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ASPB News



THE NEWSLETTER OF THE AMERICAN SOCIETY OF PLANT BIOLOGISTS

President's Letter

Funding Plant Biology in Hard Times

BY RICHARD DIXON
 University of North Texas, Denton

I'm not sure that I know any research scientist who wouldn't claim that funding is tight these days. With historically low success rates at federal agencies, industry consolidating and pulling back from supporting science in the public sector, and state funding for public universities no longer what it used to be, times are hard. Several of the federal programs that have been staples for funding plant biology in the past now have success rates of less than 10%; this seems a far cry from the days when I was on panels that funded around 35% of proposals, some as merit-based awards in which a proposal from a lab that had shown a strong track record in the past would, rightly or wrongly, undergo a fairly cursory review for renewal. Now it is both hard to get into the game and just as hard to maintain a large and productive lab.



Rick Dixon

When I moved to the United States in 1988 and started to participate on federal grant panels, I was impressed by their relatively broad remit, as the system from which I had just moved had recently become more difficult to maneuver—only Arabidopsis one year, something else the next. Although discipline specific, the programs at USDA and NSF did not specify more circumscribed areas but in large part allocated funding based on the best science. Furthermore, most of the grants in those days were single investigator grants, and if you made good progress, you could hopefully count on continued funding that would see you through your tenure evaluation and beyond.

A politically more sophisticated scientific community now lobbies for research initiatives that translate into topic-specific calls for funding. An unintended effect of this

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**2016
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in Austin

If you are coming to Austin for Plant Biology 2016, by now you have likely made your airline and hotel reservations.

So What's Next?

A good first step is to make a plan for the sessions, posters, and exhibitors you want to see (<https://www.eventscribe.com/2016/ASPB/>). If you're not ready to make a plan, explore your options: for example, join the discussion about the meeting on Plantae.org, check out the interview with Harry Klee about his symposium on developing healthier foods (see page 5), or start letting others know your plans to attend and your interests at [#plantbio16](https://twitter.com/plantbio16). Beginning June 30, you can download the conference app to connect with colleagues and friends.

You'll have free time before and after the sessions, and Austin is a perfect place for foodies, history buffs, music lovers, and outdoor fans. So here is a suggested itinerary, but you can check out <http://365thingsaustin.com/> and create your own plans. In addition, watch for regular updates on new and interesting things to do in Austin at [#plantbio16](https://twitter.com/plantbio16) and on the conference app.



Enjoy the Outdoors

Register early. Registration is open Friday, July 8, from 2:00 p.m. until 6:00 p.m. and beginning at 8:00 a.m. on Saturday, July 9.

If you're not attending an early session, take a walking tour around downtown Austin (<http://bit.ly/1I2ba4T>). Then, if you have time one evening, walk over to the Congress Avenue Bridge and see the bridge bats, a famous Austin tourist attraction (<http://bit.ly/1SyF2Rq>).



It's All About the Food

By now, the meeting is in full swing, but you have to eat, so try some of the great food the city has to offer. There are many different cuisines (<http://bit.ly/1pCPT4F>). Check out the food trucks and popular eateries most famous with the locals (<http://365thingsaustin.com/eating/>).



Music Lover's Paradise

Austin's music scene continues to evolve, and great places to listen are within walking distance of the Convention Center and your hotel. Check out the music venues in nearby Austin neighborhoods (<http://www.austintexas.org/visit/entertainment-districts/>).



Annual Party

As the meeting nears its end, you'll have met new colleagues, planned some collaborations, attended great science sessions, and shared your ideas at the ASPB Town Hall. Now it's time to celebrate! The Austin Nines band returns for this year's annual party. (If you were in Portland or Minneapolis, you know how great they are.) The venue for the 2016 annual party is *Speakeasy*, just a few blocks from the Convention Center, with a music lounge, bowling alley, and pool table spread over three levels (<http://speakeasy-austin.com/gallery/>). For your singing enjoyment, there will also be karaoke.



President's Symposium

Make the most of the last day of the meeting by attending the President's Symposium, organized by ASPB President Rick Dixon, "Plant Specialized Metabolism Overview." One of four major priorities in ASPB's Decadal Vision is to develop an understanding of the synthesis and biological purposes of plant-derived chemicals. Plant specialized metabolism has, for many years, been treated as a specialized subject not of general interest to plant scientists, of broad relevance to plant biology, or attractive to funding agencies. This situation is now changing. The 2016 President's Symposium will highlight aspects of plant specialized metabolism that relate to broader aspects of biology, namely genome organization, evolution, ecology, and exploitation for bio-based products.

Also, make plans to attend the Post-transcriptional Gene Regulation in Plants meeting on July 14-15 at the Austin Convention Center. You can attend two great meetings with one trip! Registration and abstract submission are now open. To submit an abstract, go to <http://bit.ly/1Sltspd>. To register, go to <http://bit.ly/1TcfKby>. ■

2016 Plant Biology

JULY 9-13 | AUSTIN, TEXAS

President's Symposium Q&A with Rick Dixon

Interview with ASPB President Richard Dixon, University of North Texas

Rick Dixon has organized an important major symposium for the Plant Biology 2016 conference on plant specialized metabolism. Joining Rick for the sessions will be

Ian Baldwin
Max Planck Institute

Gregg Beckham
National Renewable Energy Laboratory

Joe Noel
Salk Institute

Anne Osbourn
John Innes Centre

Here are just a few insights Rick would like to share about his upcoming session.

How did you choose your topic for the symposium, and why is it so important?

Rick: I was thinking about how plant specialized metabolism isn't always viewed as central to plant biology, as is, for example, plant development or stress biology. Funding agencies can think that it is special to a particular plant or

group of plants, and therefore not of general interest. All plants develop differentiated organs, or exhibit responses to cold or drought, but not all plants make polymethylated flavonoids (as just one example). But a study of plant specialized metabolism can illuminate many areas of biology, from genome structure and evolution (Why are some pathways now being discovered to be encoded by clustered genes [Osbourn]?) to ecology (a great example is tritrophic interactions among plants, herbivorous insects, and their predators [Baldwin]). And then, of course, plants are central to the future development of a bio-based economy in which their remarkable chemistry is exploited to ultimately replace petroleum for fuel, polymers, and specialty chemicals (Beckham).



What are some highlights?

Rick: I hope that the main highlight will be the cumulative realization from the four talks that studying plant specialized metabolism provides a powerful approach to addressing nonspecialized aspects of the life and evolution of plants...and that the chemistry is really cool!

Is there anything else you want attendees to know about the session or its presenters?

Rick: The four speakers came to plant specialized metabolism or its application from different perspectives. Anne

Osbourn, Joe Noel, and Ian Baldwin are well-established leaders in their fields, approaching the subject from the areas of plant-pathogen interactions, structural biology, and ecology, respectively. Gregg Beckham is a young scientist who works at the interface of microbiology, chemistry, and bioprocessing. Although not strictly a plant scientist, he represents the type of person with whom plant scientists can interact to move plant science toward the bio-based economy. ■

There is still time to register for Plant Biology 2016!

plantbiology.aspb.org

Major Symposium—Developing Healthier Foods: Quality, Nutrition, and Molecular Gastronomy

Interview with Harry Klee, University of Florida

Harry Klee has organized an important major symposium for the Plant Biology 2016 conference on developing healthier foods. Joining Harry for the sessions will be

Andy Allan, Plant & Food Research

Linda Bartoshuk, University of Florida

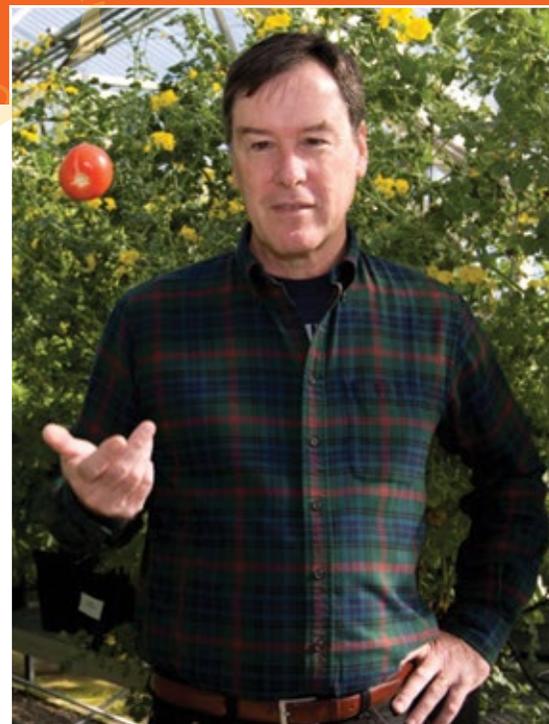
Cathie Martin, John Innes Centre

Harry answered some questions about his upcoming session.

Q: How did you choose your topic for the symposium, and why is it so important?

Harry: We feel that the loss of flavor quality is a critical problem in modern “industrial” crops. For too long, consumers have been left out of the priorities for plant breeding. This has occurred for multiple reasons. First and foremost, our food supply chain does not reward growers for quality

attributes such as flavor. Growers are paid for the amount of product they deliver. Consumers have been irrelevant because quality does not translate into profit. Second, flavor and nutritional quality are not easy things to measure. They’re expensive and technically challenging. Most, if not all, breeding programs do not have the capacity to measure quality traits. Thus, quality has deteriorated over time through benign neglect. We can and have quantified that deterioration. The real-world consequences are that people choose not to buy as much fruits and vegetables as they might because they are not happy with the flavor. This has a knock-on effect of reducing the quality of the diet of the average American. We think if we can give consumers more incentives to eat better tasting and more nutritious foods, they will make better decisions about their diets.



Q: What are some highlights?

