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One year later…

ASPB News

THE NEWSLETTER OF THE AMERICAN SOCIETY OF PLANT BIOLOGISTS

President's Letter

ASPB and the Plant Science Community—We Are One and the Same

BY ALAN M. JONES
ASPB President
University of North Carolina

Exciting things are happening at ASPB as we move toward a future in which membership and being part of the plant science community are one and the same. Historically, the ASPB community has been made up of dues-paying members only. Our new inclusive, open approach welcomes all individuals in the plant science ecosystem: researchers, students, postdocs, professionals, educators, and more. Anyone will be able to join the community for free, and depending on what you want from ASPB, different tiers of paid memberships will be available for additional benefits, access, services, and discounts. The price for full access to many of these tools and services will be on par with current paid membership fees.

Where Do We Begin?

When we gathered data from people in the plant science community who have interacted

Alan Jones

with us in some way since 2007, we identified an estimated 56,000 individuals. These include authors of papers submitted to our journals, educators, meeting attendees, and legislators and their aides, as well as scientists in industry, government, and academia.

When Will This Happen?

This transition begins May 2015, when we launch our digital platform for the plant science community. Between now and then, you will begin to see changes that reflect this shift. All of these changes are focused on you, providing a framework along with tools and resources to help you be as successful as

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Julian Schroeder Assumes Presidency October 1

Julian Schroeder is ASPB's new president. He succeeds Alan M. Jones, University of North Carolina. The Society's new president-elect is Rick Dixon, University of North Texas, Denton.

Julian is professor and codirector of the Center for Food and Fuel for the 21st Century at the University of California, San Diego. He is also director of Plant Systems Biology Graduate Training in San Diego. He grew up

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CORRECTION: On page 25 of the July/August 2014 issue of the ASPB News, Ed Tolbert was mistakenly identified as Eric Conn in the photo caption at the bottom of the page.

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

For quick response, e-mail us at info@aspb.org or visit our FAQ at www.aspb.org/faq.

ASPB Executive Committee

ASPB Staff

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Rick Dixon Elected to Lead ASPB in 2015–2016

Richard A. Dixon is distinguished research professor in the Department of Biological Sciences at the University of North Texas, Denton (UNT). He was previously founding director of the Plant Biology Division at the Samuel Roberts Noble Foundation, Ardmore, Oklahoma, where he worked from 1988 to 2013. He was born in South Africa of British parents and moved to the UK at the early age of 3 months. He grew up in the UK and pursued his bachelor's and PhD degrees in biochemistry and botany, respectively, at the University of Oxford. He did postdoctoral work in plant biochemistry with Derek Bendall at the University of Cambridge and spent nine years as lecturer and then reader in plant biochemistry at the Royal Holloway College, University of London. During his Oxford days, he established a collaboration with Chris Lamb, with whom he copublished over 100 papers and review articles between 1978 and 2004, documenting the molecular basis of plant defense responses, including the roles of hydrogen peroxide and nitric oxide as signal molecules.

Rick's early research developed an understanding of the biosynthesis of plant phenylpropanoid natural products at the enzymatic level. He developed an elicitor-induced cell suspension culture system for studying the biosynthesis of isoflavonoid defense compounds, and, with Chris Lamb, applied the new tools of molecular biology to show

that elicitor-mediated defense responses in plants involve transcriptional coactivation of suites of genes encoding biosynthetic enzymes.

His lab went on to pioneer the molecular identification of enzymes of the phenylpropanoid biosynthetic pathways, and this work has formed the basis for his subsequent studies on metabolic pathway engineering. Breakthroughs identified key enzymes dedicated to the formation of isoflavonoids and condensed tannins.

Shortly after moving to Oklahoma in 1988 to establish the Plant Biology Division at the Noble Foundation, Rick turned his research focus to alfalfa. A series of transgenic alfalfa plants was generated in which the lignin pathway was down-regulated at each known step. This resource revealed the relationships between forage quality (digestibility) and lignin content and also provided material for breeding programs with an industrial partner that will soon result in commercial release of low-lignin alfalfa with improved forage quality.

His lab subsequently took a leadership role in demonstrating the feasibility of designing improved lignocellulosic biomass sources for production of liquid biofuels, applying the lignin technology to the bioenergy crop switchgrass. In addition to these applied studies, his group has recently discovered transcription factors facilitating ectopic secondary cell wall formation in pith tissues, allowing for biomass densification, and demonstrated genetically the critical role of laccases in lignin polymerization.

Since moving to UNT in February 2013, Rick is continuing to maintain a similar balance of fundamental and applied science. His recent publications reporting the discovery of novel linear lignin polymers in plant seed coats should facilitate exploitation of lignins for production of bio-based products.

Rick has been a member of ASPB since 1988 and has served on the ASPB Publications Committee. He was awarded the doctor of science degree for his research achievements by Oxford University in 2004. He has published over 400 papers, and he has been named by the Institute for Scientific Information as one of the 10 most cited authors in the plant and animal sciences. He is co–editor-in-chief of the journal *BioEnergy Research;* a member of the editorial boards of four other international journals; a member of several international scientific advisory boards; and recipient of many awards, including Oklahoma Scientist of the Year, the Groupe Polyphenols Scientific Prize, and the Shang-Fa Yang Memorial Lectureship of Academia Sinica. He is a AAAS fellow, and he was elected to the U.S. National Academy of Sciences in 2007, in which capacity he serves on the National Research Council Board on Agriculture and Natural Resources.

Rick is a strong advocate for maintaining funding for basic science. As a scientist who has worked with industry to develop commercial products, he understands that science has its greatest impact when people are doing what they do best, with strong interactions between basic and applied scientists for projects that have applied drivers. The membership of ASPB represents the brightest and the best in plant science, and Rick will support the organization in making the case to policy makers that the United States must remain at the forefront of innovation in this area. He also feels strongly about the need to better explain the benefits of biotechnology to an ever more skeptical consumer base and to address regulatory issues that are preventing potentially life-saving technologies from becoming realities. Finally, he is committed to the open exchange of ideas on these and other topics within the broad community represented by ASPB. ■

JULIAN SCHROEDER
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in New Jersey, where he took frequent family weekend hikes in nature, and also in New York City. His family moved to Germany, where he pursued his undergraduate studies in physics at the University of Göttingen, including a year as exchange student at the University of Grenoble in France. He completed his MS and PhD in biophysics and physics at the Max Planck Institute for Biophysical Chemistry in Göttingen as the first graduate student of Nobel laureate Erwin Neher, in conjunction with the University of Göttingen. He pursued a postdoctoral fellowship at the University of California, Los Angeles, with Susumu Hagiwara, who had codiscovered calcium channels in animal systems. In 1990, he joined the faculty at the University of California, San Diego, where he has been active since.

In his early research, Julian pioneered the characterization of ion channels in higher plants. He identified and characterized several of the major classes of higher-plant ion channels and derived models for their functions in ion transport, osmoregulation, and signal transduction. He developed the model for how these different classes of ion channels with pumps function together in a network in guard cells for mediation of stomatal opening and stomatal closing during gas exchange regulation in plants. This understanding of plant ion channel functions is distinct from the "excitatory" paradigm of ion channel functions in excitable animal cells. At the same time, unique mechanisms by which plant anion and calcium-permeable channels can produce signal transduction were identified. Julian and his coworkers developed genomic approaches to guard cells, which control water loss and CO_2 intake in plants. He further adapted and developed reconstitution of plant ion channels and transporters in Xenopus oocytes, which allowed direct characterizations of transport properties and plant transporter gene functions.

Julian's laboratory then pioneered the combined use of patch clamp analyses and Arabidopsis genetics. From the above advances, his laboratory turned its research focus toward identifying the basic molecular mechanisms by which plants respond to and mount resistance to abiotic stresses. The abiotic stress mechanisms that Julian and colleagues are characterizing are directly linked to water and gas exchange regulation, in particular drought stress–induced guard cell signal transduction mechanisms, salinity resistance mechanisms, and how stomatal conductance responds to the continuing rise in the atmospheric CO_2 concentration. Understanding the basic mechanisms of these abiotic stress responses is also relevant in reference to the availability of arable land to meet the food and energy needs of the growing human population.

Julian's research has identified key early abscisic acid signal transduction genes and their underlying mechanisms. In this research, Julian and colleagues obtained molecular genetic, genomic, biophysical, cell biological, and whole-plant physiological evidence for new genes and mechanisms in guard cells that control water loss of plants in response to drought. In recent years, Julian's laboratory has identified CO_2 signal transduction mechanisms, including CO_2 binding proteins, intracellular signaling proteins, and ion channels in guard cells, through which the continuing rise in atmospheric CO_2 level reduces stomatal pore apertures in plants.

A second effort in his lab focuses on identifying genes that mediate salt (sodium) stress resistance and heavy metal uptake and detoxification in plants. His laboratory has coidentified major mechanisms through which plants detoxify and accumulate heavy metals and the metalloid arsenic. Julian's lab also identified the plant HKT transporter family and showed its key role and the mechanism through which it mediates salinity resistance in Arabidopsis. Research on the staple crops rice and wheat in several laboratories is now showing that this same HKT transporter mechanism plays a major role in determining salinity resistance under saline stress. For example, HKT marker breeding efforts in wheat in Australia are showing improvements in yield, illustrating how basic Arabidopsis research can aid in innovation in agriculture.

Julian is Novartis Chair in Plant Sciences and distinguished professor in the Division of Biological Sciences at the University of California, San Diego. He has received awards for his research advances, including the Charles Albert Shull Award from ASPB, the Presidential Young Investigator Award from the National Science Foundation (NSF), the Deutsche Forschungsgemeinschaft (DFG) Heinz Maier-Leibnitz Research Prize, and the Blasker Award in Environmental Science and Engineering. He received a Feodor-Lynen Alexander von Humboldt Fellowship as a postdoc. He was also an Alexander von Humboldt Fellow at the Max Planck Institute for Biochemistry in Munich and visiting professor at the ETH Zurich and was named Chinese Academy of Sciences International Professor (2009), and Churchill Overseas Fellow at Cambridge University (2012). He is a fellow of AAAS.

Julian has been a member of ASPB since 1986 and has served the plant science community in diverse functions, including service on ASPB's Public Affairs Committee. He was a member of the North American Arabidopsis Steering Committee (NAASC) from 2006 to 2010 and was NAASC chair in 2009/2010. He has been active on the advisory board of the Arabidopsis Biological Resource Center (2007–2011). Prior to these activities, he was a member of the Department of Energy, Energy Biosciences Council. He has further served on many national and international grant panels, including for NSF and NIH. Julian is committed to inspiring young students in the excitement of the plant sciences, is pursuing high school internship training in his laboratory for students from families with no prior four-year college degrees, and visits local schools for science presentations as a "Nifty 50" member of the annual San Diego Science Festival.

Julian favors opportunity, intellectual integrity, diversity, inspiring and creative research, ethics, and global cooperation. He also strongly supports recent

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Alice Harmon Is Secretary-elect

Alice C. Harmon is professor and former chair of the Department of Biology, University of Florida. She is member of the Plant Molecular and Cellular Biology Degree Program and has a joint appointment in the Department of Chemistry. After graduation with an undergraduate degree in chemistry from the University of Florida, she worked for eight years in technical positions at Chevron Chemical Company in Richmond, California; the Environmental Protection Agency in Athens, Georgia; and the Savannah River Ecology Laboratory, Aiken, South Carolina. She was also a medical technologist at Medical College of Georgia, Augusta.

