminaries,” “Membership Corner,” or “Where Are They Now?” For details, contact Laurie Smith at lgsmith@ucsd.edu. As always, we are open to suggestions for articles or features of interest to readers of the *ASPB News*.

Stan Roux

Professor Emeritus, University of Texas

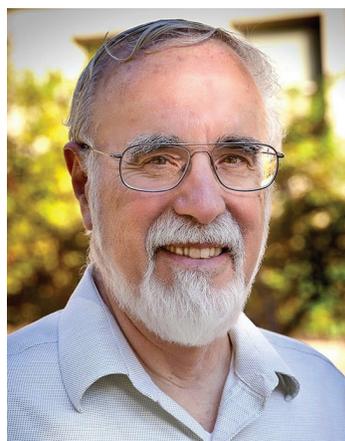
This past September, I became emeritus after 42 years on the faculty at the University of Texas (UT). Although I am formally “retired,” I am fortunate to have ongoing grant support, so I and my longtime co-PI Greg Clark will be able to continue our research on apyrase (NTPDase) enzymes and eATP signaling at least through the end of this year. My other favorite activity here at UT was teaching, and although I taught my last course in the fall of 2019, I still enjoy helping Greg teach the three courses I taught for decades—Discovery Lab, Hidden Treasures of Plants, and Plant Physiology. I also now spend more quality time with my wife, Pat, and I thank her for supporting my continued activities at the university.

If I were to write an autobiography, the title of it would be “Serendipity” because so many of the key events in my career happened without my planning or control. My intense interest in plants began with my unexpected experience harvesting 150 lb of tomatoes from 15 plants while gardening during my second year at Spring Hill College: How does an 8-foot-high plant loaded with fruit develop from a tiny seed?



Stan Roux . . . then and now.

To learn more about this, I switched my major from classical languages to biology. There, by chance, my most inspiring teacher was a plant biologist, so after graduation I decided to do plant research for a master’s degree in the Biology Department at Loyola University in New Orleans. There, again by chance, the department chairman, Father John Mullahy, had done his PhD work at Vanderbilt University, where he had become friends with Ian Sussex. When he encouraged me to go on for a PhD, I’m sure his letter to Ian was influential in my being accepted for the doctoral program at Yale University.



After my first year at Yale, Ian recommended that I take the summer course in plant developmental biology at Woods Hole and do research there. Less by design than by chance, my research project there ended up being with Bill Hillman, who encouraged me to do a project on phytochrome. Bill thought the data I generated that summer could be turned into a publication if I spent the fall semester in his lab at Brookhaven National Laboratory doing follow-up experiments. Although Yale normally does not give permission for second-year students to go elsewhere for research, it turned out that Art Galston at Yale knew Bill

Hillman well, and he convinced the graduate adviser to give me permission to go do research at Brookhaven. To make a long story short, my surprise “semester” at Brookhaven lasted almost two years and resulted in two publications on phytochrome biochemistry that became core chapters in my Yale PhD dissertation.

I did my postdoc in the Biophysics Department at Yale to do structural studies on phytochrome with the eminent crystallographer Fred Richards. At that time, however, there was a scientist in the lab of Lubert Stryer, Juan Yguerabide, who was studying the interaction of rhodopsin with artificial black lipid membranes (BLMs), and he thought it would be interesting to test whether the Pr and Pfr forms of phytochrome differentially interacted with BLMs. Unexpectedly, I found that Pfr, but not Pr, promoted ion permeability changes in BLMs. This led to a *PNAS* publication that helped me be competitive when I began applying for faculty positions in 1972.

In 1973 I accepted an assistant professor position in biology at the University of Pittsburgh, where, luckily, my research was

significantly aided by equipment left there by Ian Sussex (!), when he departed for Yale. I would have been happy to stay at Pittsburgh, but incredibly, the year I came up for tenure my department was dissolved, and my tenure decision was now to be decided by the new head of my new department. Feeling somewhat insecure about this, I applied for faculty positions elsewhere. I received an offer for an assistant professor position from UT at about the same time Pittsburgh decided to promote me to associate professor with tenure. Should I risk giving up tenure?? I chose to accept the

UT offer because UT had more plant collaborators and because, by chance, the chair of botany at UT was Ted Delevoryas, whom I had known well while he and I were at Yale, and he assured me he would support my promotion to associate professor at UT after my first year there.

