

ASPB News



THE NEWSLETTER OF THE AMERICAN SOCIETY OF PLANT BIOLOGISTS

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Inside This Issue

Peggy Lemaux Is
President-elect

Julia Bailey-Serres Elected
Secretary

Richard Vierstra Elected to
Executive Committee



Plant Biology 2011

Minneapolis
August 6-10

coverage starts on page 12



Steven Huber Assumes Presidency October 1

ASPB welcomes Steve Huber as its new president. Steve is a research scientist with the USDA-ARS at the University of Illinois. Steve received his BS degree from the University of Wisconsin in 1974 and completed his PhD degree in 1977 with Gerald Edwards, also at the University of Wisconsin. He then joined USDA-ARS as a plant physiologist and was located at North Carolina State University. In 1985-1986, he was a visiting professor at Nagoya University in Japan, and in 2000-2001, he served as review officer for the then newly formed ARS Office of Scientific Quality Re-



Steve Huber

view, where he provided scientific oversight of the peer review of ARS projects. In 2003, Steve moved to the University of Illinois, where he is a member of the ARS Global Change and Photosynthesis Research Unit and adjunct professor in the Departments of Plant Biology and Crop Sciences.

A major focus of work in the Huber lab concerns the biological mechanisms that control primary carbon and nitrogen metabolism in plants. Steve and his colleagues have a long-term interest in sucrose metabolism

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President's Letter

"May You Live in Interesting Times..."

Reported to be an ancient Chinese curse, the first written record of the text in the title is attributed to New York Congressman Frederic R. Coudert, who wrote of his recollection of a letter to a colleague in the *Proceedings of the Academy of Political Science* in 1939. Speaking about Europe in 1936, Coudert followed these words with "Surely no age has been more fraught with insecurity than our own present time" (1). Perhaps every generation faces its own interesting times, but at the beginning of the 21st century, our interconnected global community



Nick Carpita

faces challenges of food insecurity, energy insecurity, and water insecurity in a frighteningly near-term future. As a community, my hope is that ASPB's global membership will bring its collective and considerable talents to bear on these challenges. Plant biology is of critical importance to our society, and ASPB needs to voice this message loud and clear.

For the majority of our members, our Society is best known for its publication of the two most cited journals in plant science—*Plant*

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The *ASPB News* is delivered online as well as in print. Members will be alerted by e-mail when a new issue is posted. The *ASPB News* welcomes member feedback. Contact the editor at nancyw@aspb.org.

ASPB Executive Committee & Staff

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President's Letter
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Physiology and *The Plant Cell*—and as convener of the annual Plant Biology meeting, where roughly a third of the membership take the opportunity to network and present their work at this large forum. However, with the growth and evolution of ASPB have come many more opportunities for our members to step up to advance the discipline of plant biology. I have presented some of these ways in previous letters and reiterate some of them here. With close to half of our membership living outside the United States, our Society is ever more engaged with the international plant science community. The Global Plant Council, initiated by ASPB through the leadership of Mel Oliver, is a growing coalition of 20 societies of the world organized to provide a strong voice for the role of plant sciences in addressing global challenges of world hunger, human health and well-being, global climate change, energy and biomaterials, and sustainability and environmental protection (2). Leon Kochian and members of ASPB's International Committee have organized a workshop this November in Kenya on how molecular breeding can solve real problems in food production. Members are strongly encouraged to build research and education relationships with talented young investigators who are on the front lines of food security in Africa. Agency support is being sought to fund travel for participants of this workshop to attend Plant Biology 2012 in Austin so that they may network with annual meeting attendees with a view toward promoting longer-term research and educational relationships that will accelerate success. If you would like to be kept informed regarding any post-workshop events that are planned during Plant Biology 2012, please contact ASPB's executive director Crispin Taylor at ctaylor@aspb.org.

The Public Affairs Committee (PAC), under the leadership of past chair Gary Stacey and current chair Dick Sayre, serves as a voice for plant science to the U.S. Congress and Executive Branch, including the federal funding agencies. The PAC develops various strategies for support of basic plant sci-



The members of the Global Plant Council

ence while coordinating efforts with other plant science societies and related groups. One such way is the creation of the Plant Biology Research Summit that was held this September. This summit engaged a broad spectrum of the plant science community, including researchers, plant and agriculture industries, commodity groups, and the like, to build a true and broad consensus on the ways in which plant science research can most effectively address national challenges and identify priority goals that will need to be met. Roger Beachy, former director of the National Institute of Food and Agriculture (NIFA), is working to establish an even broader coalition of organizations in support of dramatically increasing funding for research in plant and agricultural sciences.

ASPB education and outreach activities focus on energizing and fostering the interest of future scientists in plant biology. Together with the Education Committee and Education Foundation, led by chair Erin Dolan and acting chair Mary Lou Guerinot, respectively, ASPB has developed an exceptionally strong portfolio of education and outreach products and activities to ensure that the knowledge of plants begins at an early age (3). One of the highlights of my presidency this year was participating in the ASPB science exhibit at the White House

Easter Egg Roll on the South Lawn. ASPB was selected by the Office of Science and Technology Policy as one of three scientific societies to present activities to promote science education. Our seeds of "success" were planted in egg-carton "mini-pots" by thousands of kids, who carried them off with bookmark handles containing one of the 12 Principles of Plant Biology. My thumb is still numb from cutting up the many hundreds of egg cartons!