Alice's desire for a more challenging career led her to enroll as a graduate student in the lab of Milton Cormier, Department

of Biochemistry, University of Georgia. The lab's focus was on the chemistry of bioluminescence and involvement of calcium in its regulation. The lab's discovery of calmodulin in plants piqued Alice's interest, and it became the subject of her dissertation work. As a postdoc in the same lab, she and graduate student Cindy Putnam-Evans (now associate dean of research at Eastern Carolina University) discovered and characterized calcium-dependent protein kinases in soybean. Alice has worked on this family of kinases and their roles in signal transduction ever since. Her current work is in the area of the role of protein kinases in stomatal movement and their regulation by redox.

Alice has served on many grant review panels for the National Science Foundation, the U.S. Department of Agriculture, and Deutsche Forschungsgemeinschaft. She was a monitoring editor for *Plant Physiology,* a member of the editorial board of *The Plant Journal,* and a reviewing editor for the *Journal of Biological Chemistry.*

Alice joined ASPB as a graduate student in the early 1980s, and she has participated as an organizer of minisymposia, as a member of the (then) Women in Plant Physiology Committee (1993–1996), and as a member and chair of the Bylaws Committee (2007–2012; chair 2010–2012).

One of the important functions of the secretary is to chair the Program Committee. Alice has administrative experience as department chair and chair of numerous department committees. Also important for this job is a broad appreciation for all aspects of plant biology. Although her research focus has been at the molecular and cellular levels, Alice has taught a range of courses, including introductory biology, plant physiology, plant metabolism, and plant biochemistry. In her teaching she uses the integrative approach of relating molecular functions to function at the cellular and organismal levels. ■

PRESIDENT'S LETTER
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possible, no matter where you are in your career journey.

Loyalty and Value

This new focus on service changes the way we having been doing business for the last 90 years. When I began my career in plant biology in the mid-70s, it was simply expected that you would join a professional society and that you would show loyalty to that society until retirement. So I paid my annual dues when prompted—initially to the American Society of Plant Physiologists and now to ASPB—without questioning what my society was doing for me. Loyalty alone does not work in this new world. Value is what it is all about now.

With that focus on value, we are reorganizing many existing benefits and developing a variety of new tools and resources that we know will help support your life's work. More than anything, we are focused on you and your needs by offering easy access to research content, job search tools, assistance with funding opportunities, professional development and ongoing education, grant management, a personal professional website, and much more.

The Result?

A vibrant and connected community of plant scientists, content, tools, and resources that stays with you throughout your career journey.

Acknowledgment

This is my last President's Letter, and I would like to take this opportunity to thank the incredible staff at ASPB headquarters—too many to name individually here. They are an enjoyable, dedicated bunch of professionals who are really focused on ASPB and the plant science community—which are one and the same. ■

Joe Kieber Elected to Executive Committee

Joe Kieber is a professor in the Biology Department at the University of North Carolina at Chapel Hill. He received his BS in biology from Cornell University in 1984 and a PhD from the Department of Biology at the Massachusetts Institute of Technology in 1990. His graduate research was done in the laboratory of Ethan Signer and focused on characterizing DNA topoisomerase I from plants. He did his postdoctoral studies with Joe Ecker, then at the University of Pennsylvania, where he began his work on phytohormone signaling. In 1993, he joined the Department of Biological Sciences at the University of Illinois at Chicago as an assistant professor, and in 1999 moved to the University of North Carolina at Chapel Hill, where he was promoted to full professor in 2004. In 1999, he was elected a AAAS fellow.

Joe's research program focuses on various aspects of signaling in plants, especially on the pathways regulating hormone function. The first hormone Joe worked on was the gaseous signaling molecule ethylene. Some highlights of the ethylene research include identifying and characterizing the role of the Constitutive Triple Response 1 (CTR1) protein kinase and the Response to Antagonist 1 (RAN1) copper transporter in ethylene signaling, demonstrating that the regulation of 1-aminocyclopropane-1-carboxylate (ACC) synthase (ACS) protein stability plays a key role in regulating the level of ethylene biosynthesis and elucidating the mechanisms controlling ACS stability. A second avenue of research has focused on the phytohormone cytokinin. Research in Joe's lab established the role of two-component elements in cytokinin signaling and went on to define the role of these elements in various aspects of Arabidopsis growth and development, and more recently in the monocot rice. An additional project in the lab has focused on a signaling pathway regulating cellulose synthesis in Arabidopsis, which includes a Leu-rich receptor-like kinase and a novel role for ACC as a signaling molecule independent of its conversion to ethylene.

Joe is active in teaching at both the undergraduate and graduate levels. He has served on numerous scientific boards and panels, including the North American Arabidopsis Steering Committee, the International Plant Growth Substance Association council, and the Multinational Arabidopsis Steering Committee. He has been an active ASPB member since 1993 and served as a monitoring editor of *Plant Physiology* from 2003 to 2009. He has been a frequent panelist for the National Science Foundation, the U.S. Department of Agriculture, and the Department of Energy, and he is serving as the panel manager for the USDA Plant Growth and Development panel. ■

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efforts of global plant science societies and the Global Plant Council to work together to advocate for plant research support and sees a need for training and providing opportunities to scientists from financially disadvantaged countries and regions of the world toward addressing and solving impending global challenges. He strongly supports efforts of members of ASPB to make their voices heard and especially encourages young members, with information support from ASPB, as well as our senior members to contact their policy makers, support policy makers' understanding that our science base is the future of plant biology and agriculture globally.

Julian invites members to contact him and the ASPB leadership with ideas and criticisms toward enhancing ASPB's long-term impact. ■

Complete Collection of *Annual Review of Plant Physiology* Available

Anyone interested in a complete collection of *Annual Review of Plant Physiology* (now Biology) through volume 64 (2013), please contact Nancy Winchester at nancyw@aspb.org. The donor is willing to help pay shipping to libraries in developing nations.

Social (and Other) Benefits of Plant Biology 2014

If You Are Too "School for Cool," You Probably Raised Your Glass at Plant Biology 2014

BY KATIE ENGEN
ASPB Education Coordinator

Sure, you could just download the publications relevant to your research and skip the trip to ASPB's annual meeting. Or you might focus on only attending the maximum number of sessions, pursuing grant or collaboration options, and talking shop directly with the PIs doing the coolest work. And this would be time well spent. But the true Plant Biology aficionados know that it's the meeting's in-between moments and social opportunities that make showing up so worthwhile.

Need proof? Consider the community bonds and plain old fun enjoyed by many in Portland at the joint meeting of ASPB and the Canadian Society of Plant Biologists (CSPB).

The Opening Mixer

The mixer is a great way to kick off the meeting's networking events. The traffic jams in the aisles of the exhibit hall attested to the importance of mixing with old friends and making new connections, as everyone chatted and enjoyed refreshments together. The cheerful buzz that filled the hall was paid (or is that played?) forward throughout the rest of the meeting.

Summer Undergraduate Research Fellowship Dinner

Saturday was jam-packed for these undergraduates as they presented in a special poster session and then jumped into navigating the full conference agenda. To make sure this next generation of plant scientists synchronized early, ASPB hosted the 15 SURFers, their mentors, and SURF committee members for a casual dinner in a student-friendly local restaurant. This year's dinner at Spirit of '77 (skee-ball, basketball, and big-screen TV optional) had plenty of mingling, munching, and mirth. The undergraduates enjoyed each other's company while learning that faculty are pretty fun to hang out with, too. After several hours of fun, the undergraduates politely departed as one group. Was it curfew? Nah. They just wanted to get to a downtown brewery—together—before the $1 pitcher deal expired for the night.

President-elect Julian Schroeder mixes it up.

Philip Pardey (left) and Robb Fraley mingle at Plant Biology 2014. PHOTOS BY NAIM HASAN

That Extra Kick

- Coffee, coffee, coffee. Or tea. The science really was scintillating in Portland. Yet sitting and listening for multiple sessions required caffeine. Or maybe what was truly revitalizing was the bit of socializing that occurred over cups of steaming hot brew.
- Ardent soccer fans were thankful to the PB14 vendors and conference center restaurant managers who aired the World Cup final match on Sunday. After all, per this ASPB blog post (http://tinyurl.com/ASPBchamps) on turf grass science, everyone knows world champions need plant biology. The international mélange of conferees who con-

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ASPB/AAAS 2015 Mass Media Science & Engineering Fellows Program

Are you interested in science writing?

Do you want to help people understand complex scientific issues?

Apply for the ASPB/AAAS Mass Media Science & Engineering Fellows Program and learn how to increase public understanding of science and technology. Fellows in the 10-week 2015 summer program will work as reporters, researchers, and production assistants in mass media organizations nationwide. **Deadline: January 15, 2015.**

Visit **http://www.aaas.org/MassMedia** for more details and to download an application brochure, or call 202-326-6441 for more information.

Some former host sites

Los Angeles Times

Milwaukee Journal-Sentinel

National Geographic

National Public Radio (NPR)

NOVA

Philadephia Inquirer

Raleigh News & Observer

Sacramento Bee

Scientific American

The Oregonian

WIRED

Slate

AMERICAN SOCIETY OF PLANT BIOLOGISTS
INVENIAMVS VITALIA ARCANA PLANTARVM
1924

AAAS
ADVANCING SCIENCE, SERVING SOCIETY

SOCIAL BENEFITS OF PB14
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nected over soccer was fantastic. And if nonfans wanted to discuss resources or research? Everyone exemplified focused professionalism (at least until the next great shot on goal).

Breaking Bread

So many shared meals—casual and spontaneous—are crammed into the rare off-moments and after hours of this busy conference. Here are some examples:

- Sarah Wyatt (Ohio University) worked (and reworked) her event and meeting schedule to make sure she could host her lab at a nice dinner.
- Education Committee chair Kathleen Archer (Trinity College) invited workshop speaker Adrienne Williams (UC Irvine) to a pre-workshop dinner to make sure Adrienne was properly oriented and felt connected, since this was her entrée to the plant science community.
- Part of the iConnect team gathered at Deschutes, a very popular gastro-pub and microbrewery.
- On Bastille Day, symposium speaker Mark Tester (King Abdullah University) and his friends were not allowed to order dinner at an incredibly busy French restaurant. Some ASPB staff at an adjacent table had the last allowed order. So both groups merged to dine family style amid much laughter. Incidentally, this was Mark's first meeting in 29 years of (travel-laden) membership. He said this experience and many other fun PB14 moments allowed him to see the value of attending such a wonderful event.

> "Indeed, much fun was had. One of the main reasons I keep coming back is for the social aspects. . . . They can be very important—in addition to the science, of course.
>
> —Jon Monroe, James Madison University

Local Excursions

Portland is replete with unique neighborhoods, riverfront parks, and inspiring gardens. It was easy to spot happy groups of plant people strolling to and from Powell's City of Books, Kure Juice Bar, or the International Rose Test Garden. Whether they were crossing bridges or hiking the rather steep inclines just north of downtown, these groups of PB14 attendees did so in good company.