Harry: I think people will see several great examples of translational science—work that is founded on fundamental research that has been taken from the bench through to products that will potentially make a real difference in the world. One of my main motivations in organizing this symposium is to show our young scientists that you can do solid fundamental science that is both fun and has real-world impacts. Flavor and nutrition are powerful tools to engage the public and show them what we as plant scientists can do for them. Everybody understands the importance of these issues and personally relates to them. We’ll show the attendees

how patient, long-term investment in complex problems can pay off.

Also, our non-plant science speaker will provide a very engaging talk on the nature of flavor and taste. Linda Bartoshuk is one of the world’s foremost experts on taste and smell, and she’ll illustrate how she has collaborated with us to take apart a very complex trait in plants and helped us reduce it to its simplest elements.

Q: Is there anything else you want attendees to know about the session?

Harry: We promise it will be scientifically and experientially excellent. Everyone will learn something useful from it. ■

PRESIDENT'S LETTER *continued from page 1*

trend has been the erosion of the single-investigator awards. This is not to decry multi-investigator, multidisciplinary awards; some critically important goals are best achieved by the work of large consortia, and the synergy that such projects generate can be highly stimulating, leading to new opportunities aside from the project that brought the team together. But early career scientists who used to rely on success from single-investigator awards to establish their reputation may now find it hard to break into a particular field and become part of larger initiatives. It's not clear how well the voice of early investigators was heard during the development of the new funding models.

So where does ASPB stand in the debate over research funding? As for quantity, its position is relatively straightforward. I'm sure that most, if not all, ASPB members believe passionately that plant biology is underfunded, and the Society works diligently to bring this situation to the attention of policy makers. For example, in 2015, the Society worked with other organizations and groups to help secure more than \$610 million in funding for plant science research projects and other activities.

But just saying that we need more money is not enough to sell plant biology to policy makers. We have to be able to present a well-reasoned argument for more funding that can resonate with both Congress and the general public. For example, public concern about genetically engineered crops has resulted in a debate within the

government about mandatory food labeling, but we have not seen a similar debate in Congress to make plant and agricultural research the priority we all believe it should be. Whereas the 2015 NIH request was over \$30 billion, the budget for the Agriculture and Food Research Initiative (which includes the National Institute of Food and Agriculture) was not much more than one-tenth of this amount.

It is always easy to make a case for increasing funding for research on human health, and initiatives such as President Obama's \$300 million BRAIN initiative stir the imagination like NASA's moon program in the 1960s. But in spite of the fact that plants have provided food, feed, fuel, shelter, and medicines throughout civilization, and will need to do so increasingly to meet the demands of the expanding world population and the uncertainties of climate change, there has been no high-profile government-led initiative to capture the public's imagination around revolutionizing agriculture through basic plant science research. Rather, we live in a climate of increasing public skepticism and fear of biotechnology in agriculture. Collectively, we have not done a good job of advocating for plant science.

Regarding a focus for funding, the astronomy community garnered support for the Hubble telescope by coming together behind a single vision. The plant science community has defined its vision and wish list for the future through publication by ASPB of the Decadal Vision document *Unleashing a Decade of Innovation in Plant Science: A Vision for 2015–2025*, a must

read for ASPB members (<http://bit.ly/1Fj1IC3>). The report is prefaced by the statement, "To create crops that are flexible and adaptable to the challenges of environment and population, we must increase the predictive and synthetic abilities of plant scientists. The sustainability of our agricultural enterprise is at stake." This statement highlights the critical role of basic plant science in agriculture and envisions the cost of failure to implement new approaches.

Sadly, it seems that this message is not an easy sell to policy makers or the public. In part, this could be because, at least in the United States and most of Europe, food security is not viewed by the general public as a pressing problem. And then there is the denial of climate change, or at least its human causation, and the same tactics that were used to attempt to discredit climate change scientists (i.e., requests for e-mail correspondence through the Freedom of Information Act) have recently been used against scientists working on and advocating for plant biotechnology.

Plant biologists must speak with one voice if we are to advocate successfully for increased funding, so it is important that the Decadal Vision have the support of the broader plant biology community. Although the research developments it envisions do not, and could not, cover every area of plant biology in which ASPB members participate, the Decadal Vision provides a focus to educate the public and policy makers about the central importance of plants to society in the 21st century. It does not favor one type of technology, such as genetic engineering, over another

but rather lays out a blueprint for filling the knowledge gaps that will allow us to predict and assemble new traits and harness the remarkably diverse chemistry of plants, while at the same time training a workforce that is geared to the demands of agriculture in the 21st century.

ASPB attempts to influence policy on research funding in many ways, from direct meetings with staffers and members of Congress to representation in international and national organizations such as the Global Plant Council and the National Plant Science Council. The latter was formed by ASPB President-elect Sally Mackenzie (University of Nebraska) and David Stern (Boyce Thompson Institute) to advocate for the implementation of the Decadal Vision.

Whatever your views on future directions for plant biology, from specific initiatives to the balance between single- and multi-investigator awards, ASPB needs your feedback. Start a discussion on Plantae.org, or contact the Society through Facebook or by email to elected officers or committee chairs. If you are worried about how your funding will look five years from now (and aren't we all?), don't just complain! Change ultimately comes in response to a focused message from a large constituency, so don't let your voice go unheard. ■

ASPB Announces 2016 Awards

Each year, ASPB honors excellence in research, education, outreach, and service through its numerous awards to individuals who promote the mission of our Society. We are proud to announce this year's recipients.

Adolph E. Gude, Jr. Award

Joe L. Key

University of Georgia, Athens

Joe L. Key is this year's recipient of the Adolph E. Gude, Jr. Award, which is given in recognition of outstanding service to the science of plant biology. Joe's early implementation of molecular techniques to study auxin-regulated gene transcription and heat shock-regulated protein synthesis laid a foundation for the field of plant molecular biology. He was instrumental in securing the USDA Competitive Grants Program that brought funding and scientific rigor to plant biology, recognized the value of recombinant DNA technology to agricultural sciences before its time, and provided leadership and vision during the first international meetings on plant molecular biology. These endeavors seeded the current community of plant biologists.

Charles Albert Shull Award

Jiří Friml

Institute of Science and Technology Austria

Jiří Friml is the 2016 recipient of the Charles Albert Shull Award. Jiří has played a leading role in elucidating the biology of polar

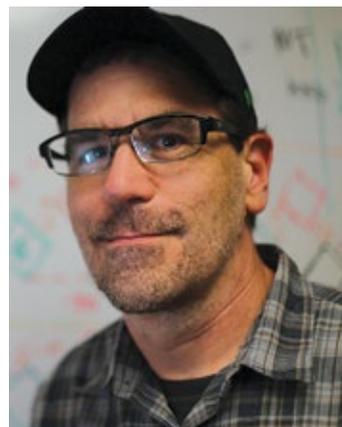


Joe L. Key

auxin transport, including the discoveries that PIN family proteins mediate auxin efflux from the cell and that the PIN proteins are expressed at cell poles where they establish a tissue-wide polar auxin gradient responsible for the apical-basal axis of the plant embryo and organs. He showed that this mechanism accounts for developmental plasticity via which growth and development reorient in response to developmental or environmental cues. Jiří discovered that clathrin-mediated endocytosis plus polar recycling give rise to the polar distribution of PIN proteins. He found that some PIN family members reside in the endoplasmic reticulum, where they regulate cellular levels of auxin. His work has had major impacts on several areas of plant biology, including hormone signaling (auxin transport), plant development (cell polarity and auxin gradients), and plant cell biology (endocytosis).



Jiří Friml



David Kramer

Charles F. Kettering Award

David Kramer

Michigan State University

David Kramer pioneered our understanding of how the biochemical/biophysical machinery of photosynthesis works, individually and together as a network, to define the "energy strategy" of the plant, balancing the needs for efficient photosynthesis and avoidance of photodamage. To accomplish this, David developed



Karen Koch

a large and varied toolbox of non-invasive instruments and spectroscopic approaches that allow him and others to probe these reactions in vivo, under natural photosynthetic conditions. David's group has developed a series of instruments and techniques that allow observations in real time of key reactions in the electron and proton circuits of photosynthesis.

Charles Reid Barnes Award

Karen Koch

University of Florida

Karen Koch is this year's recipient of the Charles Reid Barnes Award, ASPB's first honor. Karen has excelled in research, in the training of students of plant biology, and in service to the Society. Her research on carbohydrate metabolism and sugar signaling is known internationally; her training of plant biology students is legendary; and having attended every annual ASPB meeting for the past 40 years, she is a model for us all.

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**Corresponding
Membership Award**

Ikuko Hara-Nishimura
Kyoto University

Ikuko Hara-Nishimura is professor in the Department of Botany, Kyoto University. She is an excellent plant cell biologist whose research program has covered an impressive range of topics. Her work on transport of proteins to the vacuole and particularly the discovery of vacuolar processing enzymes (VPEs) is regarded as seminal. VPEs, which belong to a large family of cysteine endopeptidases, are widely distributed in the vacuoles of plant tissues and involved in the activation and processing of a range of proteins. She found that many of the downstream effects of VPE activity have widely divergent effects on developmental processes, such as cell death and seed coat formation.

She also greatly expanded our knowledge of the plant endomembrane system by showing the dynamics of transport from the ER to the Golgi apparatus, the organization of the ER, and the role of the cytoskeleton in ER function. Her group was the first to identify novel ER bodies and their role in responses to pathogens and abiotic stress. Work in her laboratory on myosin XI, a myosin-class protein found in plants, led to the discovery that cytoplasmic streaming is regulated by an interaction between the ER, myosin XI, and F-actin. Furthermore, her group has also advanced the functioning of other subcellular compartments, including the roles of oil bodies in the synthesis of many important lipids, the role of the nuclear pore and myosin XI in the organiza-

tion of the nucleus, the role of the vacuole in plant cell death, and the distribution of stomata. This is an impressive range of accomplishments that have significantly advanced the field of plant cell biology.