Excellence is achievable only when the broadest community is at the table. Twenty-five years ago, when Ellen Weaver reported on the status of women in the plant sciences, a standing committee was launched to address a serious problem of exclusion in a male-dominated Society. Today, the Women in Plant Biology Committee (WIPB), now led by Marta Laskowski, has helped make ASPB a paradigm for other societies and the scientific community at large; women make up one-half of ASPB's leadership as chairs of standing committees and elected members. They look outward to address issues of particular concern to women scientists and to promote the inclusion and advancement of women in our profession. The Minority Affairs Committee (MAC), under the leadership of MariaElena Zavala, seeks to enhance diversity in our membership and advance-

ment in academia, industry, and government. We still have much to do, and we have the leadership to achieve further progress. One example is through our long-term connections with diversity-serving societies and meetings, such as the Society for the Advancement of Chicanos and Native Americans in Science (SACNAS) and the Annual Biomedical Research Conference for Minority Students (ABRCMS). Through the Summer Undergraduate Research Fellowship (SURF) program and the travel grants programs of WIPB and MAC, ASPB supports annually around 100 young scientists to participate in research and present their work at the annual meeting. Also through support of ASPB, an even greater number of undergraduate and graduate students have been supported to attend and present their work at one of the five regional meetings of the Society.



Maria Elena Zavala
PHOTO BY NICOLE BURKART

Editors-in-chief Don Ort and Cathie Martin are guardians of the high standards and reputation of *Plant Physiology* and *The Plant Cell*. The chair of the Publications Committee, Sally Mackenzie, has done a marvelous job managing a range of issues, not the least of which is to lead efforts to identify an individual to succeed Don when he steps down from his editorship at the end of next year. But we publish more than these two journals: in addition to the *ASPB News*, there is the free access, online-only “TAB” (*The Arabidopsis Book*), the second edition of *Biochemistry & Molecular Biology of Plants* (in collaboration with Wiley-Blackwell), due out in 2013, and *Molecular Life of Plants*, due out in 2012 (also with Wiley-Blackwell).

The leadership of ASPB, as elected officers or committee chairs, typically serves for up to three years in any post, but they don't serve in a vacuum. It is the Society's staff that ensures that all the parts work—they are what ensure ASPB remains a leading scientific society. In the publications domain this year, we said farewell to managing editor John Long, thanking him for his service to both journals, and we welcomed Patti



Education Foundation coordinator Katie Engen shows how to make seed cups at the White House Easter Egg Roll.

Lockhart to the post. We owe a great debt of gratitude to the “glue” that holds all this together: director of publications Nancy Winchester. Diane McCauley provides Nancy with a tremendous amount of support while also producing the *ASPB News* and TAB (and dealing with the occasional tardy submission of a President's Letter or two!).

The scientific program for the annual meeting is developed by the Program Committee, which is responsible for the tremendous quality of the science presented. Inarguably the hardest responsibility for an elected ASPB officer is serving as secretary and chair of the Program Committee, a position currently held by Judy Callis. But the attendees at the annual meeting rarely have a glimpse into the incredible organization needed to make it happen, especially in the creation of services and opportunities that have been developed alongside the science that is presented. Jean Rosenberg, director of meetings, marketing, and membership, is the one who lays the foundation for the meeting and so much more. As attendees to our annual meeting well know, Shoshana Kronfeld provides Jean with huge support in member services.

The newest member of the senior staff group is Adam Fagen, our director of public affairs, which includes the education and outreach missions I mentioned earlier as well as extensive legislative affairs responsibilities. Adam quickly grasped the aims and aspira-

tions of our Society and articulates them in written testimony to Congress. Foundation coordinator Katie Engen and Adam deserve a standing ovation for their work to make events such as ASPB's presence at the White House Easter Egg Roll a huge hit, as well as the many other outreach events that heighten our visibility. Sadly, we will soon say goodbye to Adam, who is moving into the CEO position at the Genetics Society of America.

Largely through the success of our journals, our Society has grown to have a \$6 million annual operating budget and an \$11 million endowment. The Good Works that ASPB does to enhance our education and research community depends on the astute oversight of the Board of Trustees, chaired by Mary Lou Guerinot, but it also has a great manager in Kim Kimnach, associate director of finance and administration, who makes all the numbers work, regardless of how difficult we sometimes make it for her!

Two new initiatives have been launched this year. The Business Development Committee (BDC), inspired by our immediate past president Tuan-hua David Ho and now chaired by Jim Siedow, is charged with the creation of new revenue streams. At the same time, the ASPB Foundation exploratory committee, chaired by Russ Jones, will explore new approaches toward further growing our

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Steven Huber
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and nitrate assimilation and the control of these and other important plant processes by reversible protein phosphorylation. In particular, their studies have focused on the regulatory phosphorylation of key enzymes such as sucrose phosphate synthase, sucrose synthase, and nitrate reductase. The work with nitrate reductase introduced the Huber lab to the so-called 14-3-3 proteins that function as phosphoserine-binding proteins and thereby interact with a wide array of cellular proteins. Steve and his coworkers are currently studying the binding of 14-3-3s to membrane proteins such as receptor kinases, where the 14-3-3s can function as positive regulators of signaling. A new aspect of receptor kinases that Steve's lab is investigating is the role of tyrosine autophosphorylation. Recent results indicate that in addition to serine and threonine autophosphorylation, some receptor kinases can also autophosphorylate on tyrosine residues, which uncovers a previously unappreciated component of plant receptor kinases. Finally, the long-term interest in regulation of protein kinase specificity has resulted in a second new area of work dealing with the impact of reactive oxygen on protein phosphorylation and the

emerging notion that methionine oxidation can function as a redox switch directly linking ROS signaling to phosphorylation. Steve's lab also has a long-standing interest in soybean seed composition and is currently studying how pod position along the main stem affects the relative content of protein and oil.