The Final Party

The World Forestry Center (http://www.worldforestry.org/) setting was fabulous. Everyone enjoyed drinks and crudité along with clever displays, including games with life-sized forest conservation tools and the traveling exhibit of the amazing Dr. Seuss's work. As the sun sank, the live band on the outdoor patio coaxed a few early dancers onto the dance floor, including the iConnect Team (see http://tinyurl.com/ASPBiTeam) and at least two presidents (Nick Carpita and Alan Jones). But those who stayed late learned that if you're "too school for cool" (thanks, Pink; http://tinyurl.com/ASPBcool), then you definitely want to "raise your glass" with ASPB! Here's how it went down (you can't make this stuff up):

9:57 p.m. Dedicated dancers put on a show; reluctant dancers started rockin' out (some hanging onto backpacks and poster tubes).

(from left) Jon Monroe, Mark Haux, Ken Helm, Amanda Storm, and Mark Brodl at Cannon Beach enjoying R&R with tufted puffins nesting on Haystack Rock. PHOTO BY JON MONROE

10:45 p.m. The band's lead singer proclaims, "All you plant scientists partying hard on a Tuesday night have blown my mind!"

11:41 p.m. The dancing mob is warned that the final train would depart at 11:59; they demanded ONE MORE SONG, and the band complied…with a very short tune.

11:50 p.m. Hundreds crowd the subterranean departure platform for the last train of the night. Above the din, a voice cried, "A–S," and the masses roared back, "P–B!" The call-and-response filled the cavern, and then disintegrated into laughter when a very vocal minority chanted, "Go Canada!" The gang was all there.

11:59 p.m. The train arrived; a handful of sleepy passengers startled to attention as the mass of plant scientists swarmed aboard. One local asked, "Are there any really famous plant scientists in the mix?" Yes. And just then, one of them rallied everyone for another round of "A–S–P–B." The party rolled on.

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Plant Biology 2014—The Last Word

BY IAN H. STREET
Dartmouth College

For me, one major reason to attend conferences is to hear and learn from colleagues. And this year's Plant Biology Program Committee made it easier than ever, with dedicated time to meet and chat with speakers after their symposia. There were also many chances to connect with colleagues both old and new at the meeting, as well as continue the connections after the meeting.

I enjoyed Erin Friedman's mentoring discussion at the Minority Affairs Committee (MAC) luncheon about the cutting edge of not just plant science, but science period. And the cutting edge was completely apparent from the awards symposium, where Shull prize awardee Harvey Millar started things off with a fantastic talk on his group's basic research in plant respiration. He discussed the large collaborations he's been involved in to build up a systems-level view of the dynamics of how plants respire. Hales prize awardee Brian Larkins talked about his plant nutrition work but also discussed some lessons he's learned during his own career—namely, "Follow your passion, but recognize an opportunity when it presents itself."

Journalist Nathanael Johnson gave an engaging talk based on his fantastic Grist series, Panic-Free GMOs (http://grist.org/series/panic-free-gmos). He spoke about how the GMO debate isn't really about facts or GMOs necessarily; it's about the larger stories we attach to the debate such as sustainability, the corporate-controlled industrial food system, and the wonder of science. None of this list is mutually exclusive, as technology is itself agnostic and the specific application matters. His message reminded me that this is something to keep in mind when communicating or educating about plants and plant science.

Two related major symposia (http://blog.aspb.org; see posts by Sabrina Elias, Sandra Smieszek, and me) on feeding and nourishing the world's growing population offered several stories on how we can feed the world in the face of challenges such as climate change. Both sessions featured speakers reflecting research and the thinking required to feed people with the projected population growth.

Anna Amtmann gave a fascinating talk on plant nutrient status and how plants can remember stress and gave an elegant epigenetic mechanism for memory. The other speakers—Tim Benton, Alan de Brauw, Ricardo Uauy, Philip Pardey, David Jenkins, Pam Ronald, and Mark Tester—spoke eloquently about challenges and possible solutions (http://blog.aspb.org; by Sandra Smieszek), plant yields, nutrition, food, and environmental security. One speaker who embodied the cutting-edge technology (i.e., fine-scale climate/soil monitoring, crop/pollinator biotechnology, marker-assisted breeding, and cell phones) being brought to bear on the problems of feeding the world was Robb Fraley. All in all, I felt that the complex keys to a food-secure future are partly technology; a varied, more plant-based diet; and prudent land management.

The major symposia dedicated to basic research were on abiotic stress (see http://blog.aspb.org; by Sabrina Elias), synthetic biology of specialized metabolism (designing plants to make desired compounds; Sarah O'Connor gave a particularly interesting talk on pathway elucidation), and plant signaling (http://blog.aspb.org; see my post), which had lots of great basic and applied research.

Continuing with the technology and ingenuity theme, there were minisymposia on next-generation sequencing (http://blog.aspb.org; by Maria Ekramos) and other state-of-the-art tools, such as The Danforth Center phenotyping robot presented by Malia Gehan and the root-GLO system presented by Rubén Rellán-Álvarez. The workshop from The iPlant Collaborative (http://blog.aspb.org; by Maria Ekramos) and a workshop from Software Carpentry (http://software-carpentry.org) that occurred after the conference (ask attendee Molly Hanlon about it) underscored the vast array of technologies available to plant scientists, as did a walk through the vendor booths.

Technology can be challenging to learn, but there were workshops on how to publish once you learn to use a technology (http://blog.aspb.org; by Mary Williams), and a workshop on flipping the classroom to improve both student and instructor learning (http://blog.aspb.org; by Maria Ekramos). As PUI faculty can tell you, it all starts with education (http://blog.aspb.org; by Leeann Thornton). All of the technology, publishing, and learning have something in common: career. Sarah Blackford led a workshop titled Your Career, What's Next (see her blog at http://www.biosciencecareers.org/).

This year, ASPB celebrated its 90th anniversary, and *The Plant Cell* turned 25. There were cake and champagne to enjoy while we looked at the timeline (http://milestones.aspb.org) and appreciated the past.

I had the opportunity to be part of a team asking people to answer the question, "Why plant biology?" Answers were varied and a lot of fun, demonstrating the intelligence and creativity of plant scientists. One of my personal favorite comments was given by Crispin Taylor, ASPB's executive director, who said, "Because the community that studies them rocks!"

The closing party at the World Forestry Center, at one of the most scientifically inspired mass transit stops in the world (http://thefinchandpea.com/2014/07/29/portlands-scientific-light-rail-

station; post by Eva Amsen), was wonderful. The venue was great, as was the band (http://blog.aspb.org).

The President's Symposium was a celebration of plant science and how plants have led the way in understanding nature's mechanisms. Speakers David Baulcombe, Julie Law, and two-talk meeting rock star Pam Ronald all beautifully demonstrated great foundational science and highlighted how plant science isn't inferior or "me-too" but is a real contender, revolutionary and critical for humanity's future—and it connects us all.

The annual meeting (#plantbiology14) was a great way to get a glimpse of the broad world of plant biology. If you couldn't attend this year, check out http://blog.aspb.org for all the highlights. If you were there, you're invited to add to the documentation of Plant Biology 2014 by leaving a comment about your impressions and takeaways at http://blog.aspb.org. ■

Looking Back at Plant Biology 2014

In one of the hottest years on record in Portland, Oregon, 1,365 plant biologists gathered for the joint annual meeting of the American Society of Plant Biologists and the Canadian Society of Plant Biologists, and indeed they came from all over the globe—42 countries were represented at this year's meeting.

Attendees represented the following groups:

- 242 postdocs
- 354 graduate students
- 113 undergraduates
- 651 faculty, government, and industry scientists
- 5 emeritus members

Check out the photo spread (see pages 12–13) to find colleagues and friends who were there!

For more on Plant Biology 2014: #plantbiology14 and http://blog.aspb.org

(from left) Yuanyuan Liu, Shumin Wang, Lan Tran, Yoichiro Watanabe, and Sofiya Lazarova at the final fete. PHOTO BY NAIM HASAN

SOCIAL BENEFITS OF PB14
continued from page 9

A Recap

Mixing it up at the ASPB annual meeting works on many levels, because

- undergraduates, graduates, postdocs, faculty, industry, technologists, and exhibitors all find common ground;
- new ideas, fresh collaborations, and integrated initiatives spring up just by hanging out; and
- to borrow from Cyndi Lauper, plant scientists just wanna have fun!

Want to get in on the fun? See you in Minneapolis, Minnesota, for Plant Biology 2015. Check the website in the coming weeks for information (http://my.aspb.org/?page=ME_Index). ■

(back row, from left) ASPB President-elect Julian Schroeder with 2014 award winners Christopher Staiger, Gloria Muday, Robert Sharp, Eduardo Blumwald, Tuan-hua David Ho, Dominique Loqué, Susanne von Caemmerer, and ASPB President Alan M Jones. (front row, from left) Thomas Guilfoyle, Brent Buckner, Su-May Yu, Cathie Martin, Carl Douglas, Mike Thomashow, Jim Siedow, and Shawn Mansfield (CSPB award winner).

Portland, Oregon

PHOTOS BY NAIM HASAN

Plant Physiology®

Call for Papers

Focus Issue on Ethylene

Deadline for Submission: March 6, 2015
To submit an article, please go to http://submit.plantphysiol.org

First discovered as a plant growth regulator over a century ago, ethylene continues to be a focus for research worldwide. It controls numerous physiological processes during plant growth and development in various phases of the plant life cycle and in interaction with the environment. Ethylene was previously featured in a *Plant Physiology* Focus Issue in 2004, but there have been substantial advances in our understanding of how this phytohormone functions in the decade since then, arising in part from emergent new technologies, thereby inspiring our 2015 Focus issue on Ethylene. The scope of this Focus Issue includes all aspects of ethylene as a plant signaling molecule. Topics include, but are not limited to, the mechanisms of ethylene biosynthesis and signaling, the role of ethylene in plant growth and development, and how ethylene mediates interactions and responses of the plant to its biotic and abiotic environment.

Authors interested in contributing should indicate this in the cover letter when submitting papers online at http://submit.plantphysiol.org. Please select "Ethylene (July 2015)" 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 on Ethylene.

Please contact Eric Schaller (george.e.schaller@dartmouth.edu) or Rens Voesenek (L.A.C.J.Voesenek@uu.nl) for more information.

Joseph Jez Named 2014 HHMI Professor

Awarded $1 Million to Integrate Lab Research and Undergraduate Learning

BY KATIE ENGEN
ASPB Education Coordinator

In June, ASPB member Joseph Jez (Washington University in St. Louis) was named a Howard Hughes Medical Institute (HHMI) professor. Joe is one of 15 esteemed scientist-educators in the United States selected for effectively infusing their science education endeavors with just as much energy, focus, and discipline as they devote to their scientific research. This year there were 173 nominees serving as faculty at 106 institutions known for "very high research activity" (per the Carnegie Foundation for the Advancement of Teaching). The complete selection process and information on all of this year's professors can be reviewed in the HHMI June 30 news release (http://tinyurl.com/HHMIprofs).

The growing community of HHMI professors—40 in the past 12 years—forms a core of expertise for catalyzing synergistic, positive changes in undergraduate science education in the United States. This enterprise aligns well with the national Vision & Change (http://www.visionandchange.org) and the Partnership for Undergraduate Life Science Education (http://www.pulsecommunity.org) initiatives that ASPB supports. A primary goal for each HHMI professor is to enhance how undergraduate students interact with and understand the process of science. HHMI professors are charged with creating new activities and new models for teaching science at research universities. To support their efforts, each HHMI professor is awarded $1 million over five years to continue integrating their research and their innovative instruction methods for undergraduates. As noted in the HHMI press release, "The new professors can apply up to 25 percent of their HHMI funding to support research activities in the context of student learning."