Ikuko has received a number of awards, including the Japan Society of Plant Physiologists Award in 2013 and the Medal with Purple Ribbon from the Japanese government for outstanding scientists in 2014. She has served ASPB through her role as coeditor of *The Plant Cell*, and she was president of the Japan Society of Plant Physiologists (JSPP) in 2014–2015. Notably, she was the first woman elected to this post in the history of JSPP.

Jian-Feng Ma
Okayama University

Jian-Feng Ma is a professor at the Institute of Plant Science and Resources, Okayama University, Japan. Jian-Feng is recognized internationally for his pioneering work on and discoveries of a number of important plant transporters for mineral elements, including transporters for essential, beneficial, and toxic elements in plants. Most noteworthy is his work on the identification of both silicon (Si) influx and efflux transporters in rice, which provided the first evidence for polar localization of transporters in plants that mediate efficient uptake and translocation of the beneficial mineral Si. Recently, he published novel research on the molecular and biochemical mechanisms that control the distribution of mineral elements between different vascular bundles within the nodes of graminaceous plants. Jian-Feng is also a world leader on the molecular and physiological



Ikuko Hara-Nishimura



Jian-Feng Ma

bases for aluminum resistance in plants and has identified a number of key and novel aluminum (and other toxic metal) tolerance genes, especially in rice and barley. He received his PhD in plant nutrition from Kyoto University, Japan. He has garnered a number of awards, the most significant being the Japan Society for the Promotion of Science Prize in 2006 and the Japan Academy Medal in 2006. He was recently selected by Thomson Reuters as one of the World's Most Influential Scientific Minds for 2015 in the category of Plant and Animal Sciences.

Jian-Feng has been a long-standing member of ASPB, and he was recently selected as one of the Society's Top Authors in 2015, based on his highly cited papers in both *The Plant Cell* and *Plant Physiology* (one of nine top authors in Asia).

Widmar Tanner
University of Regensburg

Widmar Tanner is professor at the University of Regensburg, Germany, now in emeritus status but still very active; he has been an ASPB member since 1971.



Widmar Tanner

He has published more than 200 papers, reviews, and books in various fields of biology, including pioneering work on membrane transporters, sugar transfer reactions, and long-distance transport. In particular, he has advanced our understanding of plasma membrane subcompartments (raft-like domains) and their importance for transport processes. In addition, and of high importance regarding public attitudes toward GMO crops in Germany and elsewhere in Europe, he contributed immensely to rationalize these discussions. Widmar's scientific achievements have been recognized through election to learned

societies, including EMBO, the German National Academy of Sciences Leopoldina, and the Bavarian Academy of Sciences and Humanities. Widmar provided important service to the plant science community in leadership positions, such as vice president of the Deutsche Forschungsgemeinschaft (the German equivalent of the NSF) from 1993 to 1997 and as speaker of two Priority Collaborative Research Centres (SFB) spanning 1981 to 2004. He also served on important advisory boards, including for the Max Planck Institute of Biochemistry, Research Centre boards, the Daimler-Benz foundation, and the election committee for the Leibniz Prize (Germany's highest monetary science award of up to 2.5 million Euro). At the University of Regensburg he contributed important service as dean and vice president of research. Widmar belongs to the top tier of plant biologists worldwide.

Early Career Award

The Early Career Award acknowledges outstanding research by a scientist generally not more than seven years post-PhD. This year's Early Career Award co-recipients are Cora MacAlister and Jin Suk Lee.

Cora MacAlister

University of Michigan

Cora MacAlister, assistant professor, is recognized for exceptional contributions and creativity in her studies of the molecular mechanisms of plant development, particularly with respect to transcriptional control of stomatal development and inflorescence architecture in diverse plant species.



Cora MacAlister



Candace Galen



C. Robin Buell



Jin Suk Lee

Jin Suk Lee

Concordia University

Jin Suk Lee, assistant professor, Montreal, is recognized for her exceptional contributions to plant cell signaling, particularly with respect to mitogen-activated protein kinases that participate in auxin signaling and peptide-receptor kinase signaling pathways that regulate stomatal development and inflorescence architecture.

Excellence in Education Award

Candace Galen

University of Missouri

The 2016 Excellence in Education Award recipient is Candace Galen for her exceptional and sustained contributions to plant biology education at the K-12, undergraduate, and graduate levels. Candace was instrumental in launching *ShowMe Nature*, an NSF-funded graduate training program introducing science into elementary school classrooms, and *BGREEN*, a literacy program that has elementary students conducting environmental research. She has worked for the past decade cultivating community partnerships to protect Pennsylvania Mountain in the Colorado Rocky Mountains, where she has long conducted ecological research. In both her research and outreach efforts, she demonstrates effective mentorship and teaching by enlisting undergraduates, graduate students, teachers, and community partners.

Fellow of ASPB

Established in 2007 and granted to no more than 0.2% of the current membership, the Fellow of ASPB Award is given in recognition of distinguished and long-term contributions to plant biology and service to the Society by current members in areas that include research, education, mentoring, outreach, and professional and public service. Current members of ASPB who have contributed to the Society for at least 10 years are eligible for nomination. The 2016 Fellow of ASPB class includes the following individuals:

C. Robin Buell

Michigan State University

Robin deploys cutting-edge genomics approaches in large-scale efforts to address key biological questions, many of which directly impact agriculture. She plays leadership roles in sequencing and annotating the rice and potato genomes and documenting genetic diversity in these and other organisms. In addition to her research contributions, Robin has served ASPB and the plant biology community through her work on the edito-

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rial boards of *The Plant Cell* and *Plant Physiology*, which demonstrates her commitment to a core mission of ASPB and to the plant science community.

Bijay Singh *BASF Plant Science*

A central focus of Bijay's research has been branched-chain amino acid biosynthesis, as well as identification of chemical inhibitors as tools to understand metabolism and as herbicides with agronomic utility. Bijay's commitment to ASPB is evident in his long-term membership and service on various committees. He has been a member of the International Committee and has served as mentor at the ASPB Career Center at the annual meetings. In addition, he conceived the idea and led the effort for ASPB to establish two new awards: the Eric E. Conn Young Investigator Award, for which he served as chair of the award committee from 2010 to 2015, and the ASPB Innovation Prize for Agricultural Technology, which was established in 2015.

Krishna K. Niyogi *University of California, Berkeley*

Kris has added a new dimension to our understanding of photosynthesis through his studies demonstrating how algae and land plants deal with excess light energy and avoid the major problem of photo damage. He unquestionably ranks among the very top investigators studying photosynthesis and physiology in algae. Kris has also served ASPB by contributing reviews and book chapters, including a chapter in



Bijay Singh



MariaElena Zavala

both editions of *Biochemistry & Molecular Biology of Plants*. He has been a member of the Charles Albert Shull Award committee, coeditor of *The Plant Cell*, and chair of the Publications Committee. He has also served on several review and advisory committees and scientific boards.

MariaElena Zavala *California State University*

MariaElena has been one of the primary movers and shakers for undergraduate education in science, not only for minority students, but also for many Southern California undergraduates. She



Krishna K. Niyogi



Pal Maliga

is driven by the quest to encourage minority students to become scientists. Since the beginning of her own career, MariaElena has served on numerous minority committees and educational committees for various scientific societies including the American Society of Cell Biology and the Botanical Society of America, as well as ASPB. For ASPB, she was an Executive Committee member from 2012 to 2015 and a member of the Minority Affairs Committee from 2007 to 2013, serving as chair during that period.

Lawrence Bogorad Award for Excellence in Plant Biology Research

Pal Maliga *Rutgers University*

Pal Maliga has made multiple groundbreaking discoveries in chloroplast biology. His development of a method for stable transformation of land plant chloroplast genomes, once thought to be impossible, established the field of chloroplast genome engineering in higher plants and has led to an explosion of research concerning the chloroplast genome's role in photosynthesis, functional analysis of plastid genes by reverse genetics, and mechanisms of plastid gene regulation. Using the technology, Pal's lab has made many seminal contributions, including evidence for the existence of the nuclear-encoded plastid transcription system and identification of key elements involved in promoter recognition, translational initiation, and RNA editing site specificity. His discoveries continue to stimulate chloroplast biotechnology as well as basic research into chloroplast function.

Robert Rabson Award

Xiaobo Li *Carnegie Institution for Science*

For his novel discoveries linking the genetic and biochemical control of triacylglycerol biosynthesis and turnover with cellular metabolism and nutrient responses of microalgae, Xiaobo Li is the winner of the Robert Rabson Award in 2016. The novel insights arising from Xiaobo's research support the development of renewable and sustainable biodiesel trans-



Xiaobo Li

portation fuel from microalgal feedstocks.

This award recognizes Bob Rabson's steadfast advocacy

for plant biology through the creation of funding programs in the DOE for research in basic energy sciences.

Stephen Hales Prize

Gloria Coruzzi

New York University

Gloria Coruzzi's research is focused on the regulatory mechanisms that control metabolic networks in plants. One of the primary efforts of Gloria's lab is the mapping of nitrogen regulatory networks in Arabidopsis. This work made Gloria a leader in exploring the interface of plant and systems biology and provided the first integrated view of mecha-



Gloria Coruzzi

nisms controlling the assimilation and use of nitrogen. Gloria's group has developed novel computational tools that help biolo-

gists mine high-throughput data to generate testable hypotheses. She has worked on numerous national and international committees, panels, and scientific journals to further promote plant science. These contributions include her editorship of one of the first systems biology focus issues of *Plant Physiology*. In addition to her excellence in research, Gloria is also a dedicated educator and organizer at her university.

Congratulations to all the 2016 awardees, and many thanks to their nominators and the committees who evaluated nominees for each award. ■

ASPB Members Elected to National Academy of Sciences

ASPB congratulates its members for their accomplishments. A full article will appear in the July/August issue.