At Illinois, Steve has taught plant physiology and metabolism and currently teaches a graduate-level course on plant proteomics. He also serves as faculty adviser of a new Professional Science Master's Program in Plant Biology (Biotechnology) that blends an integrated curriculum of science and research combined with business skills and real-world experience. Other professional duties have included serving on grant panels for NSF, NRI, and DOE and several journal editorial boards. He currently serves on the boards of *Photosynthesis Research* and Faculty of 1000 and is a deputy chair of *The Biochemical Journal*. Steve was recognized as an ISI highly cited researcher in Animal and Plant Sciences in 2000 and was elected a fellow of AAAS (American Association for the Advancement of Science) in 2007, a fellow of ASPB in 2007 (inaugural class), and a fellow of the American Society of Agronomy and

Crop Science Society of America in 2000. He served the *Annual Review of Plant Biology* as a member of the board (2002–2006), member (2005–2007), and chair (2007–2009).

Steve has been an active member of ASPB since 1975, serving as a *Plant Physiology* board member and monitoring editor, a member of the Shull Award Committee, chair of the Martin Gibbs Award Committee (2009–2013), chair of the Constitution & Bylaws Committee (2009–2012), and elected member of the Executive Committee (2007–2009). In 2008, he was awarded the Lawrence Bogorad Award for Excellence in Plant Biology Research. Steve has volunteered in the Education Booth at ASPB and AAAS annual meetings and is an avid supporter of the role of the Society in education and public awareness of important issues. Steve has a special interest in establishing closer ties within the Society between the public and private sectors. To promote this, he has recently established the new Interest Group, Bridging the Private & Public Sectors (<http://my.aspb.org/members/group.asp?id=83752>), and encourages scientists in academia, government, and industry to join and help shape the scope and focus of this group. 

President's Letter
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endowment. Both activities aim to secure our financial footing as we continue to expand our research, education, and outreach missions. Our executive director, Crispin Taylor, is much more than the manager of a deeply dedicated staff—Crispin elevates the stature of our Society in many tangible and intangible ways. (Take it from me, he is a very good editor, too!) Crispin and I owe a huge thanks to our “minder,” Donna Gordon, executive and governance affairs manager, a great resource and institutional memory whom we both have come to rely on.

I have very much enjoyed this year, with much to learn and so much to do. Tuan-hua David was a tremendous resource, and I thank him for his friendship and inspiration. I welcome incoming president Steve Huber, who took the reins October 1, and offer my best wishes to Peggy Lemaux as president-elect. Welcome also to Julia Bailey-Serres, who will take over for Judy Callis as secretary and chair of the Program Committee. Joining elected members Rita Varagona and Gloria Muday is Rick Vierstra, filling a big hole left by the departure of Kathy Osteryoung. The governance of ASPB is most certainly in good hands, and I feel so fortunate to have

been a part of this team. They will continue a singular aim to make ASPB the most relevant and responsible society to make a difference in these interesting times. 

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Peggy Lemaux Elected to Lead ASPB in 2012–2013

Peggy Lemaux, University of California, Berkeley, is ASPB's new president-elect. Peggy received her BA from Miami University in Ohio and her PhD in microbiology from the University of Michigan in 1977, where she studied with Frederick C. Neidhardt. Her first postdoctoral mentor was Stanley N. Cohen at Stanford University



Peggy Lemaux

Medical School, and her second was Arthur Grossman, Department of Plant Biology, Carnegie Institution of Washington at Stanford. In 1988 she joined the Department of Plant Genetics at DeKalb/Pfizer Genetics as a research scientist, where her group was the first to report the successful transformation of maize. In 1991 she became a faculty member at UC Berkeley, where as a cooperative extension specialist she conducts research on cereal crops and leads an outreach program to educate the public about foods, agriculture, genomics, and biotechnology.

The major research goals of Peggy's laboratory are threefold: (1) to utilize genomics tools to unravel complex pathways and identify genes of interest for crop improvement, (2) to solve remaining challenges for genetic engineering of cereals, and (3) to create new value-added cereals. Her laboratory has developed effective transformation methods for all major cereal species. The work entailed overcoming a number of obstacles, including reducing somaclonal variation that causes mutations during in vitro culture, eliminating vector and selectable marker sequences from transgenic plants, and increasing transgene expression stability. The resulting technologies have been transferred to laboratories worldwide and have led to issued patents, now licensed to both start-up and major agricultural bio-

technology companies. Her lab currently uses the approaches she developed to address basic and applied questions in plant biology. Her laboratory led efforts to use maize *Ds* transposable elements as a gene delivery system and as a gene tagging tool in small grain cereals. Her applied contributions involving transgenic cereal crops include

development of faster germinating barley with improved starch characteristics for the brewing industry; a hypoallergenic wheat variety for consumers with wheat allergies; improved sorghum digestibility for Africa under the auspices of the Bill & Melinda Gates Foundation; and, most recently with Chinese collaborators, the mitigation of preharvest sprouting in wheat. These projects, in collaboration with Bob Buchanan, involved modulating expression of a key redox regulatory protein, thioredoxin.

An equally important aspect of Peggy's position is interacting with the public on issues related to food, agriculture, genetics, and genomics. In this role, she has developed lay-language fact sheets, informational videos, educational displays, K–12 curricula, and an award-winning website, <http://ucbiotech.org>. Recently she wrote two extensive review articles on issues relating to agricultural biotechnology for *Annual Review of Plant Biology*. She also served as a lead PI of extension and education for the USDA-sponsored Rice CAP (Coordinated Agricultural Program) and Barley CAP, most recently creating a barley grower page on eXtension (<http://www.extension.org/pages/32458/barley-information-for-growers>).