Joe Jez and Ashley Muehler, a graduate student in Joe's lab. (photo below) Joe Jez and Madeline Mullen, an undergraduate in Joe's lab.
PHOTOS BY JOE ANGELES

Joe reports that in addition to the synergy between his research and undergraduate teaching priorities, his involvement as a mentor with ASPB's Summer Undergraduate Research Fellowship (SURF) program (http://surf.aspb.org) helped him attain his HHMI professorship. He explains, "Since my ASPB SURF students helped contribute in different ways to the development of ideas in the [HHMI] professor grant, I [want] to reaffirm how awesome the SURF program is. Thanks, ASPB!"

Of course, combining multiple priorities and disciplines is nothing new for Joe. His lab work includes an effective combination of structural biology, protein chemistry, and molecular and cellular biology, which he uses to understand biochemical networks in plants and microbes. His vision is to apply what he learns to address agricultural and environmental problems. Joe's students benefit from sharing in these explorations as he encourages them to find solutions to real-world problems. More information about Joe and his many successful teaching and research endeavors is available from the HHMI webpage on Joe (http://tinyurl.com/HHMIjez) and the Washington

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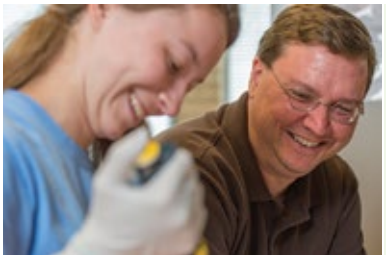

> Exceptional teachers have a lasting impact on students. These scientists are at the top of their respective fields, and they bring the same creativity and rigor to science education that they bring to their research.
>
> **—Robert Tjian, HHMI president**

From Around the Web

As the international community struggles to address the largest and most devastating Ebola outbreak in recorded history, plants are offering a glimmer of hope (http://reut.rs/VjZmPn). Drug company Mapp Pharmaceuticals is using molecular pharming to turn tobacco plants into monoclonal antibody-producing factories. Dubbed "plantibodies," the experimental treatment has already been administered to two American aid workers. As of the writing of this article, both are said to be recovering. Compared to traditional, animal-based methods of antibody production, plants allow for a faster and cheaper alternative. This is a widely reported example of how plant biotechnology is helping to broaden the public's horizons regarding the utility of plants and some of the unique opportunities they can afford humanity. Among the researchers interviewed for the various articles on this topic were ASPB's own Charles Arntzen and Qiang Chen, both of whom are affiliated with Arizona State University.

Another plant science story that has received a fair amount of attention is ASPB member Heidi Appel's work on how plants recognize predation by the vibrations of their leaves. Featured on NPR (http://ow.ly/yWVS2) and numerous other media outlets, Heidi and her team's work demonstrated that the lives of these seemingly static organisms are much more dynamic than would appear.

Several members of the ASPB community have been recognized or have joined important national committees within the past few months. Among them is ASPB member Joseph Jez, codirector of the plant and microbial biosciences graduate program at the University of Washington at St. Louis, one of 15 professors across the United States to be awarded $1 million to introduce innovative approaches in teaching science in undergraduate education and to be designated as a Howard Hughes Medical Institute (HHMI) Professor (http://bit.ly/Y3MPRX). Launched in 2002, the HHMI Professors Program was created in 2002 to empower research scientists to apply to science education the same creativity and rigor that made them successful in scientific research.

In late June, President Obama announced the appointment of former ASPB president Vicki Chandler and ASPB member Roger Beachy to the National Science Board (NSB; http://1.usa.gov/1BdxMnY). NSB is a 25-member body, drawn from industry and universities, representing a variety of science and engineering disciplines and geographic areas. Further, NSB advises the president and Congress on "policy matters related to science and engineering and education in science and engineering." NSB also serves as NSF's board of directors.

In July, U.S. Secretary of Agriculture Vilsack announced the creation of the board of the newly formed Foundation for Food and Agricultural Research (FFAR). Among the appointees were ASPB's recommendation, Deborah Delmer, and several other members of the plant community (http://1.usa.gov/1sBwz7G). Authorized as part of the 2014 Farm Bill, "the foundation will operate as a nonprofit corporation seeking and accepting private donations in order to fund research activities that focus on problems of national and international significance." The U.S. Congress has provided up to $200 million in matching funds for FFAR. ■

JOSEPH JEZ
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University press release, http://tinyurl.com/jezWUSTL/.

ASPB already has enjoyed some of the ongoing success of the HHMI professor program. As an HHMI professor in 2006–2010, ASPB member Rick Amasino (University of Wisconsin–Madison) developed rapid-cycling, self-compatible *Brassica* plants for use by high school students for genetic experiments that reveal how traits that affect plant development are inherited. Today, many ASPB outreach events include the *Fast Plant self-compatible* (http://www.FPsc.wisc.edu) resources that came from Rick's work and have been further developed and disseminated by ASPB Education Committee member Scott Woody (University of Wisconsin–Madison). Recent examples include some "wicked good" outreach in Boston, Massachusetts (see the May/June 2014 issue of the *ASPB News* at http://tinyurl.com/l252u77) and the Plant Biology 2014 Education and Outreach Booth (see page 26).

> "Students benefit most when scientists draw on their own interests and expertise in their educational activities. And many of the HHMI professors have told us that their research programs have benefited from their educational efforts.
>
> **—David J. Asai, HHMI senior director in science education**

Where Are They Now?

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 Beth Gantt, University of Maryland, "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 please contact me, David Horvath, Membership Committee chair, at david.horvath@ars.usda.gov. As always, we are open to suggestions for articles or features of interest to readers of the *ASPB News*. Enjoy!

Masaki Furuya

ASPB Corresponding Member, University of Tokyo

In 1987, upon reaching the age of 60, I had to retire from the University of Tokyo and the National Institute for Basic Biology at Okazaki according to Japan's regulations for government employees. Just before that time, it was my good fortune to be asked to head one of six projects in rapidly moving research fields in life and material sciences in the newly created Frontier Research Program (FRP) at RIKEN. In breaking with an older Japanese academic tradition, the new FRP policy began an acceleration of scientific areas, and I was excited to become a pioneer for the first five-year term. One of the major benefits was that the program allowed for a newly created postdoctoral fellow system, plus the opportunity to enlist active colleagues worldwide.

First reunion with my former graduate students, Masamitsu Wada, Masakatsu Watanabe, Yasunori Inoue, Kiyotoshi Takeno, Kotaro T. Yamamoto, Yukio Shimazaki, Akeo Kadota, Mitsuru Miyata, Ryo Sato, Yoshinobu Mineyuki, Akira Nagatani, Koji Konomi, Taro Q.P. Ueda, Ken-ichi Tomizawa, Hikaru Saji, Hideyuki Shimizu, Jun Sakai, Tomoko Shinomura, the secretary Mitsue Ishikawa, and the technical staff at Koishikawa Botanical Garden of the University of Tokyo in May 2013.

Regulatory restrictions on genetic engineering in Japan threatened a decadal lag behind those of western countries. To solve such a handicap, I asked Nam-Hai Chua to work together in producing diverse transgenic plants that expressed differently engineered genes of phytochromes. Joanne Chory had introduced me to the world of Arabidopsis through a wonderful collaboration. Also, frequent visits by Pill-Soon Song, Eberhard Schaefer, and their students greatly expedited our combined efforts. During my five years at FRP, I had 42 postdoctoral contractors from 12 countries, with an average stay of 16 months, and they published 48 papers in good journals. FRP succeeded in proving the importance of flexibility, but I also realized the need for stability in science research that FRP had aimed to eliminate.

When my FRP project ended in 1992, Eiichi Maruyama, the first director of the newly established Hitachi Advanced Research Laboratory (HARL), invited me to work there. As I had a grant for two more years from the

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MASAKI FURUYA

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International Human Frontier Science Program (IHFSP) with Nam-Hai Chua and Eberhard Schaefer, I gratefully accepted it. Though I did not anticipate it at that time, I actually worked at HARL until 2001 with support from another IHFSP grant with Phil Gilmartin and Steve Kay and with a big federal grant with Makoto Takano and Akira Nagatani. HARL was indeed a utopia to me, because this well-designed modern laboratory was in a beautiful natural setting and I had no administrative duties. I could thus concentrate solely on my research on phytochromes with a few Hitachi scientists who voluntarily joined in my projects and with a few visiting colleagues from abroad.

In the fall of 1992, Akira Nagatani and Joanne Chory gave me seeds of *phyA*- and *phyB*-null mutants of Arabidopsis prior to their own publication. I immediately decided to determine the action spectra for PhyA- and PhyB-specific responses separately, because previously all reported action spectra for phytochrome were measured with wild-type plants that contained all phytochrome species. Tomoko Shinomura commuted to the Okazaki Large Spectrograph (Watanabe et al., 1982) with dark-imbibed seeds of these mutants, and we discovered to our great astonishment that PhyA and PhyB perceive light in essentially different manners. Namely, PhyA induces Arabidopsis seed germination upon a light pulse, which was an extremely broad spectral range (from 300 nm in the UV range to 780 nm in the far-red range) and with a three to four orders of magnitude lower fluence rate than traditional red/far-red reversible reactions (Shinomura et al., 1996), so we called it the very low fluence response (VLFR). In contrast, the action spectra for PhyB-mediated seed germination in Arabidopsis were identical to those for the well-known red/far-red reversible effects on lettuce seed germination that the researchers at Beltsville discovered in 1952. Furthermore, we determined the action spectrum for the high irradiance response (HIR) of blue and far-red light that Hans Mohr had proposed in the 1960s. Again, using *phyA*- and *phyB*-null mutants and cyclic irradiation with pulsed light at the Okazaki Spectrograph, we found that both PhyA and PhyB can induce HIR in such different manners that FR pulses for PhyA were required every three minutes, and R pulses for PhyB were effective if given every two hours. The observed peaks of the action spectrum for PhyA-mediated HIR were indicative of the irradiance by which the photocycle of PhyA is most efficiently driven (Shinomura et al., 2000). I had long been dreaming of the amazing functions of PhyA, and now we realized its critical nature to the evolution of higher plants distributed all over the globe.

One evening in the autumn of 1995, while I was chatting with Peter Quail and Gareth Jenkins after dinner at the HARL guesthouse, I received a phone message that Shoko, my New Haven–born daughter, had given birth to a baby girl. Peter and Gareth strongly pushed me to visit her in the hospital immediately, so I drove back to Tokyo and saw my newborn granddaughter at midnight. It was truly one of the most exciting and memorable nights in my life.

In January 2001, on a very cold morning in my office at HARL, I suffered a heart attack without any previous symptoms, but was saved by rapid transport to the hospital. Yet the following May, during a Photobiology Society meeting in Missouri, I was hit by a brain infarct and a few weeks later was sent back to my hospital in Tokyo with two flying nurses. Considering my health problems and my age, I shut down my lab at HARL that summer and began my retirement life at the age of 75.