Julia Bailey-Serres, director, Center for Plant Cell Biology, and professor of genetics, Department of Botany and Plant Sciences, University of California, Riverside

Bonnie Bartel, Ralph and Dorothy Looney Professor of Biochemistry and Cell Biology, Department of Biosciences, Rice University

James J. Giovannoni, research molecular biologist, Agricultural Research Service, Boyce Thompson Institute, Cornell University

Mary Lou Guerinot, professor, Department of Biological Sciences, Dartmouth College

Krishna K. Niyogi, investigator, Howard Hughes Medical Institute; faculty scientist, Physical Biosciences Division, DOE-Lawrence Berkeley National Laboratory; and professor, Department of Plant and Microbial Biology, University of California, Berkeley

ASPB Member Wins Humboldt Research Award

Natalia Dudareva, professor, Department of Horticulture & Landscape Architecture, Purdue University

The Plant Cell

Fast, fair review by your peers



2 days to initial decision (external review or decline)*

29 days to post-review decision*

86 days submission to acceptance*

112 days submission to publication*

*2015 median

ASPB's 2016 Women's Young Investigator Travel Award Winners Announced

Each year, ASPB—through its Women in Plant Biology Committee—awards travel grants to attend the Plant Biology annual meeting to early career women investigators. The goal of the competitive process that underpins the Women's Young Investigator Travel Award (WYITA) program is to increase attendance of young female investigators who are within the first five years of their appointment in academic faculty-level positions, government research scientist positions, or industry research scientist positions, as well as experienced post-docs, at the annual meeting by providing travel funds. Selection is based on (1) the science and quality of the abstract submitted relative to the amount of time as an early-career investigator; (2) a statement describing why travel should be supported, and (3) financial need.

Seven women were selected this year, and each will receive a \$1,000 award to support their attendance at Plant Biology 2016 in Austin, Texas. Several awardees will present a concurrent symposium talk. A list of the recipients and their abstract titles follows.

Congratulations to each of the 2016 WYITA winners.

Juan Dong

Waksman Institute, Rutgers University

Cell polarity and asymmetric cell division: The crosstalk between MAPK signaling and the polarity protein BASL in *Arabidopsis* stomatal development



Juan Dong



Cornelia Hooper



Jeeyon Jeon



Marina Kalyuzhnaya



Heather Marella



Heather McFarlane



Vered Tzin

Cornelia Hooper

The University of Western Australia

The compendium of crop proteins with annotated locations (cropPAL): Subcellular tracing of protein functions in barley, wheat, rice and maize

Jeeyon Jeon

Amherst College

Characterization of a mitochondrial ferroportin in *Arabidopsis*

Marina Kalyuzhnaya

San Diego State University

Methane cycle in dry land: First evidences for plant-methanotrophic bacteria cooperation

Heather Marella

Bridgewater State University

Root-knot nematode infection of *Arabidopsis thaliana* is mediated by MscS-like mechanosensitive channels

Heather McFarlane

University of Melbourne

Cell wall regulation at the trans-Golgi network

Vered Tzin

Cornell University

Genetic mapping shows intraspecific variation and transgressive segregation for caterpillar-induced aphid resistance in maize ■

5th Pan–American Congress On Plants and BioEnergy

Santa Fe, New Mexico
August 4-7, 2016



Registration and Abstract Submission Open

Two hundred participants are expected to gather for this meeting, the largest conclave in the coming year of scientists from the major bioenergy research centers across the two American continents.

Networking and collaboration opportunities will be plentiful. Coffee breaks, meals, and other symposium gatherings, both formal and informal, will provide excellent opportunities for strengthening relationships and exchanging research project and business development ideas.

Engagement with Pan-American colleagues forges strong collaborations around a common goal of making bioenergy a key component of national energy security. If this is an area of interest for you, you won't want to miss this program.

Details on the meeting can be found at
www.bioenergy2016.org.

ASPB: Making a Difference in 2015

A summary of ASPB's major accomplishments and positive impacts on the plant science community in 2015

Supporting a global plant science community



ASPB serves a community of more than

39,000

scientists from

103
countries

Partnering for a better future



Partnered with **more than 20 different organizations and groups** on a variety of activities, including grants, projects, and strategic initiatives, to support the community

Bringing plant scientists together in person and online

Convened **more than**

1,600

plant scientists at six in-person meetings



Plantae

Launched **Plantae.org**—the digital ecosystem for plant science that connects the community online

Engaged a growing online community through social networks, Twitter, and Facebook



Grew Twitter community to more than **16,000** followers across all profiles



Grew Facebook community to more than **26,000** across all pages

Bringing research to the world

Published over

750

papers representing the work of **more than**

4,400
authors

in the highest-impact (*The Plant Cell*) **and the most highly cited** (*Plant Physiology*) **plant biology primary research journals**



Translated the coloring/ activity book *My Life as a Plant* into **18** languages

Facilitated the presentation of **more than**

1,300

posters across six meetings



Copublished such important texts as *Biochemistry & Molecular Biology of Plants*, 2nd edition; and *Plant Genes, Genomes and Genetics*



Helping secure funding for important projects and initiatives



Working with other organizations and groups, ASPB helped to secure **more than**

\$610 million

in funding for plant science research, community projects, and activities

Supporting, recognizing, and inspiring plant scientists



Awards and recognition for scientists and educators

ASPB granted more than **\$320,000 through 148 awards**

25 ASPB members received major recognition through external fellowships and awards



Supporting plant science educators

Published **32 Teaching Tools in Plant Biology**, which have been **downloaded thousands of times** by individuals in **more than 100 countries**

"Why Study Plants?" has been translated into **18** languages



Helping plant scientists navigate careers

Two education sessions, 13 workshops, more than 75 resume reviews, and more than 200 high-quality job opportunities were held or posted at Plant Biology 2015 in Minneapolis



Inspiring and nurturing future plant scientists

Participated in **six major public outreach events** in large settings and **distributed more than 10,000 giveaways**

Midwestern Section Annual Meeting Report

ASPB's Midwestern Section held its annual meeting March 19–20, 2016, at the Edgar S. McFadden Biostress Laboratory at South Dakota State University. More than 100 attendees from 19 institutions, 10 states, and one Canadian province were treated to 35 oral presentations and 50+ posters. Oral presentations were provided primarily by undergraduate and graduate students, and several talks came from technicians, postdoctoral research associates, and faculty at primarily undergraduate and research institutions.

Keynote speaker Federica Brandizzi (Michigan State University–DOE Plant Research Laboratory) discussed her lab's efforts to characterize both conserved and novel plant-specific factors involved in transport systems within plant cells. Featured speaker Adrian Hegeman (University of Minnesota–St. Paul) described his lab's ongoing projects toward making plant metabolomics analyses faster, more effective, and of greater resolution.

Melanie Binder and Natalie Henkhaus from ASPB headquarters detailed new membership initiatives and solicited feedback on ongoing efforts, including the evolution of *Plantae.org*, from section members. Carl Fellbaum advertised the value of serving as an ASPB ambassador, including CV enhancement, increased opportunities for professional development, and promotion of the plant sciences to diverse audiences.

The meeting gave attendees numerous chances for conversing



ASPB Midwestern Section members. Left to right: Senthil Subramanian (South Dakota State University), Aaron Wyman (Spring Arbor University), Gustavo MacIntosh (Iowa State University), Keynote Speaker Federica Brandizzi (Michigan State University), and Kathrin Schrick (Kansas State University).

informally, making new friends, and renewing old acquaintances. The poster presentation sessions displayed the diverse array of pursuits involving plant biology within the section, including cell wall biochemistry, phycoremediation, changes in plant species diversity in the plains, genetic analyses of seed formation, evaluation of novel model organisms, analyses of altered ecosystems in the plains, and elucidation of microbial–plant interactions.

Undergraduates learned about different graduate programs across the Midwest. Graduate students gained wisdom on obtaining postdoctoral research positions in various professional sectors. Postdocs learned that there are careers in plant biology besides being an assistant professor. All attendees had ample opportunities during breaks, between sessions, and at dinner (in a converted 1920s-era, brick-

and-mortar, high-ceilinged fire hall) to network, dialogue, and share a story and a laugh in a relaxed setting.

A major meeting highlight each year is the presentation of student awards, and 2016 was no exception. Eleven students earned travel grants. Although the oral and poster presentations were consistently of admirable quality and content, the section noted several of distinguished caliber. Awards for best undergraduate oral presentation went to Erik Carlson, University of North Dakota (1st place); Vaithish Velazhahan, Kansas State University (2nd place); and Jennifer Myers, University of Nebraska–Lincoln (3rd place). Awards for best undergraduate poster were earned by Jordyn Williams, Truman State University (1st place); Maggie Campbell, Truman State University (2nd place); and Sarah

Mislan, Truman State University (3rd place).

In the graduate student categories, best oral presentation awards were given to Stacey Barnes, Iowa State University (1st place); Suresh Damodaran, South Dakota State University (2nd place); and Martha Ibore, Iowa State University (3rd place). Best poster presentation awards for graduate students went to Stephanie Morriss, Iowa State University (1st place); Anthony Schmitt, University of Minnesota–St. Paul (2nd place); and Rawnaq Chowdhury, South Dakota State University (3rd place).

Numerous topics were discussed in the business meeting on Sunday. Calls for nominations for the site of the 2017 Midwestern Section annual meeting, the 2016–2017 vice chair position, the 2016–2017 local meeting organizer position,

continued on page 18

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 Jill Deikman, Membership Committee chair, at jill.deikman@monsanto.com. As always, we are open to suggestions for articles or features of interest to readers of the *ASPB News*. Enjoy!