At UT, my research, first on phytochrome, then on apyrases and eATP, flourished. Equally rewarding for me was my teaching experience. I credit Ian Sussex and Art Galston, both outstanding teachers, for inspiring my successes in the classroom. I adopted their credo: “I believe

that I cannot generate enthusiasm in others for the material I teach unless I first generate enthusiasm in myself for this material.” Beyond any research awards I have received, my two most cherished academic honors were being elected to the Academy of Distinguished Teachers at UT and receiving the Excellence in Education Award from ASPB.

While continuing my research at UT, I am now also trying to recruit endowment support for plant biology here. Although plant biology is typically well supported in ag schools, other public universities, like UT, are

often under financial pressure to favor hiring faculty who bring in large disease-related grants over scientists whose research is less directly health linked. There is a chance that my current research, which is funded by local entrepreneurs, could bring UT financial rewards. Whether or not that happens, I will continue to look for new ways to convince those in leadership positions of the many treasures plants offer society, and I am grateful that ASPB leads the same effort internationally. ■

New Staff

ASPB Welcomes Chris Lowe as Managing Editor

Chris Lowe joined ASPB on February 18 as managing editor for *The Plant Cell* and *Plant Physiology*.

Chris will be directly overseeing the journals’ production operations at the Society’s new publishing partner, Oxford University Press. Chris will also work closely with the editorial boards of both journals, as well as with the team that runs *Plant Direct*, to ensure quality, draft and enforce journal policy, and institute any improvements in the journals’ processes.

Chris arrives at ASPB from the American Gastroenterological Association (AGA),



where until now he has spent his entire career in scholarly publishing. Chris started at AGA in 2004 as a production editor and in 2012 became managing

editor of the AGA’s flagship journal, *Gastroenterology*. During his career, Chris has gained experience in many roles and facets of publishing scientific journals, including working with publishers to coordinate and manage journal production; overseeing the transition of outgoing and incoming editorial boards; developing and executing new journal features and initiatives; and addressing the needs of editors, authors, and peer reviewers throughout each stage of the editorial process from submission to publication.

A lifelong resident of Maryland, Chris grew up in

the western part of the state in Cumberland and graduated from Frostburg State University with a BA in English in 2001. Chris lives in Silver Spring with his wife Melissa and their cat Lila, both of whom are also lifelong Marylanders. Chris and Melissa share a love of movies, going to live shows and concerts, and browsing bookstores. During the past year of the COVID-19 pandemic, they have tried to develop other hobbies such as nature walks, cooking, and mixology. ■

Policy Update

BY VICTORIA HABER
Lewis-Burke Associates, LLC

The information in this article was accurate at the time of writing.

Congress Finalizes FY2021 Funding for Federal Government and Research

Congress once again rejected significant cuts to federal research agencies and programs proposed by the Trump administration in the final fiscal year (FY) 2021 omnibus appropriations bill that Congress passed on December 21 and President Biden signed into law. These provisions were part of the massive end-of-year package that, in addition to including \$1.4 trillion for fiscal year FY2021 appropriations, also included COVID-19 pandemic relief and several other pieces of legislation. The package had broad bipartisan support, passing the House on a vote of 359–53 and the Senate on a vote of 92–6. Because of budget constraints under the last year of legally mandated budget caps, Congress provided only modest increases to federal programs compared with prior years. However, Congress did modestly increase or maintain stable funding compared with FY2020 for most federal agencies and programs of interest to the ASPB community, including NSF, USDA, and DOE research and development programs.

Congress Passes Long-Awaited Energy Innovation Package

For the first time in over a decade, Congress passed a sweeping Energy Innovation Package that authorizes key research and development programs at

DOE. The energy package consists of dozens of bills passed by the House and passed through the Senate Energy and Natural Resources Committee with strong bipartisan support. Of interest to the research community, the energy package authorizes every DOE applied energy program and advances broad areas of energy innovation from wind, solar, industrial decarbonization, carbon capture systems, nuclear, regional energy innovation centers, and technology commercialization efforts. Of note, the bill authorizes \$35 billion in appropriations for clean energy research and development over the next five years.