Peggy designed and taught a course for undergraduates, Modern Applications of Plant Biotechnology, covering agricultural

history, modern approaches to improving crop plants, and the issues raised by biotechnology. Her professional contributions include service on grant panels for NSF and as an ad hoc reviewer for state and federal granting agencies as well as a broad array of professional journals. She earlier served as a member of the National Sustainable Agriculture Advisory Committee, the Biological Sciences Advisory Committee of NASA, and chair of the Electorate Nominating Committee of AAAS. At present, she serves on the Public and Scientific Affairs Board of the American Society for Microbiology. Her opinion is routinely sought by the national and international news media and by local, state, and federal representatives. Peggy was elected a fellow of AAAS in 2002, a fellow of the Crop Science Society of America in 2007, and a fellow of the American Society of Plant Biologists in 2009. In 2010 she received the Career Achievement Award from the Society of In Vitro Biology.

Peggy has been an active member of ASPB since 1984, serving on the Public Affairs Committee (1997–2002; chair from 2001 to 2002) and on the board of the Education Foundation (2003–2008). In 2003 she received the Society's Dennis R. Hoagland Award for Outstanding Contributions to Agriculture. She frequently volunteers at ASPB-sponsored educational venues at the meetings of the National Science Teachers Association and AAAS, as well as at Plant Biology, often providing educational resources she developed with Education Foundation funding. In 2010, she represented ASPB at the national conference of the Society for Advancement of Chicanos and Native Americans in Science.

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Julia Bailey-Serres Elected Secretary

ASPB welcomes Julia Bailey-Serres as secretary. Julia is a professor of genetics in the Department of Botany and Plant Sciences and the Center for Plant Cell Biology at the University of California, Riverside. She established and has served as director of UC Riverside's first National Science Foundation-sponsored ChemGen IGERT (Integrative Graduate Education and Research Traineeship) program since 2005 and is world-renowned for her far-reaching work on plant response and adaptation to environmental challenges. Julia grew up in La Jolla next to the Scripps Institute of Oceanography, where she developed an early interest in coastal sage plant communities and their biology. She received a BS in biology from the University of Utah in 1981, working as an undergraduate researcher first in aquatic entomology and later on a plant mitochondrial DNA project.

After touring Europe by bike for four months with a dog-eared paperback biochemistry text in her panniers, she accepted a graduate research position with Christopher Leaver at the University of Edinburgh, Scotland. Leaver had cloned the first plant mitochondrial gene, and Julia soon became interested in the role of nuclear cytoplasmic incompatibility in cytoplasmic male sterility. Her PhD dissertation focused on genome rearrangements associated with recombination within mitochondrial genomes of sorghum. Returning from abroad in 1986 for a postdoctoral position in Michael Freeling's lab at UC Berkeley, she began working on the low oxygen response of maize seedlings and also became fascinated with post-transcriptional gene regulation. She joined the faculty at UC Riverside in 1990 to de-



Julia Bailey-Serres

velop a research program on sensing, signaling, and acclimation responses to low oxygen stress in plants. Her multidisciplinary approach combines genetic, molecular, biochemical, and bioin-

formatic technologies and has significant implications for agricultural and global food challenges. Recently, she has received international attention for her group's dissection of the mechanistic role of the *SUB1A* gene in conferring submergence tolerance in rice. In 2008 she was the lead recipient of the USDA National Research Initiative Discovery Award for Outstanding Agricultural Research to Enhance Submergence Tolerance in Rice, and a World Technology Award

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Richard Vierstra Elected to Executive Committee

Richard Vierstra joins ASPB's Executive Committee. Richard earned his BS in biology and chemistry from the University of Connecticut, Storrs, in 1976 and his PhD in plant biology from the Plant Research Laboratory, Michigan State University, East Lansing in 1980. He has held positions as a postdoctoral research associate (1980–1983) with Peter Quail at the University of Wisconsin–Madison and as assistant professor (1984–1988), associate professor (1988–1992), and professor (1992–2003) in the Department of Horticulture at the University of Wisconsin–Madison. Rick was a Fulbright senior scholar at the University of Melbourne, Australia (1993–1994). He has been a professor in the Department of Genetics at the University of Wisconsin–Madison since 2003.

Rick's research and academic interests include (1) mechanisms, regulation, and evolution of protein breakdown by the ubiquitin/26S proteasome system using *Arabidopsis* as the model; (2) roles of autophagy in plant growth, development, and survival under suboptimal conditions; (3) functions of SUMO during the plant stress response; (4) understanding the phytochrome signaling systems in plants and microorganisms at the atomic level, using x-ray crystallography, NMR spectroscopy, single particle EM, and biochemical methods; and (5) defining post-translational modifications that control protein behavior, localization, and half-life using various proteomic methods. To date, Rick has mentored 39 postdoctoral fellows, 25 graduate students, and a host of under-

graduates. Teaching responsibilities include introductory biology and a graduate-level class on plant biotechnology.



Richard Vierstra

He has received numerous awards throughout the years, including UW–Glenn Pound Outstanding Research Award-CALS (1986), UW–Romnes Faculty Research Award (1989), UW–Kellet Mid-Career Faculty Research Award (1995), Fulbright Senior Scholarship (1992), fellow of AAAS (2002), UW–Honored Instructor (2010), and UW–Stanley J. Peloquin Professor of Genetics (2010 to present).

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Julia Bailey-Serres
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finalist in 2009, with collaborators David Mackill and Pamela Ronald. In addition, the sustained efforts by her lab in studying dynamics of mRNA translation led to the pioneering profiling of “translatomes” of discrete cell types of plants.