John S. Boyer

Professor Emeritus, University of Delaware

A few years back, I moved to the University of Delaware after having been on the faculty of the University of Illinois and later Texas A&M. Helping early to run the family farm in Maryland had convinced me that water was an important limiting factor in agriculture and natural plant communities. We needed controlled environments to allow us to repeat water relations experiments, like a biochemist would use a test tube to repeat conditions around a complex enzyme. The controlled environments were excellent at Delaware, and an added bonus was the chance to work with algae in a biology/biochemistry group at the College of Marine Studies. I had admired the work of Paul Green with large algal cells in which pressure known to be necessary for cell enlargement could be varied while the enlargement of the same cells was measured. I thought this might be a chance to understand enlargement more fully and to extend Paul's work.

Fortunately, we had complete control of the humidity in the



Jean and John Boyer

controlled environments, which meant we could dehydrate soil-grown plants to any level repeatedly and maintain their water status for days or months. We learned that plants can maintain turgor when exposed to moderate water limitations ("osmotic adjustment") and that they have

a means of attracting water to enlarging cells ("growth-induced water potentials"). The controlled environments also allowed us to investigate reproductive development in grain crops such as maize. Mark Boyle found that a drought-induced depletion of photosynthetic products could be

reversed by feeding the products to the stem of the plant. Grain was produced when otherwise none would develop. Clearly, drought-induced grain losses had a biochemical origin! We found that the genome of grain crops monitored the sugar status of the developing florets and was actively causing them to abort during a water limitation. Feeding photosynthetic products had thus identified genetic targets for improved drought performance.

At the same time, Ted Proseus was doing experiments like Paul Green's with large algal cells that were revolutionizing our thinking about the basic process of cell enlargement. The process increasingly appeared to be controlled by the secretion of the pectin component of the cell wall, causing a series of nonenzymatic chemical steps in the wall that resulted in larger cells while wall strength was maintained. This was an immense surprise!

But in what seemed like a flash, it was time to retire. The problem was that age was creep-

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ASPB ambassador Carl Fellbaum with Plantae community manager Melanie Binder, at the Midwest Section meeting.

MIDWESTERN SECTION MEETING *continued from page 16*

and the 2016–2017 Midwestern Section publications manager position were announced. Individuals interested in serving in these positions and suggestions for meeting sites are to be sent to the 2016–2017 secretary-treasurer Kathrin Schrick (Kansas State University). The meeting will be led by 2016–2017 chair Gustavo MacIntosh (Iowa State University).

The meeting was formally closed Sunday afternoon by section chair Aaron Wyman

(Spring Arbor University), with significant appreciation and gratitude extended to vice chair Gustavo MacIntosh, secretary-treasurer Kathrin Schrick, local meeting organizer Senthil Subramanian (South Dakota State University), and the South Dakota State University graduate students who worked tirelessly to staff, manage, prepare, and operate the sessions. Special recognition also was extended to the Biochemical Spatio-temporal NeTwork Resource (BioSNTR) at South Dakota State University, which provided substantial monetary and infrastructure support

for the meeting. Attendees were thanked for participating in the 2016 Midwestern Section annual meeting and encouraged to come to Plant Biology 2016 in Austin, Texas, and to the next Midwestern Section meeting in Spring 2017. ■

WHERE ARE THEY NOW? *continued from page 17*

ing up while work in the lab had become riveting. As the lab closed, I wondered whether retirement was the right thing. On the one hand, fewer deadlines were attractive, and there would be more time to think. There would be more time to work on the family farm or go sailing (a lifelong hobby). On the other, the excitement of the lab and working with others didn't go away. There is something special about glimpsing how plants make a living that I cannot define. Maybe it's building something positive or the chance to understand what otherwise seems magic. For me in this situation, the only practical thing was to keep publishing as though we were still working—or maybe I should say, publish what I should have done before retiring.

As I look back on the 10 years since that retirement event, the extra time has been valuable.

Promotions and impact factors no longer matter. Identifying something in a plant's life is more important, and tying it to farm performance or ecological principles is exciting. Just thinking gave deeper insights than were possible before, and some of our results with photosynthesis or cell enlargement that we didn't understand began to make more sense. Along the way, it was gratifying to see some of our work helping to create genetic products in seed companies or find others' views of cell enlargement coming closer to our own.

Then two years ago, Robert E. Sharp called. Bob had been a postdoctoral associate in our lab at Illinois years ago. He is now directing the Interdisciplinary Plant Group (IPG) at the University of Missouri, a group of unusually collaborative plant scientists. He wondered if I would like to go back to the lab, maybe part time. For years, our lab benefited from students and

postdoctoral associates produced by the IPG at Missouri, and Jean (my long-term spouse and friend) said, "Why not?" So we were off to Missouri in winter while our family farm (and the boat) slept. It is the greatest pleasure to be back in an academic environment working with young people and a particularly welcoming faculty.

We spend our time imaging the location of glucose in plants, aiming to understand more fully how drought alters glucose availability in the reproductive tissues of grain crops or in roots whose extension relies on sugars. The work is enhanced by the recent availability of mutants less able to load sucrose into the phloem or move glucose into plant cells. We also hope to test some of the hypotheses coming from our algal experiments. We would like to know whether similar principles apply in terrestrial plants. If Chara become larger by using a unique chemistry of calcium pectate, do terrestrial plants do the same?

It has been quite a ride, but only with the good help of many others. To the many students, postdoctoral associates, and visiting faculty with whom it has been a pleasure to work, I owe a great deal, due to their curiosity, combined perseverance, and faith in the future. Although I can't name them all, it is great to see them succeed and contribute to science. Many of my earlier colleagues have likewise been inspirational and supportive, giving help where they can. Special gratitude goes to Paul J. Kramer, John B. (Jack) Hanson, and Carolyn A. Thoroughgood.

Jean has the view that this is a team effort, and as a plant scientist herself, her adventuresome nature encourages us to spend our lives this way. It amazes us that we are alive at a time when plant biology is in a great revolution but also faces daunting challenges. Perhaps in a small way we can keep participating. Please visit us if you are close by. ■

Policy Update

BY LAUREN BROCCOLI
Lewis-Burke Associates, LLC

House Appropriators Hold Hearing on NSF Budget

Following the release of the president's fiscal year (FY) 2017 budget request in February, House and Senate appropriations committees have held a number of hearings to review proposed budget levels for federal agencies. The Bipartisan Budget Act of 2015, a two-year agreement passed into law last fall, provided relief from sequestration for FY2016 and FY2017, but despite this agreement, some fiscal conservatives in the House are demanding reductions in overall discretionary spending. This demand is anticipated to stall the appropriations process. In terms of funding projections, federal science agencies like NSF and USDA will likely experience flat funding or very minor increases to their budgets in FY2017.

On March 16, the House Appropriations Subcommittee on Commerce, Justice, Science, and Related Agencies held a hearing on the FY2017 budget request for NSF. Following opening statements by Chairman John Culberson (R-TX) and Ranking Member Mike Honda (D-CA), NSF Director Dr. France Córdoba testified before the subcommittee on the administration's funding request for the agency.

During the hearing, Honda asked for Córdoba's input on recent congressional efforts to allocate funding for individual directorates within NSF. Córdoba responded that Congress appro-

priating at that level "would undermine [the] collaborative process, and jeopardize our ability to pursue the most promising opportunities." Honda's question echoes concerns from the scientific community about proposals from House Science, Space, and Technology Committee Chairman Lamar Smith (R-TX) to cut funding for NSF's Geosciences and Social, Behavioral, and Economic directorates. In comments after the hearing, Culberson attempted to distance himself from Smith's efforts, hinting that he was not in agreement with the controversial approach.

Sources and Additional Information

- The full archived video of the hearing is available at <http://tinyurl.com/hnso3ak>.
- A related *Science Insider* article is available at <http://tinyurl.com/haofq8p>.

House Passes Bipartisan Bills to Promote Women in Science

On March 22, the House of Representatives passed two pieces of legislation to promote and support women in science: the Promoting Women in Entrepreneurship Act (H.R. 4742) and the Inspiring the Next Space Pioneers, Innovators, Researchers, and Explorers (INSPIRE) Women Act (H.R. 4755). Both bills passed with bipartisan support.

The Promoting Women in Entrepreneurship Act, introduced

by Rep. Elizabeth Esty (D-CT), authorizes NSF to support recruitment and development efforts for women in commercial settings. The purpose of this legislation is to support workforce initiatives to help women with STEM degrees pursue careers within the field. The INSPIRE Women Act, introduced by Rep. Barbara Comstock (R-VA), directs NASA to prioritize initiatives that promote women and girls in STEM disciplines.

Source and Additional Information

- The press release with further information on the legislation is available at <http://tinyurl.com/z9ztfbp>.

Administration Announces Executive Actions to Combat Drought

On March 22, the White House released a memorandum titled "Building National Capabilities for Long-Term Drought Resilience" to expand federal resilience efforts first announced in the 2013 executive order on the impacts of climate change. The memorandum was released in conjunction with the White House Water Summit, an event highlighting federal, academic, and private commitments and efforts to support water resilience. The memorandum institutionalizes the National Drought Resilience Partnership, an interagency initiative established in 2013 to build on the National Oceanic and Atmospheric

Administration's National Integrated Drought Information System.

In addition, the White House released a federal action plan detailing renewed efforts to implement resilience initiatives across multiple agencies, including the Environmental Protection Agency, the Department of Commerce, the Department of the Interior, USDA, and the Department of Homeland Security. Although the action plan does not include new funding streams, it does provide insight into the research priorities agencies will be implementing in the next year and highlights existing initiatives, such as the Agriculture and Food Research Institute's Water for Agriculture program.

Sources and Additional Information

- The presidential memorandum can be found at <http://tinyurl.com/jesos7l>.
- The partnership action plan is available at <http://tinyurl.com/jo9kq3o>.
- The 2013 executive order can be found at <http://tinyurl.com/jok7um3>.