The investment reflects a growing bipartisan priority of investing in green technologies. Key programs of interest to researchers, such as the Advanced Research Projects Agency–Energy (ARPA-E), were also reauthorized. The package is officially named the Energy Act of 2020, and a large portion of the provisions were included in the \$1.4 trillion year-end omnibus.

Source and Additional Information

- The Energy Act of 2020 can be found at <http://bit.ly/EnergyAct2020>

Biden Nominates Environment-Focused Cabinet and White House Appointees

President Biden has continued to nominate and appoint diverse experts to environment-relevant positions in his cabinet and other

leadership roles in his administration, such as former Secretary of State John Kerry as Special Climate Envoy. Environmental justice issues are a priority for several of Biden's recent selections, as demonstrated by their professional accomplishments or shared experience with communities that have disproportionately experienced detrimental environmental impacts.

President Biden selected Tom Vilsack for secretary of USDA, a role Vilsack held under President Obama. Vilsack's previous experience as USDA secretary weighed heavily in Biden's nomination decision because he wanted someone who could immediately act to address the hunger and farm crises that have worsened throughout the COVID-19 pandemic. In the Biden administration, USDA is poised to play a large role in addressing climate change, likely through technological innovation and carbon sequestration, among other mechanisms. Some progressive farm advocates, however, were hoping for a fresh face who would be more aggressive against large agricultural corporations and more focused on hunger issues. Vilsack was confirmed as secretary on February 23.

In a last-minute appointment, President Trump announced that Carrie Castille would serve as head of the USDA National Institute of Food and Agriculture (NIFA). She has a background in forestry and conservation and played a role at the USDA under both the Obama

and Trump administrations. Her appointment to this scientific leadership position is not tied to the administration, and therefore Biden will not be appointing a nominee of his own.

President Biden chose former Michigan governor Jennifer Granholm to be secretary of DOE. Granholm is expected to prioritize transitioning the United States to a renewable energy-based economy. Granholm has laid out some plans for alternative energy and electric vehicle charging, although many criticize her lack of experience in dealing with larger DOE priorities such as protecting the electric grid and nuclear reactors. Granholm was confirmed as secretary of energy on February 24.

Rep. Deb Haaland (D-NM) has been chosen to head the Department of the Interior and will serve as the first Native American cabinet secretary. Haaland has worked to elevate environmental justice; her efforts include requiring the Department of the Interior to report on its activities' impacts on environmental justice communities, leading a conservation plan to protect 30% of U.S. land and ocean by 2030, and opposing fossil fuel industry interests. Haaland was confirmed on March 14.

Brenda Mallory, an Obama-era expert and longtime environmental lawyer, will serve as the first Black chair of the White House Council on Environmental Quality (CEQ). CEQ advises the

White House and Congress on matters pertaining to environmental justice, land use, energy policy, and endangered species. Mallory also served as general counsel for CEQ under Obama. The Climate 21 Project, which Mallory helped lead and which has outlined environmental suggestions for the new administration, suggested that CEQ is best suited to promote environmental justice and lead the fight on climate resilience.

Tapped to lead the Environmental Protection Agency (EPA) is environmental regulator Michael Regan from North Carolina, who is the first Black man to head the agency. Regan previously worked at EPA during the Clinton and Bush administrations. As EPA administrator, he will be tasked with rebuilding scientific capacity that was depleted during President Trump's administration, creating fuel efficiency standards for vehicles, overseeing emissions, and leading cleanup efforts at the nation's most polluted sites. He will also have to resolve many regulatory rules and rollbacks that the Trump administration put in place and to establish new sets of rules. Regan was confirmed by the Senate on March 10, 2021.