Julia has mentored over 50 undergraduate and 19 graduate students in their research since joining UC Riverside. She directed an NSF Research Experiences for Undergraduates site program and was

honored with a Chancellor Award for Excellence in Mentoring Undergraduate Research in 2002. In recent years, as director of the ChemGen IGERT program, she has been active in establishing and implementing courses and working with diverse groups of biologists, chemists, and computer scientists to foster cross-disciplinary training of the next generation of plant scientists. Her service to the scientific community includes membership on the ASPB Program Committee (2003–2006) and her roles as *Plant Physiology* monitoring editor

(2002–2008), associate editor (2008 to present), and coeditor for a special issue on reactive oxygen species. She has organized or coorganized several meetings, including two Cold Spring Harbor Symposia on Systems Biology and a UC Riverside Plant Physiology Symposium, and is frequently invited as a keynote speaker to national and international conferences and symposia. She was elected a fellow of AAAS in 2005 and a fellow of ASPB in 2010. 

Richard Vierstra
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Rick has held various positions in many organizations, including board of directors and treasurer, International Society of Plant Molecular Biology (2006 to present); vice chair, FASEB Conference on Ubiquitin (1991); chair, FASEB Conference on Ubiquitin (1993); panel member for USDA-NRICGP, DOE, NIH, and NIH-NSRA Ruth L. Kirschstein Postdoctoral Fellowship study sections; panel manager, USDA-NRICGP—Plant Genome and Genetics Mechanisms (2000–2001). He has also been a member of the editorial board of the *Journal of Biological Chemistry* (2001–2006) and is an ad hoc reviewer for numerous journals, including *Plant Physiology*, *The Plant Cell*, *Science*, *Nature*, *Cell*, *Journal of Biological Chemistry*, and *The Plant Journal*.

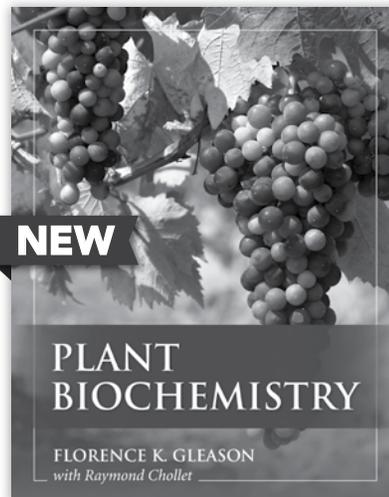
Rick has been a member of ASPB since 1978, and he has had an active role in the Society, including monitoring editor for *Plant Physiology* (1988–1992 and 1996–2001) and as a member of the Program Committee (1988–1990), Stephen Hales Award Committee (2005–2007 and 2011 to present), and Charles Shull Young Investigator Award Committee (2008–2010). He was also an ASPB annual meeting plenary symposium organizer in 1987, 1990, 1999, 2005, and 2009. 



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ADVANCING SCIENCE, SERVING SOCIETY

Plant Biology 2011

*Minneapolis
August 6-10*

Plant Biology 2011 gave new meaning to the Minneapolis Greenway. Bringing cutting-edge research, the latest discoveries, and news in plant biology, researchers from 37 countries converged on Minneapolis, Minnesota, for the five-day meeting.

Opening Session Invokes a Global Perspective on Plant Biology

ASPB's 2011 annual meeting opened with a traditional welcome by Neil McKay of the Spirit Lake Dakota. As Neil, a Dakota language specialist at the University of Minnesota, translated the beautiful welcome song to the ASPB attendees, he pointed out the connections in the welcome to plant biology. He explained that for the Dakota, every plant has a purpose and every plant has a song.



PHOTO BY NICOLE BURKART

Neil shared some of the history and traditions of the Dakota communities, including that they were given four medicines—tobacco, sage, cedar, and sweetgrass—but lamented the fact that we have lost proper knowledge of many medicines. After his presentation, Linda Different Cloud, a member of the Minority Affairs Committee, and Nick Carpita, ASPB president, presented Neil with a blanket to “wrap him in the appreciation” of ASPB.

Nick then carried on with the meeting by presenting the 2011 ASPB awards.

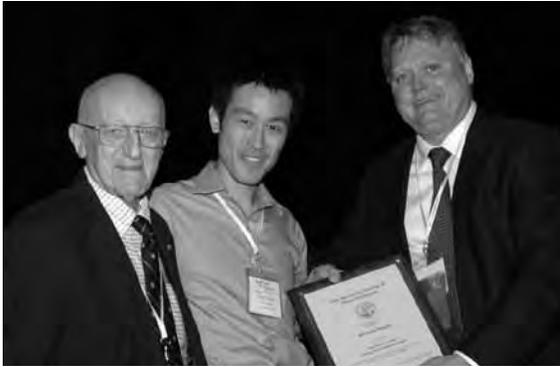
Twenty awards recognizing contribu-

tions of individuals to plant science were presented (for details of the awards and recipients, visit http://my.aspb.org/?AF_Awards).

A unique scientific connection occurred between the namesake and recipient of the Eric E. Conn Young Investigator Award. This is a new award recognizing outstanding research and demonstrated excellence in outreach and public service and mentoring by an ASPB member who is not more than five years post-PhD. Hiroshi Maeda, the first recipient of this award, identified the last undiscovered gene in phenylalanine biosynthesis, a prephenate aminotransferase, whose activity was initially characterized and reported by Eric Conn's laboratory more than 25 years ago. In a story of science coming full circle, Eric personally presented the award to Hiroshi.