State Department Appoints New U.S. Special Envoy for Climate Change

On March 21, the State Department announced the appointment of Jonathan Pershing

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POLICY UPDATE*continued from page 19*

as U.S. Special Envoy for Climate Change. Pershing will replace Todd Stern. Pershing served as senior climate advisor to Secretary of Energy Ernie Moniz. In this role, Pershing will act as the Obama administration's chief climate negotiator, representing the country at international climate conferences and supporting policy development in this area.

Source and Additional Information

- The full press release is available at <http://tinyurl.com/zv9va46>.

USDA and NSF Release Joint Plant–Biotic Interactions and Transformative Technologies Funding Opportunities

USDA's National Institute of Food and Agriculture and NSF released two joint solicitations concerning the exploration of plant–biotic interactions and transformative technologies.

The Plant–Biotic Interactions (PBI) program will support research on basic plant processes and the mechanisms that guide plant–biotic interactions in addition to translational research benefiting agriculture. Projects can be purely basic or applied or have elements of both perspectives. The overarching goal of this solicitation, and the PBI, is to improve agriculture through a deeper understanding of the interactions between plants and their environment.

This program includes two initial competitions. For the first competition, \$6 million is available from USDA for FY2016. Plans to expand the program

in FY2017 include an expected contribution of \$8.5 million from NSF to fund additional proposals.

The second solicitation is for Early Concept Grants for Exploratory Research (EAGER) proposals that deal with the development of transformative agriculture phenotyping technologies. Studies can be “high-risk, high-payoff.” There is \$6 million available for approximately 20 awards. Individual awards are predicted to be \$300,000 over two years.

Sources and Additional Information

- The full PBI solicitation is available at <http://tinyurl.com/hr7jacy>.
- More information on the PBI is available at <http://tinyurl.com/j8xm4g8>.
- More information on the EAGER solicitation is available at <http://tinyurl.com/ha8thgs>.

NSF Releases INCLUDES Pilots Solicitation

NSF released a solicitation to establish Design and Development Launch Pilots for the Inclusion across the Nation of Communities of Learners of Underrepresented Discoverers in Engineering and Science (INCLUDES) initiative. This is the first solicitation for INCLUDES, a major priority of NSF Director France Córdoba originally announced in the FY2016 budget request. Córdoba also released a dear colleague letter to accompany the solicitation outlining her vision for INCLUDES.

The Design and Development Launch Pilots will develop models or prototypes for collective action efforts to increase participation in STEM areas by underrepresented groups. These pilots are intended

to bring together partners across a region or around a common topic or research theme (e.g., data science or clean energy) to advance a specific goal with measurable objectives.

NSF plans to award 30–40 pilots, which will then be eligible to compete for much larger alliance awards in FY2017. Alliance proposals will build on a pilot to expand partners or networks, combining existing teams and organizations to “form new alliances with common goals and purposes and collective impact-style approaches, with a strategy for how the effective practices of the Alliance are likely to be deployed at scale.” Alliances will design and implement strategies to achieve their goals related to breaking down barriers for underrepresented groups in STEM and nurturing new talent.

In addition to the pilots and alliances, NSF plans to support a “backbone organization” that will drive INCLUDES “vision development, alignment, shared measurement practices, implementation research, evaluation, public support and engagement, policy change and implementation, leveraging of funding, and communication between and across the set of Design and Development Launch Pilots and Alliances.” NSF plans to release a dear colleague letter in the near future to further define the process for establishing the backbone organization, which will include a call for conference and workshop proposals to inform the design of the organization.

Sources and Additional Information

- More information on the INCLUDES program is avail-

able at <http://tinyurl.com/jzhseys>.

- The full solicitation is available at <http://tinyurl.com/hdy6376>.
- The dear colleague letter is available at <http://tinyurl.com/jf5ew7y>.
- Information on INCLUDES from the FY2017 budget request is available at <http://tinyurl.com/ztwjhaw>.

EPA Releases Solicitation for National Environmental Education and Training Program

The Environmental Protection Agency (EPA) released a request for proposals for its national Environmental Education and Training Program. Through this program, EPA intends to award one cooperative agreement to operate the program.

The program provides environmental education training through classes, workshops, conferences, and so forth. Additionally, the program provides “long-term support to the [environmental education] field through finding and disseminating best practices, implementing certification programs, and identifying quality resources.”

Sources and Additional Information

- The full request for proposals is available at <http://tinyurl.com/jv7h9jn>.
- Additional information on the program is available at <http://tinyurl.com/jbuxras>. ■

Reach Out to Your Senators and Representatives During the August Congressional Recess

BY LAUREN BROCCOLI
Lewis-Burke Associates, LLC

Congress plays a critical role in shaping the U.S. research portfolio by prescribing funding levels for research programs and, often, by directing policy. New scientific instruments, research grants, graduate fellowships, and scientific centers and institutes are created and funded by Congress each year.

As the 2016 election cycle ramps up, senators and repre-

sentatives will spend the bulk of their time in their district, and many will host specific events for constituents. Events like town halls and office hours present ASPB members with opportunities to cultivate relationships with elected officials and express ASPB's priorities for policy and federal research funding. To take maximum advantage of these opportunities, ASPB encour-

ages all members to participate in these local events, which can serve as a catalyst for future outreach opportunities, such as inviting a senator or representative or appropriate staff member to visit a laboratory or facility.

To aid these efforts, the ASPB Science Policy section of the website provides a suite of advocacy tools, including zip code matching to determine your

congressperson and guidance on meeting with and writing to members of Congress. In addition, the website provides the Society's most current position statements, which can be used in these interactions. For more details or questions, contact Tyrone Spady at tspady@aspb.org or visit <http://tinyurl.com/k6pzh5v>. ■

Science Policy Committee Meets in Washington, DC

BY TYRONE SPADY
ASPB Legislative and Public Affairs Director

On March 21, the ASPB Science Policy Committee (SPC) met in Washington, DC, and conducted meetings with congressional offices. The focus of the ASPB congressional visits was (1) to advocate for funding in the fiscal year (FY) 2017 appropriations process for the major agencies that support plant science research, (2) to communicate the importance of plant science to the economic well-being of the nation and the world, and (3) to discuss the ways that ASPB can be of support on issues of shared interest. Additionally, we discussed

how plant biology provides the foundation for advancement in agriculture and the bioeconomy, mitigation of the impacts of climate change, and development of new medicinal compounds involved in the treatment and prevention of diseases (see the Decadal Vision at <http://tinyurl.com/p9dapxv>).

The SPC urged congressional offices to support sustainable funding growth at federal agencies to allow researchers to work toward revolutionary breakthroughs in producing nutritious foods, sustainable energy, and new medicines and medical

treatments and protecting our environment, as well as advancing our fundamental understanding of plant biology. Given the tight fiscal environment facing the nation, the SPC expressed its appreciation for the bipartisan congressional support of the federal research agencies and the relative protection from budget cuts received by many.

SPC members shared the following specific appropriations requests in each congressional visit:

- **National Science Foundation:** ASPB supports the requested level of \$8 billion in FY2017 and encourages the great-

est possible support for the Directorate for Biological Sciences, including the Plant Genome Research Program (PGRP), which not only furthers fundamental knowledge but also helps us enhance agricultural productivity, grow nutritious foods, and diminish the effects of devastating plant parasites. Sustained funding growth over multiple years for PGRP will be critical to address many challenges of the 21st century.

- **Department of Energy's Office of Science:** ASPB supports... *continued on page 22*

SCIENCE POLICY COMMITTEE *continued from page 21*

ports the requested level of \$5.672 billion in FY2017. ASPB supports the FY2017 request for the Office of Basic Energy Sciences at \$1.936 billion and the Office of Biological and Environmental Research at \$661.9 million. These offices support dynamic research at the interface of plant biology and other scientific disciplines.

- **Department of Agriculture:** ASPB supports the FY2017 requested level of \$700 million for the Agriculture and Food

Research Initiative (AFRI), the full amount authorized in the 2008 Farm Bill. AFRI administers competitive funding for innovative research on issues such as food security, global health, and renewable energy. ASPB also supports the FY2017 requested level of \$1.256 billion for the Agricultural Research Service.

- **National Institutes of Health:** ASPB supports sustained funding growth and advocates for increased support for plant science research within NIH's centers and institutes to help fight disease and obesity. The SPC's core argument

during the visits was that robust investments in these agencies and programs are vital to ensuring America's ability to meet critical challenges such as developing energy independence, increasing crop production sustainably in a changing environment, training the next generation of scientists and engineers to lead the 21st-century global economy, and improving science education. These investments also will help drive future economic success and job growth.

As part of the congressional visit day, ASPB held dozens of meetings with offices representing California, Minnesota,

Mississippi, Missouri, North Carolina, Pennsylvania, and Tennessee. These offices represent a small fraction of congressional offices, and we need your help to take the message to your states and districts. We encourage all plant scientists to engage their congressional representatives during this year's longer-than-usual August recess (see the article on p. 21 on how you can get involved). Please share your efforts and their outcomes with ASPB by emailing me at tspady@aspb.org. ■

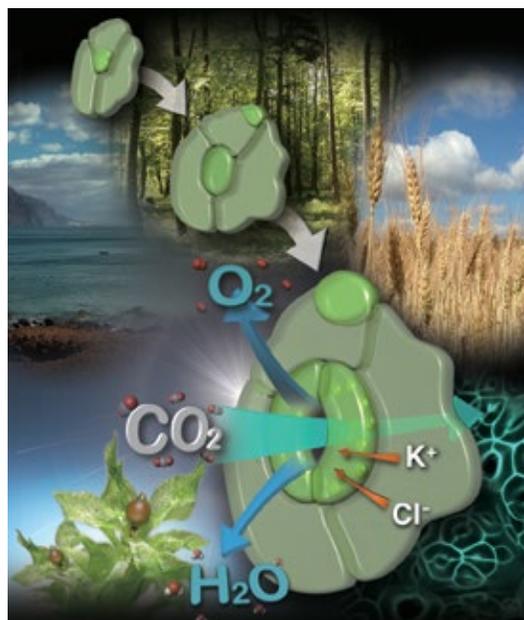


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White House Easter Egg Roll 2016: #Let's Celebrate ... Plants!