For the first time, the White House will have an Office of Domestic Climate Policy. This office will be run by longtime environmental advocate and former EPA administrator Gina McCarthy. In this role, McCarthy will coordinate federal efforts aimed at lowering U.S. greenhouse gas emissions with the likely goal of the nation reaching carbon neutrality by 2050. McCarthy is currently chief executive of the Natural Resources Defense Council. During her time

as EPA administrator, she oversaw Obama's Clean Power Plan, which set standards for reducing power plants' carbon dioxide emissions.

Sources and Additional Information

- Information on President Biden's nominations and appointments can be found at <http://bit.ly/2Pj6pcR>.
- The Climate 21 Project report is available at <https://climate21.org/>.
- The announcement of the new NIFA director is available at <http://bit.ly/NewNIFA>.

Funding Opportunity: New NSF Understanding Rules of Life Program

NSF has released a solicitation for its new program Understanding the Rules of Life: Emergent Networks (URoL:EN). The program focuses on understanding the "rules of emergence" for networks of living systems and their environments." This funding opportunity emerged from the Understanding Rules of Life thrust of the Big Ideas set out by NSF in 2016. Emergent networks explain the intersection and relationships among social, environmental, organismal, and human-engineered systems. The URoL:EN program includes participation from each of NSF's directorates.

Successful project proposals will use convergent approaches to explore emergent network properties of living systems across various levels of organizational scale. The URoL:EN projects should yield a greater understanding of how key properties of living systems emerge and how those emerging networks can respond to or influence environments. The program's design

encourages projects that cross multiple disciplines and levels of complexity, creating opportunities to explore novel experimental and comparative approaches, leverage existing large data sets and analytics, and use predictive modeling, engineerable interventions, and new data science approaches. The program encourages the integration of training and outreach activities in research plans, the convergence of training opportunities for researchers and students, development of novel teaching modules, and increasing participation of underrepresented groups in science to foster the next generation of scientists.

Projects may be laboratory, field, simulation, and theory based and may focus on terrestrial, aquatic, marine, or polar organisms and ecosystems. Projects are encouraged to extend research approaches beyond well-established model systems, individual populations, and controlled environments.

Funding: Total funding of up to \$15 million is available for this solicitation for an estimated 5 to 10 awards, with a budget of up to \$3 million per award and a duration of up to 5 years.

Eligibility: Proposals may be submitted only by institutions of higher education and nonprofit, nonacademic organizations such as independent museums, observatories, research labs, professional societies, and similar organizations in the United States associated with educational or research activities. A minimum of one PI and one co-PI must be named on each proposal who represent expertise in different disciplines pertinent to at least two of NSF's directorates.

Due Dates: Full proposals are due by 5 p.m. submitter's local time on May 10, 2021.

Sources and Additional Information

- The full solicitation is available at <https://bit.ly/3bPvweX>.
- The program page can be found at <https://bit.ly/3b5nXBN>.

AFRI Releases FY2022 Solicitation for Education and Workforce Development

This January, the Agriculture and Food Research Initiative (AFRI) released its annual solicitation for the Education and Workforce Development Program, which focuses on preparing future generations of research, education, and extension experts in the agricultural sector. The request for applications (RFA) seeks applications for two review cycles, 2021 and 2022; the anticipated amount available for new grants for the 2022 deadlines is approximately \$68 million. Applications should focus on the following program areas:

- Professional Development for Agricultural Literacy
- Agricultural Workforce Training
- Food and Agricultural Nonformal Education
- Research and Extension Experiences for Undergraduates
- Predoctoral Fellowships
- Postdoctoral Fellowships
- Agricultural Literacy and Workforce Development Evaluation.

The program area priorities in this RFA also align with the following themes outlined in the USDA Science Blueprint: (1)

continued on page 14

POLICY UPDATE *continued from page 13*

sustainable agricultural intensification; (2) agricultural climate adaptation; (3) food and nutrition translation; (4) value-added innovation; and (5) agricultural science policy leadership. The maximum program award is \$1 million. Deadlines vary by program area, ranging from August to September of 2021.

Source and Additional Information

- The full RFA is available at <http://bit.ly/FullRFA>.