In the spring of 2013, nearly all of my former graduate students from the University of Tokyo laboratory gathered at the university's Koishikawa Botanic Garden to participate in the celebration of my 87th birthday. It was a wonderful reunion and the first communal gathering since their graduation decades ago. We spent all afternoon in the seminar room listening to everyone's history illustrated by PowerPoint slides, and we realized that all of us had retained our basic personalities and values throughout the years. ■

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Plant Science Decadal Vision . . . One Year Later

BY TYRONE SPADY
ASPB Director of Legislative and Public Affairs

It was at last year's annual meeting that the Decadal Vision was unveiled. The document was the product of a broad community, multiyear, strategic visioning process and articulated a research agenda designed to address pressing societal issues associated with climate change, diminishing natural resources, and a burgeoning human population. This process was supported with funding from USDA, NSF, and DOE and in-kind contributions from the Howard Hughes Medical Institute. More important, the Decadal Vision was crafted as a tool to communicate the urgent need for increased federal investment in plant science.

Fast forward one year, and ASPB and other supporting organizations are working hard to spread the word and lay the foundation for the implementation of the Decadal Vision. It was during Plant Biology 2014 that Plant Summit II cochair Sally Mackenzie held a workshop to update the ASPB community regarding efforts to promote the Decadal Vision and how it is being used to advocate for robust support for plant science. The following are some of the past year's activities Sally highlighted:

- Hard copies of the Decadal Vision were sent to all 535 voting members of the U.S. House of Representatives and Senate.
- Select staff from key congressional committees, federal science agencies, and the White House Office of Science and Technology Policy were individually briefed on the report.
- The Decadal Vision was unveiled to the science policy community at an event cosponsored by ASPB, AAAS, the American Chemical Society, and other scientific organizations.
- Collaborating with the Modern Agriculture Caucus, ASPB hosted a congressional roundtable discussion of the role of plant science technologies and their impact on crop improvement, molecular farming, and the expansion of the bioeconomy. ASPB Science Policy Committee chair Pat Schnable and committee member David Stern (cochair of Plant Summit II) participated in this event.
- Partnering with the National Coalition for Food and Agriculture Research and Council for Agricultural Science and Technology, ASPB and the Tri-Societies held a joint congressional briefing on the role of plant breeding, including genetic engineering, in the modern agricultural enterprise. ASPB members Sally Mackenzie and Gorge Dubcovsky were featured as speakers. ■

ASPB Convenes Pacific Rim Plant Science Workshop

BY TYRONE SPADY
ASPB Director of Legislative and Public Affairs

In conjunction with Plant Biology 2014, ASPB International Committee cochairs Jeff Bennetzen and Tuan-hau David Ho, along with ASPB President Alan Jones, coorganized a workshop titled Enhancing Pacific Rim Collaborative Research in Plant Biology. The aim of the event was to bolster connections and collaborations among plant biologists in Pacific Rim countries with their Western colleagues. Among the more than two dozen attendees participating in the invitation-only workshop were Sonny Ramaswamy (U.S. National Institute of Food and Agriculture), Kay Simmons (U.S. Agricultural Research Service), Sharlene Weatherwax (DOE), Jane Silverthorne (NSF), Vipula Shukla (Gates Foundation), Roger Beachy (World Food Center at the University of California, Davis), and Wilhelm Gruissem (Global Plant Council).

The group discussed a number of bilateral initiatives that are currently in place or under development. Further, they highlighted several areas of specific need with regard to facilitating international collaborations. Those needs include improved germplasm and data exchange, improved internationalism and recognition that many of the global challenges facing plant biology transcend national boundaries, more effective advocates for international collaboration, and a database of information regarding current collaborative initiatives and funding programs. By the end of the workshop, there was significant interest in reconvening for a similar discussion with other scientific societies. ■

Policy Update

LAUREN BROCCOLI
Lewis-Burke Associates, LLC

Fiscal Year 2015 Appropriations Update

Despite a promising start, the fiscal year (FY) 2015 appropriations process has stalled indefinitely in both chambers due to the upcoming midterm elections and a variety of other political reasons. Following is a summary of the status of several relevant appropriations bills. A short-term continuing resolution (CR) is expected to fund the government from October 1, 2014, through the first part of November when Congress is expected to return after elections.

Commerce, Justice, Science, and Related Agencies (CJS)

As reported in the last issue of the *ASPB News,* the House passed its version of the FY2015 CJS bill (which funds NSF) on May 30. In the Senate, the Appropriations Committee approved its version of the CJS bill on June 5, with NSF supported at the budget request level of $7.255 billion, down $154.2 million from the House level. The legislation was intended to be considered by the full chamber as part of a larger appropriations package, but the legislation was ultimately pulled from consideration. The bill is unlikely to be considered on the Senate floor at least until the lame-duck session following the elections.

Agriculture, Rural Development, Food and Drug Administration, and Related Agencies

Both the House and Senate Appropriations Committees approved their respective versions of the Agriculture, Rural Development, Food and Drug Administration, and Related Agencies appropriations bill for FY2015. Within both bills the Agriculture and Food Research Initiative (AFRI) would receive $325 million.

In the House, the legislation was passed by the full Appropriations Committee on May 29. The legislation was brought to the floor for consideration by the full chamber on June 11, but the unexpected defeat of Majority Leader Eric Cantor (R-VA) in his primary brought House legislative action on this bill to a halt, and a White House veto threat against the bill led to further action being deferred. The Senate's version of the Agriculture, Rural Development, Food and Drug Administration, and Related Agencies appropriations bill has also been stalled.

Energy and Water Development and Related Agencies

On July 10, the House passed its FY2015 Energy and Water Development and Related Agencies appropriations bill. The bill would support DOE's Office of Science at $5.071 billion, the same level as FY2014. The White House has already threatened to veto the bill, citing funding levels for fossil and renewable energy resources and provisions that restrict nonproliferation cooperation with Russia.

The Senate version of the Energy and Water Development FY2015 appropriations bill was pulled from full committee consideration last month over debate on the Environmental Protection Agency's new power plant rule regarding new carbon standards.

FFAR Board Named—Includes ASPB Nominee

As reported previously, the Foundation for Food and Agriculture Research (FFAR) was created through the 2014 Farm Bill and will provide $200 million in mandatory funding to be leveraged by public and private resources. A 15-member board of directors, for which ASPB submitted numerous qualified plant scientists as nominees, will guide FFAR. ASPB is very pleased to see that one of our nominees, Deborah Delmer, professor emeritus of biology, University of California, Davis, has been chosen to serve on the board.

Sources and additional information can be found in the USDA's press release (http://tinyurl.com/ldujpty).

National Pollinator Week and Presidential Memorandum Establishing Task Force

On June 20, the White House released a presidential memorandum titled Creating a Federal Strategy to Promote the Health of Honey Bees and Other Pollinators. The memorandum detailed next steps to strengthen existing federal efforts and create new ones to mitigate pollinator loss and help restore pollinator populations.

Through executive order, President Obama has directed the creation of a Pollinator Health Task Force, cochaired by the secretary of agriculture and the administrator of the Environmental Protection Agency. This task force will include representatives from all the major federal agencies. The task force is also charged with creating a National Pollinator Health Strategy within 180 days of the memorandum being released. The full presidential memorandum is available at http://tinyurl.com/kk2g6f3. Additional information on the USDA Conservation Reserve Program incentives is available at http://tinyurl.com/mrgaeqn.

House Subcommittee Reviews Administrative Burdens

On June 12, the House Science, Space, and Technology subcommittees on Oversight and Research and Technology held

a joint hearing on the National Science Board (NSB) Task Force on Administrative Burdens report. Among other findings, the report found that researchers spend an average of "42 percent of their application time on meeting administrative requirements." Expert witnesses expressed overwhelming concern with the deterrent effect of extensive administrative burdens, balanced against the responsibility of transparency that accompanies federal funding. In a rare glimpse of bipartisan unity, all subcommittee members agreed that appropriate and reasonable changes must be implemented to ensure that researchers can effectively conduct research and to reduce the deterrent effect exhaustive administrative burdens have on the research field.

See the archived webcast of the hearing, available at http://tinyurl.com/mmteuhc, for sources and additional information.

Administration Launches Second Theme of Climate Data Initiative in Food Resilience

On July 29, the White House unveiled the second theme of the president's Climate Data Initiative in Food Resilience, expanding the initiative beyond its initial focus on coastal resilience, announced in March. The objective of the initiative is to leverage the federal government's data resources to stimulate private-sector innovation and collaboration to ensure the resiliency of the U.S. and global food systems against the impacts of climate change. This second theme continues the administration, push for increased public–private partnerships and contains a set of commitments from the administration, as well as from 27 private-sector collaborators, including Microsoft and IBM.

For additional information, see the Food Resilience Initiative Fact Sheet, along with details on the commitments and partners at http://tinyurl.com/krh5cst.

Senate Introduces COMPETES Act

On July 31, chairman of the Senate Commerce, Science, and Transportation Committee Jay Rockefeller IV (D-WV), along with five of his colleagues, introduced the America COMPETES Reauthorization Act of 2014, S. 2757. Of interest to ASPB, the COMPETES Act, first enacted in 2007 in response to the National Academies' Rising Above the Gathering Storm report, would authorize increases in federal research funding for NSF for FY2015 through FY2019 and includes numerous other provisions to encourage STEM education and innovation.

However, with Congress in recess for August and October and few legislative days in the fall, it is unlikely the legislation will make it to the Senate floor for a vote this year.

See the Senate Committee's full press release announcing the legislation at http://tinyurl.com/lqsdkvv. ■

2014 Recognition Travel Award Winners

2014 Recognition Travel Award (RTA) winners with MAC members and ASPB president-elect. (back row from left) Beronda Montgomery (MAC), Jessica Orozco, Leorrie Atencio, Lauretta Ihenatu, Lupita Torres, Linda Robles, Ivette Guzman, Sue Flores, Shaneka Lawson, Grace Alex Mason, Alicia Bamber, Julian Schroeder (president-elect). (front row from left) John Harada (MAC), Michael Gonzales (MAC), and Gustavo Macintosh (MAC).

CALL FOR APPLICATIONS

American Philosophical Society, Research Programs

Information and application instructions for all of the Society's programs can be accessed at our website, http://www.amphilsoc.org. Click on the "Grants" tab at the top of the homepage.

Information About All Programs

Purpose, Scope

Awards are made for noncommercial research only. The Society makes no grants for academic study or classroom presentation, for travel to conferences, for non-scholarly projects, for assistance with translation, or for the preparation of materials for use by students. The Society does not pay overhead or indirect costs to any institution or costs of publication.

Eligibility

Applicants may be citizens or residents of the United States or American citizens resident abroad. Foreign nationals whose research can only be carried out in the United States are eligible. Grants are made to individuals; institutions are not eligible to apply. Requirements for each program vary.

Tax information

Grants and fellowships are taxable income, but the Society is not required to report payments. It is recommended that grant and fellowship recipients discuss their reporting obligations with their tax advisors.

Contact information

Questions concerning the FRANKLIN and LEWIS AND CLARK, programs should be directed to Linda Musumeci, Director of Grants and Fellowships, at LMusumeci@amphilsoc.org or 215-440-3429

Questions concerning the LIBRARY RESIDENT Research Fellowships should be directed to Earle Spamer, Library Programs Coordinator, at libfellows@amphilsoc.org or 215-440-3443.

Brief Information About Individual Programs

Franklin Research Grants

Scope This program of small grants to scholars is intended to support the cost of research leading to publication in all areas of knowledge. The Franklin program is particularly designed to help meet the cost of travel to libraries and archives for research purposes; the purchase of microfilm, photocopies or equivalent research materials; the costs associated with fieldwork; or laboratory research expenses.