BY KATIE ENGEN
ASPB Education Coordinator



“Let’s Celebrate” was the theme of the 2016 White House Easter Egg Roll (<http://1.usa.gov/1NKy8b6>) on March 28. This action-packed, health-oriented day celebrated the holiday and the First Lady’s Let’s Move! initiative (<http://www.lets-move.gov/>).

From our spot down by the First Lady’s garden, the ASPB booth celebrated plants with the happy youngsters and families who visited during each of the five 2-hour visitor shifts (~3,000 ticketed entries per shift). They came to the ASPB booth to

- create a minigarden cup necklace of lettuce, radishes, or carrots, which grow in the First Lady’s garden
- talk about how plants keep themselves and all living things healthfully hopping along each day
- collect a copy of *My Life as a Plant*
- poke their face through the photo op banner for a plant-tastic photo.



It was a pleasure to interact with so many children and see how they are interested in plants and, yes, healthy foods.

—Julian Schroeder, ASPB Immediate Past President

The children were very excited to grow garden necklaces. We took the time to ask each child if they knew what plants need to grow (air, soil, sun, and water), and I was impressed that many of them could tell me! It was also fun when they came to the booth and exclaimed, “Oh, I made these last year!” You could tell it was a hit! What a great experience!

—Natalie Henkhaus, ASPB Staff

It was incredibly rewarding to see this excitement in all of the kids. And I was really impressed that so many of them already knew the basic things plants need to grow and actually have their own gardens at home. I’d love to [volunteer] again next year!

—Stephanie Klein, Penn State University

Many of our enthusiastic young visitors knew at least three things that plants needed to grow (air was the tricky fourth component). We had some return visitors from last year who said that their plants grew great and they were excited to grow something again this year. Parents were excited, too, including a few players from the Washington Redskins who enthusiastically joined their children in creating garden necklaces. Watching 6’6” offensive tackle Morgan Moses sprinkle lettuce seeds into a cup was entertaining.

—Molly Hanlon, ASPB Member

Many Thanks to Our Amazing Volunteers!

ASPB celebrates the amazing volunteers from the ASPB membership, Society leadership, and plant-interested community! Many thanks to the following people:

ASPB Membership

Daniel Czerny
Molly Hanlon
Stephanie Klein
Janet Slovin

Society Leadership

Alan Jones
Julian Schroeder

Plant-Interested Community

Jimmy Jiang
Bonnie Jones
Cathy Jones
Justin Kuan
Ryan Myer
Angelina Reid
Christian Reid
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Announcing the 2016 Summer Undergraduate Research Fellows (SURF)

BY KATIE ENGEN
ASPB Education Coordinator

The ASPB Summer Undergraduate Research Fellows (SURF) program funds undergraduate students to conduct 10 consecutive weeks of plant biology research with a mentor during the early part of their college career. This year's SURF recipients will present their research during the undergraduate and regular poster sessions at Plant Biology 2017.

SURF recipients have high academic achievement, strong motivation and skills for conducting research, and career objectives showing interest in or close relevance to plant biology. Reviewers also consider the contribution of the project to the mentor's research program, the institution's commitment to the proposed research, and the mentor's commitment to undergraduate research.

Proposals are evaluated in two groups based on whether the research will be conducted at a primarily undergraduate or doctoral granting institution. Awards reflect the ratio of applicants in each group.

Congratulations to these 15 SURF fellows and their mentors!



Cairo Archer

SURFers from Doctoral Granting Institutions

Cairo Archer, Boyce Thompson Institute

Mentor: Georg Jander, Professor
Project: *Functional analysis of the terpene synthase TPS2 in maize-aphid interactions*

The funding provided by the SURF program will allow me to further cultivate my research skills and learn new lab techniques that will benefit me throughout my research career. I will also be introduced to the invaluable network of scientists affiliated with ASPB, which will expose me to the many possible research careers within the field of plant sciences.



Julia Brose

Julia Brose, University of Missouri–Columbia

Mentor: Elizabeth Sattely, Assistant Professor of Chemical Engineering, Stanford University
Project: *Discovery of indole phytoalexins in roots of crop Brassicas*

I am very excited to receive a SURF grant from ASPB. This will allow me to take part in research at Stanford University and discover more about the plants that fascinate me.



Snigdha Chatterjee

Snigdha Chatterjee, Syracuse University

Mentor: Ramesh Raina, Chair, Department of Biology
Project: *DDR1, an Arabidopsis histone demethylase, negatively regulates cell death, drought, and defense against Pseudomonas syringae*

This award will enable me to conduct research over the summer and will provide me with an opportunity to attend and present my research at Plant Biology 2017. These experiences will help me toward my goal of getting a PhD in plant molecular biology followed by a postdoctoral fellowship after I graduate from Syracuse University.

continued on page 26



Alexander Clarke



Cole Folstad



Erin Hartzell



Johanna L'Heureux

SURF 2016
continued from page 25

Alexander Clarke, University of Missouri–Columbia

Mentor: Antje Heese, Associate Professor, Division of Biochemistry

Project: *Defining clathrin-dependent protein networks using an ENTH-vesicle adaptor*

I am honored to have been awarded a SURF grant, through which I have the opportunity to practice protein purification by affinity chromatography and immunoblot analysis, which are both widely used biochemical techniques. Perfecting my capability with fundamental experiments and increasing my knowledge in molecular biology will be key to my success in graduate school and my long-term career goal of working in plant biotechnology.

Cole Folstad, University of Minnesota Twin Cities

Mentor: M. David Marks, Professor
Project: *Engineering a new biofuel feedstock: Domesticating pennycress*

As a budding scientist, receiving a SURF award allows me not only to interact with established professionals and grow as a professional, but also to perform awesome

experiments that I would not have been able to do otherwise. This will be a wonderful and challenging opportunity, and I am very excited!

Erin Hartzell, West Virginia University

Mentor: Michael Gutensohn, Assistant Professor of Horticulture
Project: *Genetic analyses of subcellular metabolic crosstalk in the plant terpenoid biosynthetic network*

Being honored with a SURF fellowship has given me so much hope for my future. I view this fellowship as just a part of a long career in plant–insect interactions. More importantly, I hope it gives me the ability to reach out, educate, and help bridge the gap between everyday people and the science community.

Johanna L'Heureux, University of Massachusetts–Amherst

Mentor: Dong Wang, Assistant Professor, Department of Biochemistry and Molecular Biology
Project: *Determining the mode of action of a novel antimicrobial peptide from legumes*

Receiving the SURF award provides the means for me to spend 10 weeks of the summer studying something about which



Helen Liu

I have become most passionate. My project, which involves investigating the mechanism of a plant antimicrobial peptide, aligns well with my future interest of leading a research lab focused on protecting plants against pathogens in a sustainable fashion.

Helen Liu, University of Illinois at Urbana–Champaign

Mentor: Donald R. Ort, Robert Emerson Professor in Plant Biology and Crop Sciences
Project: *Silencing of XRCCA using VIGS for T-DNA insertion by homologous recombination facilitated by CRISPR/CAS9 genome editing system*

This award allows me to set my ideas into motion for a more



Iris Mollhoff

secure and nutritious global food supply. It also provides me more experience for a career in plant biology research and outreach.

Iris Mollhoff, University of California, Davis

Mentor: Philipp Zerbe, Assistant Professor of Plant Biology
Project: *Structural–functional analysis of plant diterpene metabolism*

Applying for the SURF award has allowed me to experience the grant-writing process inherent to a career in scientific research. ASPB support will provide me with the resources to work on an individual project concerning the biochemical diversity in plants.



Jeremy Pardo

Jeremy Pardo, Cornell University
Mentor: Taryn Bauerle, Associate Professor, College of Agriculture and Plant Sciences

Project: *Genetic basis of stomatal conductance under water stress in a portion of the maize nested association mapping population*

Receiving a SURF grant will allow me to conduct research on the genetic control of drought tolerance in maize. The experience from my summer project will be invaluable in my future career as I pursue graduate research in the field of environmental stress physiology.

Amanda Shurzinske, Ball State University
Mentor: Bethany Zolman, Associate Professor of Biology, University of Missouri–St. Louis
Project: *Changes in gene expression mediate auxin responses in Arabidopsis thaliana*

Receiving the SURF award is an honor, and I am so grateful for this opportunity. The fellowship will allow me to conduct further research in a plant system with greater independence. It also will provide me with experience presenting research to a larger scientific audience.



Amanda Shurzinske



Anna Tsui

Anna Tsui, North Carolina State University

Mentor: Anna Stepanova, Assistant Professor of Plant Biology and Genetics

Project: *Uncoupling the roles of auxin and ethylene in cotyledon and leaf epinasty*

I am extremely grateful to ASPB and my mentor for giving me the opportunity to continue my research on cotyledon epinasty this summer with the Alonso–Stepanova Lab at North Carolina State University. With this fellowship, I will be able to develop my skills as a scientist and a critical thinker, as well as enhance my educational experience in preparation for graduate school.



Meghan Bacher

SURFers from Primarily Undergraduate Institutions

Meghan Bacher, University of Puget Sound
Mentor: Bryan Thines, Assistant Professor of Biology

Project: *Investigating the FBS1 and 14-3-3 interaction with BiFC*

I plan to earn a PhD in molecular and cellular biology after graduating from the University of Puget Sound. The SURF fellowship gives me the opportunity to begin research this summer that will become the foundation of my senior thesis.