ARPA-E OPEN Funding Call for Innovative Energy Technologies

On February 11, DOE's ARPA-E released a \$100 million Funding Opportunity Announcement (FOA) for its OPEN 2021 program. The OPEN FOA is released once every three years. OPEN 2021 is ARPA-E's fifth OPEN competition; the previous four were held in 2009, 2012, 2015, and 2018. Unlike ARPA-E's standard technology program solicitations, which are narrowly focused on specific topic areas, OPEN 2021 is intentionally broad and offers support for the development of high-risk, transformative energy technologies. The goal of OPEN is to support energy technology development projects that fall outside of ARPA-E's targeted solicitations. In support of the Biden administration's climate innovation agenda, OPEN 2021 specifically seeks to identify cutting-edge, disruptive, clean energy technologies to address the climate crisis. Concept papers are due by April 6, 2021, at 9:30 a.m. ET.

Although ARPA-E has allocated \$100 million for the initial funding call, as in prior

years ARPA-E is likely to make an additional \$50 million to \$100 million available to fund additional proposals depending on the number and quality of proposals received. For OPEN 2018, ARPA-E also initially released a \$100 million funding opportunity announcement and selected 45 projects. Following the initial awards, over a six-month period ARPA-E allocated an additional \$100 million to the OPEN program and funded another 32 projects. ARPA-E typically selects additional projects from the concept papers submitted in response to the call for proposals and does not release another FOA.

Proposals submitted for OPEN 2021 must identify and address at least one of the technical categories or subcategories listed in the FOA. Despite the breadth of these categories, there is no guarantee that each will be equally represented among the selected proposals. Rather, the types of projects funded under OPEN 2021 will vary depending on the number and strength of the proposals ARPA-E receives. The following categories are intended to cover most major energy-related technologies and address research needs:

- Grid
- Transportation
- Building Efficiency
- Nuclear and Fossil Power Generation and Energy Production
- Renewable Power Generation
- Bioenergy.

If a proposal does not fit into any of these categories, applicants are instructed to identify their projects as falling under Category 7 ("Other Energy Technologies"), Subcategory L ("Other Energy Technologies Not Listed Above").

Areas of research related to this FOA include electricity generation (by conventional and renewable means); electricity transmission, storage, and distribution; energy efficiency for buildings; manufacturing and commerce; and all aspects of transportation.

In an additional departure from ARPA-E's standard solicitations, which provide specific technical targets within defined focus areas, the agency recognizes that OPEN is too broad for applicants to meet any predefined metrics. Thus, applicants to OPEN 2021 are required to effectively measure the potential impact of their proposals against the agency's core missions of "reducing imported energy, reducing energy-related emissions, and improving energy efficiency." Although OPEN allows researchers to submit innovative proposals outside of ARPA-E's more limited and targeted program FOAs, it is even more competitive than the targeted funding solicitations. For OPEN 2018, ARPA-E received 2,600 concept papers and selected 77 projects. The rate of success is typically less than 5%.

Funding: ARPA-E intends to allocate approximately \$100 million for 30 to 50 OPEN 2021 awards. Individual awards will range between \$250,000 and \$10 million.

Performance Period: OPEN 2021 awards will be supported up to 36 months. ARPA-E anticipates the start date of OPEN 2021 projects to be March 2022.

Eligibility: Academic institutions, for-profit entities, industry, and individuals are eligible to apply for OPEN 2021 funding as standalone applicants or as leads or members of project teams. Federally Funded Research and

Development Centers, including DOE national laboratories, may apply as lead or partner organizations on project teams but not as standalone applicants.

Cost Sharing: Cost sharing of 20% is generally required but is reduced to 5% for educational institutions and consortia made up exclusively of educational institutions. ARPA-E strongly encourages large businesses to provide more than the 20% cost share.

Submission Limitations: There is no limit on the number of submissions by each institution, and applicants may submit more than one application as long as it is scientifically distinct.

Important Deadlines: The first deadline for questions (to be sent to ARPA-E-CO@hq.doe.gov) is March 26, 2021, at 5:00 p.m. ET. Concept papers are due April 6, 2021, at 9:30 a.m. ET. The second deadline for questions and the due date for final applications are to be determined.