Three special award lectures followed the ceremony. First, Dominique Bergmann, of Stanford University, gave the Charles Albert Shull Award Lecture, explaining a portion of her research on the process of stomatal development. Dominique presented a unique vertical look at biology, addressing how her research in stomatal lineages affects not only plants, but phenotype, fields, and the world. Her investigation into the transcription factors that mediate stomatal development uncovered an elegant transcriptional regulatory network centered around three closely related bHLH transcription factors: Fama, Speech, and Mute. Dominique described the elucidation of this network and the unique temporal role of each member of the family. With twice the water content of the atmosphere passing through the stomata of plants each year and 20% of carbon fixed through stomata, it is easy to understand the link between her research and global environmental impacts. Taking her findings of the

Highlights from Minneapolis



Eric Conn (left), Hiroshi Maeda, and Nick Carpita (right).
PHOTO BY NICOLE BURKART

molecular machinery of individual plants to a global perspective, Dominique is investigating the effects of climate changes on stomata to understand how plants alter their stomatal development in response to changes in the environment. She hopes that by understanding these mechanisms, we may be able to identify methods for mitigating the negative effects of climate change through adjusting stomatal development.

The 2010 recipient of the Stephen Hales prize, Athanasios (Sakis) Theologis from the USDA, presented his work on ethylene response, specifically through the ACC synthase, the enzyme at the rate-limiting step of ethylene biosynthesis. This large family (there are nine ACC synthases in Arabidopsis, eight of which are enzymatically active) makes understanding the role and specific function of each a challenge. Sakis addressed the questions of why there are so many isozymes present and whether each one has a specific function. Through multiple higher-order mutant combinations, he is uncovering regulatory interactions indicating that the enzymes act in concert with each other. He presented these interactions as an orchestra generating a symphony of responses to a range of ethylene levels.

The final award lecture was from this year's Leadership in Science Public Service Award recipient, Deborah Delmer (see related story on page 40). As the former director for food security for the Rockefeller Foundation and currently consulting for the

Gates Foundation, Debby presented her view of the role of translational research in plant biology. Her vision of a pipeline for crop improvement starts with market forces and farmers, works up through National Agriculture Research Organizations and CGIAR groups, and feeds back into universities and private sectors. Debby presented three case studies where such interactions worked to produce tangible effects. She ended

her presentation stressing the need for young researchers to be involved with translational research, emphasizing that food production amounts need to increase by 70% to feed the world by 2050.

An example of a young scientist taking up this challenge is Jacqueline Benson, this year's recipient of the ASPB-Pioneer Hi-Bred Graduate Student Fellowship. During her research, Jacqueline identified a number of QTL that are associated with resistance to gray leaf spot, a disease in maize caused by a fungal pathogen resulting in yield loss in both the United States and Africa. Her interest in international agriculture led her to spend several weeks at the Kenyan Agricultural Research Institute genotyping maize inbreds that vary in resistance to gray leaf spot.

The Undergraduate Poster Session Exemplifies Quality Science

Even before the meeting was fully under way, scientific discussions were beginning to buzz in Minneapolis. The undergraduate poster session started Saturday morning with lots plethora of exciting posters and researchers ready to share their latest findings. Dr. Tuan-hua David Ho, immediate past

president of ASPB, welcomed the students and shared a personal story of how undergraduate research let him know he could do something right. He praised the Summer Undergraduate Research Fellowship (SURF) program for supporting two facets of research: "You have to participate in research, working at the bench to get something out of it, but once you get something, it doesn't stop there. You still have to communicate the science." The latter is why students are invited to show up and present their work as part of the SURF program. Tuan-hua David offered advice for how to navigate the conference: "Share your exciting information with someone else and enjoy all the exciting information that others have. This is the time that you don't need to worry about getting eight hours of sleep: enjoy yourself, talk with people, share the community effort." It was clear that the students were doing just that, as every poster session was crowded and students took this great opportunity to network with other ASPB members. The posters covered topics from detailed molecular mechanisms to the role of plants in mitigating the effects of global climate change. The techniques students used in their research included detailed phenotyping, proteomics, transcriptomics, systems biology, and bioinformatics, among many others.

One example of a research project

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that combined several techniques was that of Brittany Bauer of the University of Minnesota–Duluth. She explained her research in a poster titled “Identification, Cloning, and Characterization of a Lipid Transfer Protein Secreted in *Brassica rapa* Nectar.” During her research analyzing the proteins in nectar, Brittany identified and purified a 9 kDa protein that she determined was a lipid transfer protein. She suggested that this protein may be involved in preventing microbial growth and is currently investigating her hypothesis. Her exposure to research in this project developed into an interest in pursuing graduate work, particularly in plant pathogen responses.

The quality of science at these posters was impressive. Tuan-hua David recognized this in his welcome remarks, pointing out that one student had a manuscript accepted by

PNAS—something he wishes he could do! The high-quality science presented by the students was amazing! Everyone should attend the undergraduate poster sessions at the annual meetings to be prepared for how fast plant science will advance in the next few years as these students extend their research into careers in plants science.

In the first major symposium, Harvesting Bio-(Biological and Biochemical) Diversity, Sanwan Huang, from the Chinese Academy of Agricultural Sciences, presented a taste of what is possible with large-scale science. Sanwan described a massive and exciting undertaking at his academy, the 100 × 100 Plant Genome Project, along with some of the initial findings. This project is exploring the genomes of 100 plant species and 100 genotypes per species. By combining these two scales, he hopes to uncover a large portion of the natural variation in plants. The focus is on 60 species, which account for approximately 95% of crops planted. One example of the initial results is the sequencing of the potato genome, which has revealed insights into dicot evolution, including that the Asterids and Rosids diverged about 90 million years ago. Further, by comparing the potato genome to the tomato genome, Sanwan is identifying specific components of tuber biology, such as the twofold expansion of Kunitz-type protease inhibitor in potato, which is expressed highly in the tuber. Sanwan did have a bit of “good news, bad news” in his talk—the good news is that now sequencing is accessible and easy; the bad news is that almost all the easy genomes



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have been sequenced. But not to fear, his group is developing strategies for whole genome sequencing for complex genomes.