Geneva Lee, Mills College
Mentor: Sarah Swope, PhD, Assistant Professor of Biology
Project: *Consequences of varying levels of genetic diversity and subpopulation isolation on population growth and persistence in *Streptanthus glandulosus niger* (Brassicaceae)*

I plan on continuing my education in graduate school, either in ecological genetics or conservation biology. Receiving the SURF award allows me to continue my research on *Streptanthus glandulosus niger*, combining aspects of both ecological genetics and conservation biology. This gives me the opportunity to gain more



Geneva Lee



Davon Whitest

practical field and lab skills, better preparing me for graduate school and my future career.

Davon Whitest, Rochester Institute of Technology
Mentor: Michael G. Coleman, Assistant Professor of Chemistry
Project: *Synthesis and phenotypic characterization of 2-halo-1-aminocyclopropane carboxylic acid derivatives in Arabidopsis thaliana: Potential radiotracer imaging agents*

The SURF application process was my first experience applying for and securing external funding for my very own independent undergraduate research project. This was a unique opportunity for me to learn about the professional expectations to be a successful independent research scientist. ■

Chris Mayfield Joins ASPB as Digital Project Manager



Chris Mayfield

Chris Mayfield joined ASPB's staff on April 12, 2016, as digital project manager. Chris will be joining in our efforts to enhance ASPB's online presence. Chris's most recent experience is as a network administrator for the law firm Cohen, Milstein, Sellers & Toll

in Washington, DC. Before that Chris worked for the American Society of Civil Engineers in Reston, Virginia, as a web developer and as an online publishing project manager for the Optical Society of America in Washington, DC. Chris has a BA in Middle East history from the

University of Maryland, is a certified project management professional by the Project Management Institute, and is a member of the Potomac Appalachian Trail Club, volunteering for the Shenandoah National Park. ■

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Remembering Chu-Yung Lin

1928–2015

BY HEVEN SZE, University of Maryland, SHU-HSING WU, Academia Sinica, Taiwan,
and TUAN-HUA DAVID HO, Academia Sinica, Taiwan

Chu-Yung Lin (林秋榮) passed away peacefully in Taipei on October 22, 2015. He was 87. Chu-Yung was instrumental in introducing biochemistry and molecular biology to the study of plant physiology in Taiwan starting in the mid-1960s until his retirement in 1999. Consequently, many undergraduates he taught were well equipped to enter graduate schools in the United States and elsewhere and have become successful in various science professions, including as leaders in academia, research, and industry. Chu-Yung continued to be active as professor emeritus at the National Taiwan University (NTU) until two weeks before his passing. His beloved wife had passed away two years earlier.

Born in Taiwan in August 1928, Chu-Yung received his undergraduate education at NTU majoring in chemistry. He became a teaching assistant in the Department of Botany, where he was first exposed to plant biology, before going abroad for graduate studies. He received a PhD at the University of Oklahoma in the Department of Botany and Microbiology and carried out postdoctoral research with Joe Key at Purdue University.

He started his academic career in 1966 at NTU, where he offered the first course in biochemistry at the university. He continued to teach courses related to biochemistry and molecular biology and



Chu-Yung Lin

plant physiology to life science students until his retirement. In addition, he served as chair of the Department of Botany (1976–1982) and dean of the College of Science (1990–1993). After retirement, he remained active, taught graduate-level seminar courses, attended international meetings, and never ceased to enhance education and research in plant biology.

Research Highlights and Contributions

With a strong background in biochemistry, Chu-Yung pioneered investigations to study the molecular basis of protein biosynthesis in plants and the molecular action of the hormone auxin. These studies opened the way to the beginning of plant molecular biology. As early as 1966, he showed that soybean root tips had a high

proportion of polyribosomes that were dissociated by ribonuclease treatment, suggesting ribosomes were held together by RNA, later shown to be mRNA. Initially it was thought that auxin stimulated RNA expression by enhancing RNA polymerase I. These studies laid the groundwork for later discoveries of small auxin up-regulated RNAs and their promoters by Tom Guilfoyle and colleagues.

Chu-Yung's laboratory later studied the basis of heat stress in plants. His group found that many small proteins were induced by heat in soybean and rice seedlings and confirmed that these small heat shock proteins are required for the establishment of thermotolerance. Chu-Yung has a long record of publications in journals such as *Plant Physiology*, *Proceedings of the National Academy of Sciences*, and *Journal of Molecular Biology*. This record is remarkable as the facilities, resources, and research environment in Taiwan were considerably limited in the early stages of his professional career. In recognition of his accomplishments, he was elected as an Academician of the Academia Sinica in 1998, and in 2008 he became a corresponding member of ASPB, the first Taiwanese scientist to receive this honor.

Teaching and Mentoring: Impact on Students

Perhaps Chu-Yung's most exceptional achievement has been

through the education and mentoring of his students, trainees, and colleagues. This contribution is relatively invisible to the international community.

Many of us were fortunate to be among the first undergraduates in Chu-Yung's courses. His lectures were clear, logical, and stimulating. More importantly, he brought the topics to life through his knowledge of the scientists and his clear descriptions of the experiments and evidence supporting the concepts, including for DNA replication, transcription, and translation. His exams were refreshing as they tested our ability to solve problems, to reason, and to deduce. No doubt he stimulated much interest in biochemistry and molecular biology. Some students got their first taste of research in his laboratory. Although laboratory equipment was limited then, the future of biochemistry and molecular biology was bright and promising. Chu-Yung's lectures and laboratory training continued to make a strong impact on countless young minds until his retirement and beyond.

Chu-Yung was approachable and enjoyed many laughs with students who sought advice. He predicted that some of us had potential and encouraged many to pursue graduate degrees. He directed us to some of the best

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CHU-YUNG LIN
continued from page 29

plant research laboratories in the world, including Michigan State University and the University of California at Berkeley and at Davis. His letters of recommendation had impact because his name was recognized by plant biologists. Later, he would proudly introduce us to other established plant scientists at annual meetings when we were still unknown as graduate students or postdocs.

Chu-Yung had a passion for science and for the good life, taking students to well-known eateries for delicacies and wines, enjoying coffee he personally brewed in his office, playing golf, listening to classical music, and watching opera. To most students, he was an unusual professor who was young at heart at all times.

Retirement Years

Chu-Yung maintained his interest in plant research and the professional development of his mentees. The sharp intellect, natural curiosity, and enthusiasm for learning remained unchanged for over 40 years! At annual meetings of ASPP and later ASPB, he would always want to know what was new and had incisive questions about novel developments. Invariably, he would also talk about results coming from his own laboratory and discuss possible interpretations. It was amazing to see him at annual meetings of ASPB (e.g., Seattle or Boston) interacting and going to talks, even though he had been retired for years.

A hallmark of a distinguished scientist is revealed most clearly when one has passed retirement age. Chu-Yung contin-

ued to take an interest in the development of the Institute of Plant Biology at National Taiwan University and the Institute of Plant and Microbial Biology and the Agricultural Biotechnology Research Center at the Academia Sinica. The countless plant biologists who were mentored by him or were inspired by his example include Zinmay Renee Sung (University of California, Berkeley), Anthony Huang (University of California, Riverside), Teh-hui Kao (Pennsylvania State University), Jen Sheen (Harvard University), Yi-Fang Tsay (Academia Sinica), and many other plant biologists in major universities and research institutes in Taiwan. Most of them are active members of ASPB.

Chu-Yung had a long record of contributions in research and

teaching and was particularly influential in attracting some of the brightest people in Taiwan to the field of plant biology. In 2014, the CY Lin Foundation for Plant Science and Education was established jointly by Academia Sinica and the National Taiwan University Academic Development Foundation (ntuadf@gmail.com). The primary mission of this foundation is to provide scholarships and awards to promising young plant biologists.

We feel fortunate and grateful to have had such a mentor. He will be missed, yet his legacy lives on in many trainees and colleagues in Asia as well as on other continents. ■



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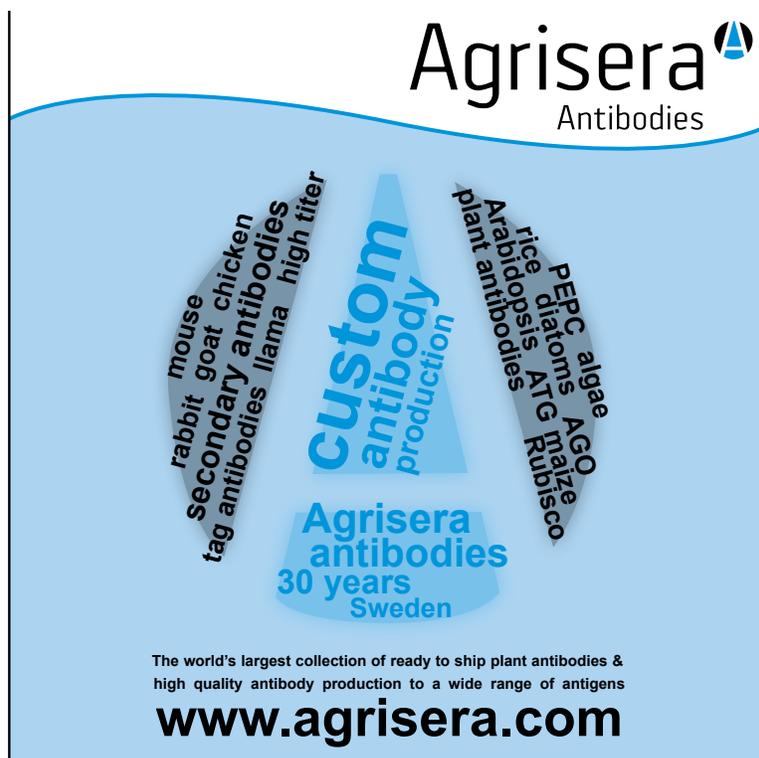
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