Sources and Additional Information

- The full FOA is available at <http://bit.ly/30SwL8c>.
- More information about OPEN 2021 can be found at <https://arpa-e.energy.gov/open-2021>
- Examples of projects funded under OPEN 2018 can be found at <https://bit.ly/300zyvs>. ■

Call for Papers

2021 Focus Issue on the Plant Cell Atlas

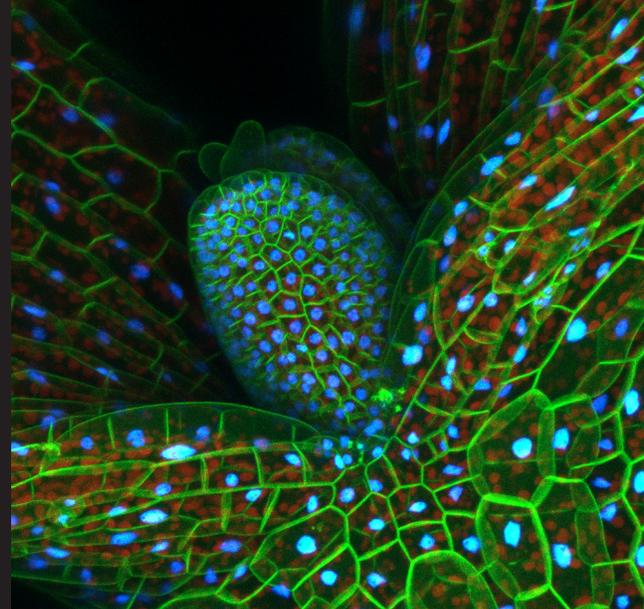


Photo credit: Kate Harline, PhD student, Adrienne Roeder lab. Epidermal plasma membrane in green and nuclei (H2B-TFP) in blue, together with chlorophyll autofluorescence in red below in the mesophyll.

Editors: Kenneth D. Birnbaum, Julia Bailey-Serres, Marisa Otegui, and Sue Rhee

Deadline for Submission: May 1, 2021; Publication: December 2021

To submit an article, go to <http://pphys.msubmit.net>

Many questions central to plant biology focus on the state of specialized cells and their response to the environment. Cellular states are relevant to every aspect of plant life, from the specialized cells that accumulate nutrients for human consumption to cell state changes in response to stress, pathogens, or developmental cues. At the same time, new technologies have opened up vast potential to screen cells—some at the level of the whole cell and others with stunning resolution at the subcellular level. The editors of this focus issue seek to include manuscripts that will provide a foundational set of approaches, concepts, techniques, and analytical methods to build a Plant Cell Atlas—a framework to generate and synthesize data on the development, dynamic functions, and specialization of plant cells. The manuscripts submitted should implement new technologies and provide new mechanistic insights. Also encouraged are manuscripts that provide new methods in plant science geared toward overcoming barriers to adoption by the plant community. Contributions will likely include such topics as single cell ‘omics, including nucleic acids, proteins and metabolites; advances in imaging, including live imaging; cell physiology; computational cell biology; synthetic biology; mathematical modeling; and data science techniques from data visualization to machine learning approaches.

Authors interested in contributing should indicate this in the cover letter when submitting papers online at <http://pphys.msubmit.net>. Please select “Plant Cell Atlas” from the Focus Issue list in the online submission system. Articles published in *Plant Physiology* on this topic within 2 years before and after the Focus Issue publication date will be collected in an online Focus Collection.

For inquiries, please contact the editors of the Focus Issue:

Kenneth D. Birnbaum (ken.birnbaum@nyu.edu)

Julia Bailey-Serres (serres@ucr.edu)

Marisa Otegui (otegui@wisc.edu)

Sue Rhee (srhee@carnegiescience.edu)



THE PLANT CELL

Call for Papers

2022 Focus Issue on Plant Biotic Interactions

Edited by Roger Innes, Cris Argueso, Yangnan Gu, Libo Shan, Dorothea Tholl, and Mary Williams

Submission Deadline: September 1, 2021

For more information, go to http://bit.ly/TPC_FocusIssues



ASPB staff are dedicated to serving our members.
We welcome your questions and feedback.

For quick response, email us at info@aspb.org.