Eligibility Applicants are expected to have a doctorate or to have published work of doctoral character and quality. Ph.D. candidates are not eligible to apply, but the Society is especially interested in supporting the work of young scholars who have recently received the doctorate.

Award From $1,000 to $6,000

Deadlines October 1, December 1; notification in January and March.

Lewis and Clark Fund for Exploration and Field Research

Scope The Lewis and Clark Fund encourages exploratory field studies for the collection of specimens and data and to provide the imaginative stimulus that accompanies direct observation. Applications are invited from disciplines with a large dependence on field studies, such as archeology, anthropology, biology, ecology, geography, geology, linguistics, and paleontology, but grants will not be restricted to these fields.

Eligibility Grants will be available to doctoral students who wish to participate in field studies for their dissertations or for other purposes. Master's candidates, undergraduates, and postdoctoral fellows are not eligible.

Award Grants will depend on travel costs but will ordinarily be in the range of several hundred dollars to about $5,000.

Deadline February 1 (February 2 in 2015); notification in May.

Library Resident Research Fellowships

Scope The Library Resident Research fellowships support research in the Society's collections.

Eligibility Applicants must demonstrate a need to work in the Society's collections for a minimum of one month and a maximum of three months. Applicants in any relevant field of scholarship may apply. Candidates whose normal place of residence is farther away than a 75-mile radius of Philadelphia will be given some preference. Applicants do not need to hold the doctorate, although Ph.D. candidates must have passed their preliminary examinations.

Stipend Stipend $2,500 per month.

Deadline March 1 (March 2 in 2015), notification in May.

Information updated August 2014

The Flipped Classroom Teaching Strategy

ASPB Education Workshop 2014

BY KATHLEEN ARCHER
Trinity College

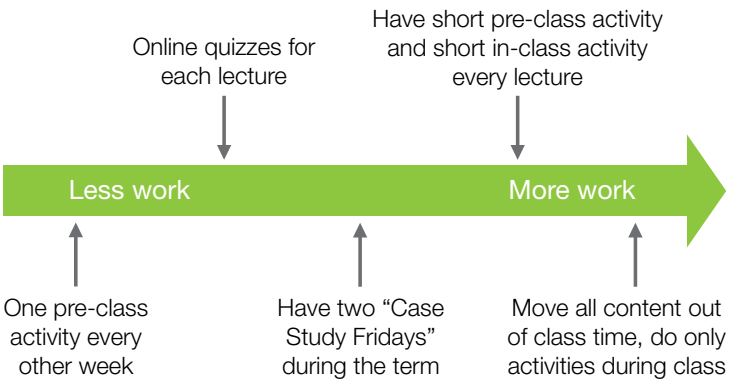
In a "flipped" course, students engage with carefully selected course content outside of class so that in-class contact time with the instructor is spent on active learning. The instructor clarifies difficult material and facilitates while students work on in-class assignments, projects, and discussions that promote achievement of learning objectives. Adrienne Williams (University of California, Irvine) brought her experience with this technique to ASPB's 2014 Education Workshop, sharing with us both the positive and negative points about this teaching method in a dynamic and informative session.

Adrienne opened the workshop with a look at several different ways that flipping can be implemented, ranging from courses where all content is delivered before class to those where just an occasional reading or video viewing outside of class time is expected. She illustrated with concrete examples how five different instructors employ the method. By asking the audience to analyze how implementation varied, Adrienne ensured the audience grasped the spectrum of possibilities.

> The big-picture message is that adding any active learning is good, and flipping can be done in small bites.
>
> **—Adrienne Williams**
> **University of California, Irvine**

Basics of Flipping

The Scale of Flipping



Strategies for providing the content to be studied outside the classroom included text readings and short videos. Adrienne noted that simply videotaping your normal lecture is the worst strategy, as this tends to be quite boring for students. Rather, she recommended a video capture of PowerPoint slides augmented with writing and voice-over, easily put together with software such as Camtasia. Preparing your own videos would require additional work in advance, but they could be used multiple times. Adrienne recommended that instructors build in some means of encouraging students to make notes (such as with a premade graphic organizer) from the texts or videos. Handwritten notes are superior to laptop typing for engaging student thought.

Adrienne cautioned that there must be some form of accountability for doing the necessary work outside of class. Online quizzes the night before or in-class quizzes help ensure that students have worked with the material and are ready to participate in active learning exercises that help clarify concepts, strengthen retention, and lead to mastery. Students, like their professors, are busy, so there must be some points associated with these assessments in order for students to understand they are valued by the instructor and to ensure they are taken seriously.

The main purpose of flipping is that it frees up class time to focus on active learning—spending time on more difficult concepts, confronting misconceptions, and giving students opportunities to articulate what they know and what they don't understand. Adrienne finished the session with a number of examples of in-class activities one could use, ranging from quick and simple to those with more time investment. Some activities result in worksheets or solved problems that should receive some notice (even a simple check-off system) from the instructor so that students are accountable for their in-class participation. Adrienne provided some strate-

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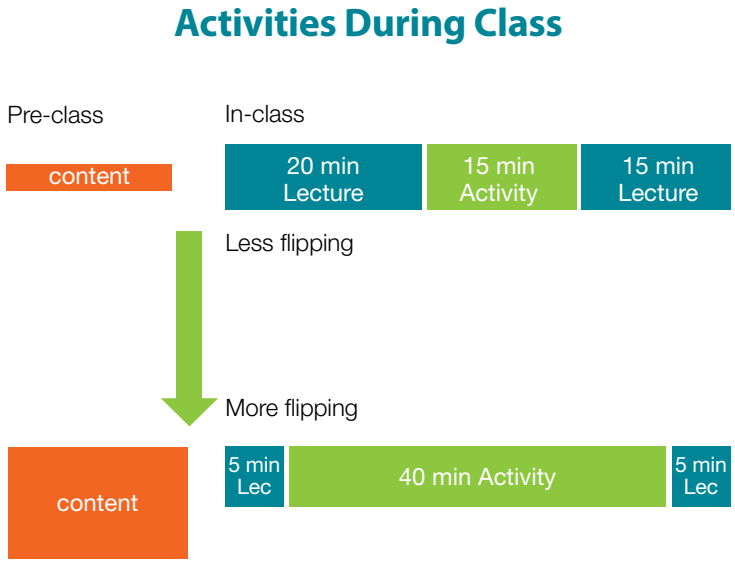
FLIPPED CLASSROOM
continued from page 23

gies for keeping the grading manageable, but did point out that spending class time in activities is not necessarily less work for the instructor. However, students make better learning gains in classes that are focused on active learning strategies, and for her, the flipped classroom means a more engaging and enjoyable time in class with students.

Major points about active learning and resources vetted by Adrienne can be found at http://tinyurl.com/FlipBioAW.

Flipped Classroom Tips and Resources

ASPB is collecting classroom-tested techniques and validated web-based resources for use in the flipped classroom. Contact katie@aspb.org to contribute your ideas and help ASPB build an online archive. ■



Professional Societies Alliance for Life Science Education

In 2013, a group of education specialists from life science societies recognized a need to cultivate how their organizations could collaborate to support the transformation of life science education, especially in higher education settings. Earlier this year, the expanding group formed the Professional Society Alliance for Life Science Education (PSALSE).

PSALSE meets periodically to share resources and strategies and determine ways in which we can achieve greater collective impact. The American Institute of Biological Sciences (AIBS) has facilitated this conversation, including establishing an initial webpage http://tinyurl.com/q28cxqw to introduce PSALSE and its current members, which include

American Institute of Biological Sciences
American Physiological Society
American Society for Biochemistry and Molecular Biology
American Society for Cell Biology
American Society for Microbiology
American Society for Pharmacology & Experimental Therapeutics
American Society of Human Genetics
American Society of Plant Biologists
Association for the Sciences of Limnology and Oceanography
BioQUEST Curriculum Consortium
Botanical Society of America
Ecological Society of America
Faculty for Undergraduate Neuroscience
Genetics Society of America
Human Anatomy and Physiology Society
National Association of Biology Teachers
Society for Conservation Biology
Society for Developmental Biology
Society for Economic Botany
Society for Integrative and Comparative Biology
Society for the Study of Evolution
Society of Toxicology

If you are interested in learning more about the activities of PSALSE or joining the group, please contact Katie Engen, ASPB education coordinator, at katie@aspb.org, or Susan Musante, AIBS director of education programs, at smusante@aibs.org.

Plant Biology 2014

Education and Outreach Posters

BY ERIN J. FRIEDMAN
Lynchburg College

Plant Biology 2014 was once again a great opportunity to discuss education and outreach, and one of the primary venues for such discussion was the poster hall. Although the 18 education and outreach posters spanned a wide variety of topics, most discussed one of the following topics: active learning in the classroom; research projects to enhance student learning; the use of literature in plant science teaching; and educational outreach by undergraduates, graduates, and professionals alike.

One prominent topic in this year's education presentations was the use of active learning; several posters described tools used to promote active learning, and others detailed evaluations of such practices. For example, Penny Kianian (University of Minnesota, poster 16022) described the use of guided inquiry in the genetics classroom to encourage students to move beyond memorization. In small groups, the students took ownership for their own learning, collaborated with their peers, and engaged in classroom activities. Jessica Lucas (Santa Clara University, poster 16016) presented a Vision & Change activity involving photosynthetic optimization during plant stress; the activity required group work and brainstorming. A pair of posters by Lisa McDonnell and Martha Mullaly (University of British Columbia [UBC]), posters 16009 and 16010) described student problem solving and flexible learning, respectively. The former poster indicated that students were able to generate a hypothesis but could not (or would not) follow up by checking their work. The poster described methods like think-aloud sessions and the integration of required (graded) checks to promote problem solving. The latter poster described the Flexible Learning Initiative at UBC, which aims to use active learning to improve student outcomes. Interestingly, the positive effect of increased active-learning time in the classroom plateaued and then declined at approximately 40 minutes. Thus, although some active learning enhances outcomes, the use of active-learning sessions interrupted by instructor follow-up was a more effective technique for improving student performance. Both topics were also presented by Martha Mullaly at the education minisymposium.

Several posters described research projects (often inquiry based) that were used to enhance classroom learning (either at the K–12 or college level). For example, Rachel Okrent (Oregon State University, poster 16018) engaged high school students in plant microbe research, thereby improving the students' attitudes toward science and their knowledge of both microbes and the jobs performed by scientists. Yawadee Srimake (University of Hawaii, poster 16019) designed an inquiry-based project in which students asked questions and designed experiments to test the growth of landscaping plants. The poster reported enhanced student knowledge of concepts and familiarity with native plants.

The power and importance of literature was addressed by three posters. Catharina Coenen (Allegheny College, poster 16012) described the use of story-based learning to improve plant biology classroom learning and to improve the appreciation of plant biology in general. The poster also described an online resource for authors who write about botany. Two posters described courses designed to improve the ability of undergraduate students to read and interpret primary literature. Marcia Harrison-Pitaniello (Marshall University, poster 16017) presented a course regarding mathematical modeling in biological systems, and Andrew Woodward (University of Mary Hardin-Baylor, poster 16014) described a course on medical botany.