WORKSHOPS

Teaching Workshops Provide Practical Techniques and Goals for the Future of Biology Teaching

ASPB has a commitment to education at all levels: K-12, undergraduate, and graduate mentoring. In support of this commitment, two teaching-centered workshops were offered at this year's meeting. On Sunday, *The Plant Cell's* Teaching Tools in Plant Biology sponsored a lunch workshop focused on effective teaching approaches and tools. Mary Williams, current editor of Teaching Tools and former professor at Harvey Mudd College, as



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well as the recipient of this year's Excellence in Education Award, offered practical tools to assist with teaching plant biology. In the workshop, Mary put into practice the lesson she was presenting, engaging the participating members in the same way she encouraged them to engage their students. She offered simple steps to becoming an effective lecturer (for more details, visit <http://www.teachingtoolsinplantbiology.org>) and encouraged the audience to imagine the experience from the back row and take an approach that provides a warm-up

period, a lecture, and a cool-down period. End-of-lecture strategies that allow students to reflect on the lecture in different ways were presented and discussed. This workshop also covered how to define learning objectives, the importance of establishing them early, and the benefits of sharing them with the students. The presentation ended with some thoughts on lecture-free learning and methods to incorporate alternative teaching strategies. Mary's final piece of advice was to teach what you find interesting. Attendees of the workshop appreciated her practical approach. Anushree Sengupta, a graduate student at Penn State, welcomed the advice and examples of how to relate knowledge to students' broader experiences. As a teaching assistant, Anushree said she would recommend this workshop to anyone and felt the course could be extended to a whole day or even an entire weekend.

Looking at undergraduate teaching from a large-scale perspective, Implementing Vision & Change in Undergraduate Biology Education was a lunchtime workshop focused on mobilizing the biology community to transform undergraduate biology education. This workshop presented the question: Does the biology we teach reflect the biology we do? Moderated discussions at each table focused on aspects of how plant

biology can fit into a new vision of biological education and student-centered learning using multiple modes of learning (more details are available at <http://visionandchange.org>).

Technical Workshops Focus on Bioinformatic Tools and Genome Resources

Teaching wasn't the only skill Plant Biology 2011 attendees could sharpen at this year's meeting—several technical workshops were also available. The goal of the Agrisera/Environmental Proteomics Workshop was to enable attendees to produce clear, publishable, quantitative immunoblots. Moving from protein analysis to genome analysis, the TAIR workshop revealed how the incorporation of experimental next-generation sequencing contributes to genome annotation. The increasing availability of high-throughput sequencing and mass spectrometry data is changing the annotation of the Arabidopsis genome. Some 11% of the RNAseq annotations were new annotations for the Arabidopsis genome. For peptide analysis, 74% of the mass spectrometry annotations were previously unannotated in the Arabidopsis genome. Overall, 7,000 new isoforms were generated. All were hand curated and are now included in the TAIR 10.0 genome release.

The iPlant workshop focused on one of the collaboration's major objectives: help users keep pace. The speakers identified two major problems facing computational analysis in plant biology. First, there is a fragmentation of the landscape, individuals are

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separated by platform, and there is little ability to share results. Second, there is an exponential growth in the size of data. The rate of growth in sequencing is outpacing Moore's law, the nearly exponential rate of growth that describes processing power and memory capacity. To combat these two problems and help users keep pace, iPlant is implementing user-extensible cyber infrastructure, or in simpler terms, scalable resources. Some examples of these resources are iPlant's data store, with tools to easily move large amounts of data, and Atmosphere, iPlant's cloud computer server. The iPlant team encourages everyone to take advantage of these resources and to engage with them on implementation. Visit their wiki (<https://pods.iplantcollaborative.org/wiki/dashboard.action>); e-mail them with questions; contact them to arrange a phone meeting; or if you would like to train several people, host a workshop at your institution.

Workshop on Communication Styles That Promote Success

As Tuan-hua David said at the opening of the undergraduate research meeting, research at the bench is only half of science. Being able to communicate your ideas is also critical. In this workshop, Washington State University Academic Dean Kim Kidwell presented a workshop on Interpersonal Communication Skills. This workshop was hands-on, experiment-based,

and required active participation. The goal was for participants to leave with an approach and skill set to communicate successfully. "Our ability to communicate is key to personal and professional success," said Kim. "Life is about people and relationships: when relationships are good, even bad science can be tolerable; when relationships are bad, even good science can be no fun." Additional benefits of successful communication include awareness and empathy for diverse perspectives, the ability to stay in difficult conversations—building consensus among participants, building synergy among team members, and creating action plans for implementing solutions. Kim discussed sources of conflict and considerations to evaluate before engaging in conflict.

Biofuels and Energy

The President's Symposium wrapped up this year's meeting on Wednesday afternoon. Dr. Steve Koonin, Undersecretary of Energy for Science, presented his perspectives on alternative energy with "Views and Perspectives on the Path Forward to Alternative Energy: America's Energy Challenges: What Can Plant Biologists Do?" He outlined three U.S. energy challenges: (1) energy security, (2) competitiveness, and (3) environmental impacts. The differences between energy supply and energy demand translate into challenges in how technical advances are approached and how change is implemented. Koonin identified six major mechanisms



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to improve our energy situation. On the stationary side, deploy clean electricity, modernize the grid, and increase building and industrial efficiency. On the transport sector, deploy alternative fuels, progressively electrify the fleet, and increase vehicle efficiency. Plant biology has a role in tapping the huge unused potential of biomass, particularly for transportation needs where liquid fuel is not replaceable, such as heavy trucks, air, and sea transport. What can scientists do? Koonin encouraged the audience to advocate for basic research—and not just in one’s own field. Applications and spinoffs are as important as basic research. People need to take time to understand the bigger problems that will affect them as both citizens and scientists and advocate for sensible policies. Scientists have a particular ability to understand issues and advocate from a knowledgeable base.