Several outreach projects described students (undergraduate and graduate) and scientists who engaged K–12 students. One poster by Greg Clark (University of Texas at Austin, poster 16023) described two outreach projects targeting middle school students. In the first, more than 50 pairs of students were allowed to "shadow a scientist," which included a visit to the lab of a scientist who demonstrated and communicated his or her research. The program has been running for three summers. In a second program, PhD students presented their theses to 12-year-olds in a fun, engaging manner. Both programs targeted middle school students to take advantage of their curiosity and desire to learn and be impressed.

To learn more about each project use "control-F" to search by poster number in the PB14 meeting abstracts at http://tinyurl.com/nn7nfrk. ■

CORRECTION: HHMI was omitted from the Life Science Groups Participating in PULSE list published in the May/June 2014 issue. ASPB regrets the omission.

Plant Biology 2014

Education and Outreach Booth Wrap-up

BY KATIE ENGEN
ASPB Education Coordinator

The Education and Outreach booth at Plant Biology 2014 had a plethora of inspiring examples of effective, scientific teaching for a variety of audiences. These resources were developed by ASPB, its Education Committee members, or invited experts.

Scott Woody agreed to serve as the full-time booth organizer on behalf of the Education Committee as he demonstrated once again the many options for using plants as effective, efficient, and really cool models for teaching science. Kathleen Archer, Burkhard Schulz, Erin Friedman, and Ken Helm were the other committee members attending the conference who also interacted effectively with booth visitors.

The booth's living library of collegial collaboration intrigued many conference participants as they sought ways to integrate the four priorities of scholarship as noted by Ernest Boyer (*Scholarship Reconsidered,* 1990) and defined in the figure below.

Following is what the Education and Outreach booth staff had to say about the experience of helping others address the priorities of the professoriate.

James Mann

Arabidopsis Biological Resource Center (ABRC)

James Mann was invited to share ABRC outreach developments with roots in a 2011 ASPB grant (http://bloome.aspb.org) for high school outreach called Greening the Classroom, created by co-PIs Jelena Brkljacic and Erich Grotewold (Ohio University). Information about that project can be found at http://abrcoutreach.osu.edu/greening-classroom. Here are James's impressions of the event:

I would like to thank ASPB for giving ABRC and me the opportunity to showcase our outreach and educational resources. Over my four days in the exhibition hall, I had the privilege to meet and talk with a variety of people within the plant science community. People who were previously unaware of ABRC's educational resources seemed excited to discover the kinds of materials that ABRC could provide. The three experiments that I was demonstrating seemed to catch the attention and imagination of a number of people who expressed interest in using Arabidopsis in their classrooms. People also were very interested in the information we provided in our brochure, discussing with me how various classroom topics could be covered using one of ABRC's educational kits. I also had the opportunity to show and discuss the resources that were available on our outreach website (http://abrcoutreach.osu.edu), and I saw that people were interested in using the videos and information ABRC has available. Overall I think everything went well and that my time spent with ASPB was valuable to ABRC, hopefully to the many people I had a chance to talk with during the conference, and to myself as well.

Following is some web usage information from the ABRC outreach site. The upticks most likely relate, at least in part, to ABRC's presence at Plant Biology 2014.

Daily Visits

Average Daily Visits
May 1 to July 12 = 5.5

Average Daily Visits
July 13 to July 27 = 8.5

Increase in Average Daily Visits = 54.5%

Average Daily Page Views
May 1 to July 12 = 20.4

Average Daily Page Views
July 13 to July 27 = 41.1

Increase in Average Daily Page Views = 101.3%

Weekly Visits

Average Weekly Visits
May 5 to July 20 = 38.8

Weekly Visits
July 21 to July 27 = 80

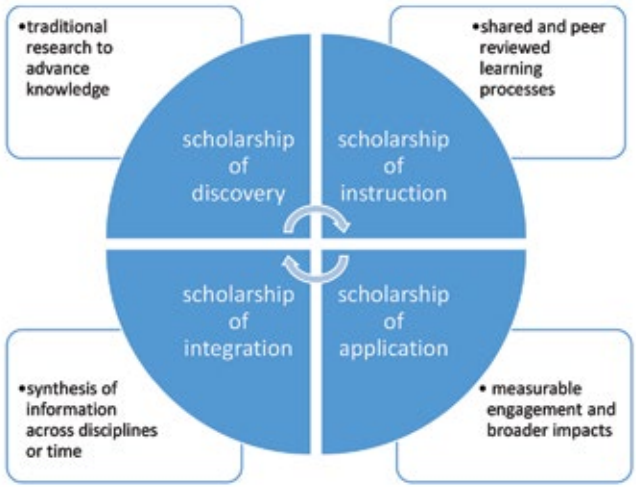
Increase in Average Weekly Visits = 106.1%

Average Weekly Page Views
May 5 to July 20 = 145.6

Weekly Page Views
July 21 to July 27 = 431

Increase in Average Weekly Page Views = 195.9%

The Work of the Professoriate



CREDIT: BASED ON IMAGE AT http://bit.ly/1ASlf6y

Scott Woody

ASPB Education Committee
University of Wisconsin–Madison

As regular readers of these pages probably know, FPsc genetic resources have become something of a mainstay in exhibition booths sponsored by the ASPB Education Committee at events such as those held by the National Science Teachers Association and the National Association of Biology Teachers and, most recently, at the annual meeting of the ASPB. Among these, ASPB is always an exceptional event insofar as I get the opportunity to discuss with seasoned colleagues in the research community the many ways plants can be used to enhance student learning outcomes in classroom and laboratory settings at the undergraduate level. Moreover, knowing that visitors would have a thorough understanding of molecular approaches useful to understand the connection between phenotype and genotype enabled me to focus on the more advanced assortment of FPsc molecular and genomic resources.

Thus, using plant populations capably grown by Jeff Young and students at Western Washington University (Bellingham, Washington), the FPsc station featured several populations in which well-behaved Mendelian alleles were segregating, including *albino* (*alb*); *abnormal leaf* (*ale*); and the latest addition to our growing collection, a *ga*-deficient *dwarf* (*gad*) mutant whose phenotype can be fully rescued by periodic application of GA to foliar tissues (to see a time-lapse video of GA-mediated rescue, visit https://www.youtube.com/watch?v=lz26M1bN3g8). Also included in the station was a sampling of *B. rapa* Advanced Intercross-RIL lineages that educators and students can use for gene discovery through QTL analysis, thus providing a complementary approach to genetics education that highlights the molecular basis of quantitative phenotypic variation. Additional information regarding FPsc genetic resources can be obtained by visiting http://www.FPsc.wisc.edu or by emailing me directly (swoody@wisc.edu).

I shared many thoroughly enjoyable and useful conversations with ASPB members over the course of several days in the Portland exhibition hall. Especially gratifying were the several instances in which young faculty, many beginning the process of curriculum design for the first time, came to recognize the pedagogical value of these new resources for effective genetics education.

Colleen Baker and Keaton Morris

Vicki Motz (mentor)
Ohio Northern University

As two (very) early-career scientist-educators, Colleen and Keaton represented the 2013 project Planting Seeds of Science: Roots, Leaves and STEM in afterschool and summer enrichment programs funded in part by ASPB. According to team leader Linda Young, Colleen and Keaton had presented a poster on the program at the 2014 Ohio Academy of Science meetings and were game for more since "the work garnered a lot of attention from educators, parents, and even several seventh- and eighth-grade students who said they wished their schools had a program like this!"

Colleen and Keaton reported that in Portland they had even more engaging exchanges with faculty interested in exploring Planting Seeds as a way to expand their broader impacts repertoire.

Colleen and Keaton were not just "fill-ins" for project PI Linda Young, who had to miss PB14 to celebrate her daughter's wedding. Instead, they were actively invited so they could expand their science communication skills (to a pretty "academically elite" audience, no less!) as they prepare to take on science education careers filled with direct classroom and broader impacts.

Linda added, "It's been fun to watch Keaton and Colleen progress throughout this experience. They really take the lead now in team meetings, come with lesson plans already developed, and demonstrate a lot of confidence in their ability to deliver a solid curriculum."

Bill Davis

Washington State University

Tom Jack

Dartmouth College

Partnership for Undergraduate Life Science Education

As representatives of PULSE (Partnership for Undergraduate Life Science Education, http://www.pulsecommunity.org), we were invited to Portland to engage with ASPB members and to discuss approaches and programs aimed at educational transformation at life science departments across the entire post–K–12 educational spectrum. We had excellent traffic during the meeting as we engaged with faculty from across the United States to hear their stories of struggle and success in implementing the recommendations of Vision & Change. Most encouraging were the healthy numbers of graduate students and postdoctoral researchers who stopped by our booth to discuss life science education. These future faculty and scientists are one of the cornerstones of change and transformation in our educational programs, since they recognize that "business as usual" is not going to be sustainable in the future. We found our efforts to be strongly synergistic with the parts of the meeting devoted to faculty development, particularly the workshop on active learning and the education plenary sessions. We expect that working from the "bottom up" through faculty development and from the "top down" through departmental and institutional change efforts will lead to the transformation of life science education envisioned by our scientific societies, stakeholders, and most importantly the future generations of plant biologists who have not yet joined our ranks.

The Prakash Lab and Foldscope: Microscopy for Everyone

Foldscope wants to democratize science frugally. And ASPB, thanks to initial contact efforts by Education Committee member Stacey Simon (U.S. Department of Education), is eager to make sure plant biology is represented in this worldwide phenomenon.

continued on page 28

BOOTH WRAP-UP
continued from page 28

The Foldscope (http://www.foldscope.com) team lead by James Cybulski, James Clements, and Manu Prakash (Stanford University) have built a super-cheap, paper microscope so kids everywhere can explore the world of microscopy and its many applications. Manu wants experts like those at Plant Biology 2014 to know, "We believe this crowd-sourced resource will revolutionize how biology and microscopy are taught to kids around the world. Self-assembled experts like you will inspire the next generation of scientists to rely less on just memorizing facts and focus on learning to ask questions that matter." See Manu's 15-minute friendly talk on the "simple" design and sophisticated Foldscope functions at http://tinyurl.com/k66e87d.

The booth in Portland featured a sample of their 240× origami microscopes and challenged visitors to brainstorm how the Foldscope could be used to help youngsters, especially in ill-supplied settings, to explore plant biology. The Prakash Lab aims to give away thousands of Foldscopes so scientists and the kids they work with can develop and pursue testable questions.

Foldscope magnifies science fascination for all ages.

Manu explained, "A successful outcome of the Plant Biology meeting—if we can get plant biologist to participate—will ensure that plant biology is well represented in the mix of experiments."

Any input from plant scientists will inform the sustainable platform and online open-source users' manual the Prakash Lab intends to build and maintain. Several Education and Outreach booth visitors shared clever ideas for using Foldscope in plant biology. To contribute more ideas, contact katie@aspb.org. ■

Booth visitors also were invited to

1. Apply to the 2014 Master Educator Program (http://mep.aspb.org): Up to $3,500 for professional development in plant biology education. Deadline October 31 (see ad at the bottom of this page).
2. Nominate U.S.-based high school teachers for free online access to ASPB journals. See http://journalaccess.aspb.org/. Rolling nominations.
3. Inspire youngsters to consider *My Life as a Plant,* an activity and coloring book offered in 11 languages. See http://my.aspb.org/?page=My_Life_As_A_Plant to download copies.

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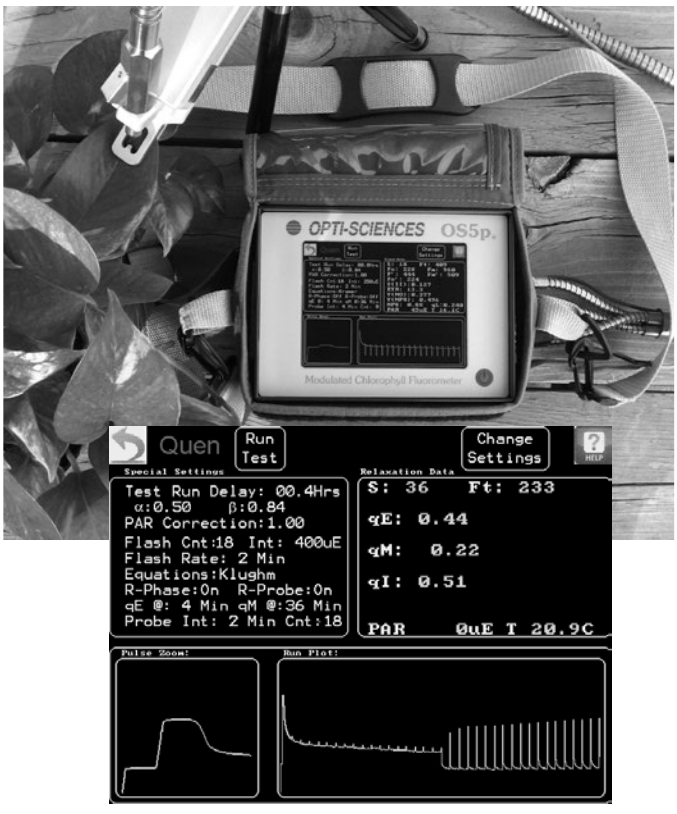


OS5p+ Research Portable Chlorophyll Fluorometer

- *First to measure q_M, chloroplast migration*
- *White actinic light insures reliable chloroplast migration measurement*
- *F_M' correction option included from Loriaux 2013*
- *Stable intensity internal actinic light source for reliable quenching measurements.*

Kramer lake model	Hendrickson lake model
Puddle model	Quenching relaxation

Jake MacMillan

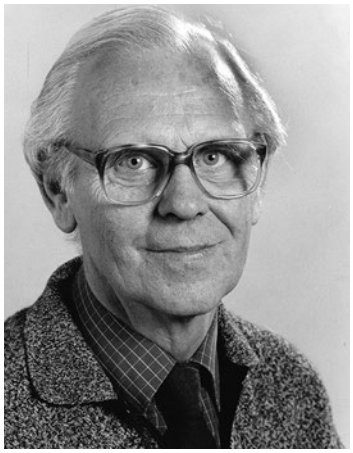
(1924–2014)

BY VALERIE SPONSEL
The University of Texas at San Antonio

Jake MacMillan died May 12 in Bristol, England, just four months short of his 90th birthday. A bioorganic chemist, Jake was a leading figure in gibberellin (GA) research for half a century. He was a fellow of the Royal Society of London and a foreign associate of the U.S. National Academy of Sciences. Jake remained unassuming and modest, and he took greatest pleasure in spending time with his close-knit family.

Jake was born in the small town of Wishaw in Lanarkshire, Scotland. Son of a railway signalman, he turned down the opportunity to become a professional football (soccer) player, deciding instead to be the first member of his family to attain a college degree. He earned a BSc with first-class honors in chemistry and a PhD in organic chemistry, both from the University of Glasgow. In 1948, Jake joined a natural products research group at the Imperial Chemical Industries (ICI) Akers Research Laboratories in Welwyn, just north of London. He lived in England for more than six decades, but never lost his strong Scottish brogue or his love for fine Scotch whisky.

Jake's time at ICI was significant in many ways, for it was there that he met his future wife, Anne Levy, a botanist with whom he shared 62 years of wonderfully happy marriage, and it was in the Akers laboratory that he made a



Jake MacMillan

Anne and Jake MacMillan at Jake's retirement in 1990.

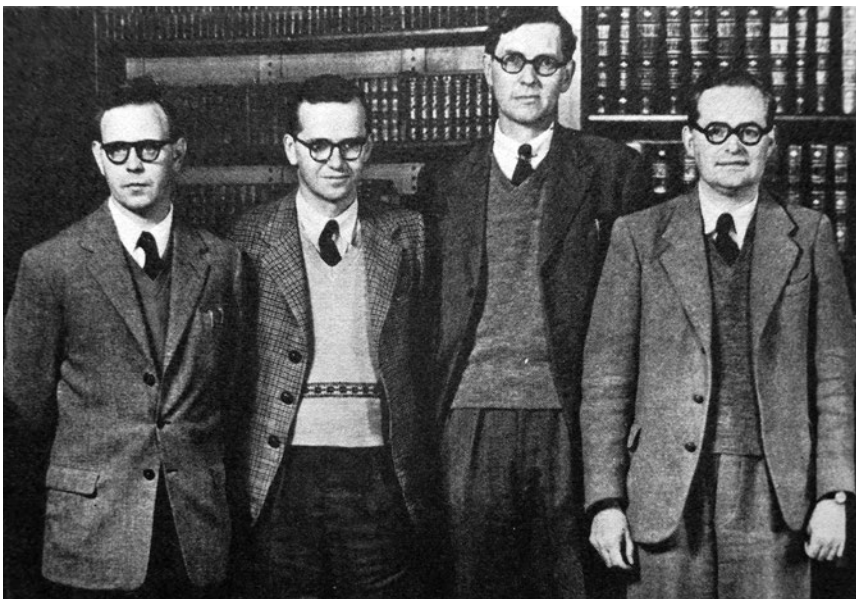
name for himself working on the structural determination of fungal products including griseofulvin, wortmannin, and derivatives of gibberellic acid (GA_3). At the time, GA_3 was known only as a metabolite of the rice pathogen *Gibberella fujikuroi*, but in 1957, Jake, as part of an interdisciplinary group led by biologist P. W. Brian, isolated the first GA from a plant source. Gibberellin A_1 (GA_1) was isolated from 100 kg of immature seeds harvested from two metric tons of locally grown *Phaseolus coccineus* pods. It soon became apparent that GAs had profound effects on plant growth and development, and they became the second class of phytohormones to be recognized, auxin having already achieved that status.

In 1963, Jake took an academic position in the Department of Organic Chemistry at Bristol University, where he built a multidisciplinary research group of organic chemists, plant physiologists, and biochemists working almost exclusively on GAs. I was privileged to be part of this group from 1972 to 1986. He pioneered the use of combined gas chromatography-mass spectrometry (GC-MS) for the identification of GAs in plant extracts, a feat he and colleagues accomplished first in 1966 and which became one of the hallmarks of his research group. In 1968, Jake and Nobutaka Takahashi, from the University of Tokyo, became the official assigners of gibberellin "A numbers" to avoid potential duplication of names. The publication of hundreds of reference spectra with Paul Gaskin was a valuable contribution to the plant science community and, along with Jake's willingness to collaborate with plant biologists, contributed to the identification of many of the 136 GAs known to date. The expertise of organic chemists within his own lab led to the production of synthetic derivatives for structure/activity studies, reference compounds to aid in structural determinations, and isotopically labeled GAs for metabolic and mechanistic studies.

Of the many international collaborations with leading plant biologists, two were particularly long lasting and productive. Starting in 1970, Jake collabo-

rated with Bernie Phinney from UCLA on the identification and metabolism of *ent*-kaurenoids (GA precursors) and GAs in *Gibberella,* particularly in the GA-deficient yet vigorous B141a mutant that Bernie had isolated. Concurrently, Jake collaborated with Jan Graebe, formerly at UCLA and later at the University of Göttingen, Germany, on the metabolism of GAs in cell-free systems from immature seeds of wild cucumber, pumpkin, and pea. The determination of GA metabolic pathways in *Gibberella* and in developing seeds during the 1970s paved the way for subsequent metabolic work with vegetative tissues in which GAs are present at concentrations many orders of magnitude less than in seeds. Fortunately, the sensitivity of GC-MS equipment had improved substantially over the decades. Further collaborative work with Bernie, utilizing his single gene dwarf mutants of maize, and with Jim Reid's group in Tasmania working on dwarf mutants of pea, led to the recognition in 1984 that GA_1 has hormonal function for stem growth and that other GAs present are either precursors of the active hormone or deactivation products.

Jake retired from the School of Chemistry at Bristol University in 1990 and became a senior research fellow at the nearby Long Ashton Research Station. Here he joined a group working on GA mode of action in a variety of plants, including cereals, and continued his own independent research project on the biosynthesis of GA_3 in plants. Upon the closure of Long Ashton in 2003, he returned to the School of Chemistry, where he continued to be a presence until his health began to fail in recent months.



A clone of British chemists from the ICI Akers laboratory, circa 1958. (from left) Jake MacMillan, Brian Cross, Paddy Mulholland, and John Grove.

Throughout his career, Jake was a highly respected colleague and mentor to a large number of graduate students, postdocs, and visiting scientists (mostly plant biologists from every corner of the world) who worked together in an exhilarating and highly productive environment. Jake was repeatedly honored for his valuable contributions to both plant biology and chemistry. In addition to those honors mentioned previously, Jake was a corresponding member of ASPB, a silver medal winner of the International Plant Growth Substances Association, and winner of the Royal Society of Chemistry's Flintoff and Hugo-Müller awards.

Jake is survived by his beloved wife, Anne, and their three children, Susan, Frankie, and Andrew. He delighted in his eight grandchildren, now in their teens and early 20s. As a sign of his humility, several of his grandchildren commented that they first learned of Jake's signal achievements in chemistry and plant biology at his funeral service, when two of his former graduate students, Tom Simpson (now chair of organic chemistry at Bristol University) and Peter Hedden (professor, Rothamsted Research), recounted his lifetime achievements. He was a fine man and a giant in his field.

A delightful autobiography, *Reflections of a Bio-organic Chemist* by Jake MacMillan, can be found at http://tinyurl.com/nzw7qam. ■

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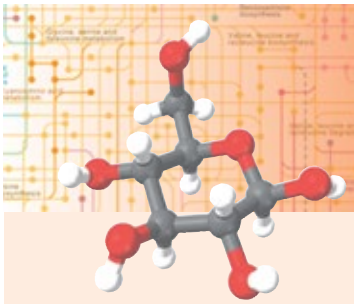

Call for Papers

Plant Physiology® Focus Issue on Metabolism

Deadline for Submission: June 8, 2015

To submit an article, please go to http://submit.plantphysiol.org

Advances in next-generation sequencing, gene and genome engineering, and sampling have had an immense impact on our understanding of metabolism. This Focus Issue on Metabolism will address these advances including, but not limited to, state-of-the-art approaches in the study of plant metabolic pathways and interactions from the molecule to the whole-plant level, and the evolution of these processes. Special attention will be paid to emerging technologies and advances that promise to accelerate our understanding of metabolism, its control, the signals that regulate metabolism, its integration within organismal signaling and response in the face of biotic and abiotic stress, its contributions to plant structure, function, and its diversity and importance within modern society.

Authors interested in contributing should indicate this in the cover letter when submitting papers online at http://submit.plantphysiol.org. Please select “Metabolism (October 2015)” 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 on Metabolism.

Please contact Alisdair Fernie (Fernie@mpimp-golm.mpg.de) or Eran Pichersky (lelx@umich.edu) for more information.

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