Public Affairs Committee Workshop

How does one go about advocating for plant biology? For those interested, ASPB offered a workshop to answer just that question. Jim Siedow opened the workshop with a presentation of the history of the Public Affairs Committee, how and why the committee was organized, and the current aims of the committee. He explained how the committee took ASPB from an organization that no

one had heard of to the face of plant biology at the federal level. The theme of the workshop seemed to be: “If you are interested in participating, we are interested in having you participate and there is a lot you can do.” One key point of the workshop was that the voices of young scientists matter. Congress really wants to know what young people investing their career in science think. By meeting with your legislators, you make it personal and demonstrate that scientists are “real people working in real places on real problems.”

Hoedown

Tuesday night, Plant Biology 2011 attendees put on their cowboy boots and hats for the hoedown party. The event was a chance for everyone to show off the latest country dance moves and a final celebration in preparation for next year’s meeting in Austin, Texas.

Exhausted attendees headed home with knowledge of the latest scientific

discoveries in many areas of plant biology. Many also obtained a vision of how plant biology research contributes to addressing the world’s energy, climate, and food problems. Additionally, attendees who took advantage of the workshops likely went back to their labs with the practical tools necessary to integrate the latest scientific knowledge with their own research.



Colleen Doherty
University of California, San Diego



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These Boots Are
Made For Walkin'...
See You in Austin
for Plant Biology 2012
July 20-24, 2012



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Award Honorees

Congratulations to the winners of this year's ASPB awards. The following presentations were made during the Saturday, August 6, ASPB Awards Ceremony in Minneapolis, Minnesota.



ASPB President Nick Carpita presents the ASPB-Pioneer Hi-Bred Graduate Student Fellowship to Jacqueline Benson.
PHOTO BY NICOLE BURKART

ASPB-Pioneer Hi-Bred Graduate Student Fellowship

This award, made possible by the generosity of Pioneer Hi-Bred International (<http://www.pioneer.com>), recognizes and encourages innovative graduate research and innovation in areas of plant biology that relate to important commodity crops. One \$22,000 fellowship will be given annually from 2010 through 2013, with an additional \$1,000 awarded for the recipient to attend the ASPB annual meeting in the year of their award. Each nominee must attend a U.S.-accredited college or university and must demonstrate interest in the study of plant biology or a related discipline. Each nominee must be a PhD candidate (i.e., have successfully passed their preliminary examinations), must demonstrate an excellent academic record, and must be a member of ASPB. An individual may receive this prize only once.

Jacqueline Benson

Jacqueline Benson is the 2011 recipient of the ASPB-Pioneer Hi-Bred Graduate Student Fellowship. Jacqueline is a PhD student in Rebecca Nelson's laboratory in the department of Plant Breeding and Genetics at Cornell University. Her dissertation research focuses on understanding resistance to gray leaf spot (GLS) disease in maize. GLS, which is caused by the fungal pathogen *Cercospora*, is a devastating disease that causes widespread yield losses in the United States and Africa. Most maize inbreds are susceptible to GLS, and resistance is a quantitative trait, making development of resistant maize varieties a challenge. Using the 5000-line nested association mapping (NAM) maize population, Jacqueline has identified a number of QTL that are associated with GLS resistance. She has generated near-isogenic lines for three promising QTL in order to further refine the map locations of the underlying genes. She is also examining GLS disease progression at the histological level, which will allow her to better understand GLS and to develop an understanding of how individual QTL contribute to GLS resistance.

Jacqueline has a strong interest in international agriculture and hopes to develop markers that can be used for marker-assisted maize breeding programs. Toward that end, last year she spent several weeks at the Kenyan Agricultural Research Institute to genotype maize inbreds that vary in resistance to GLS and several other diseases. Jacqueline's long-term plans are to continue working at the interface between basic and applied science.

Charles Albert Shull Award

Created in 1971 to honor the Society's founding father and the first editor-in-chief of Plant Physiology, this award is designed to recognize young researchers. It is a monetary award made annually and is given for outstanding investigations in the field of plant biology by a scientist who is under 45 years of age on January 1 of the year of presentation, or who is fewer than 10 years from the granting of the doctoral degree. The recipient is invited to address the Society at the annual meeting the following year.



ASPB President Nick Carpita presents the Charles Albert Shull Award to Sean Cutler.
PHOTO BY NICOLE BURKART

Sean Cutler

While a PhD student at Stanford, Sean Cutler began to explore alternatives to mutant screens using GFP fusions to identify factors important in specific signaling processes. He quickly captured the potential of chemical genetics and the coupling of this approach with genomics. He obtained first-hand experience

in chemical biology during a postdoctoral period at The Scripps Research Institute and later as an assistant professor at both the University of Toronto and the University of California, Riverside, where he now resides as a recently tenured associate professor.

Sean's career in plant biology has had two major threads: abscisic acid (ABA) signaling and chemical genetics. His early work on the ERA1 gene was a landmark study in hormone signaling. However, because Sean is an excellent geneticist, he was one of the first to recognize the limitations of forward genetic screens, particularly with genomes that exhibit a high level of redundancy. This led him to use chemical genetics to study ABA signaling. In this very competitive field, Sean embraced a truly scientific approach by sharing his data with key competitors before publishing the results, followed by collaborating with his competitors. Notes one supporter, "This openness and willingness to trust frequently yields the best results and represents the best that science can offer!"

Sean's work resulted in a number of extremely important discoveries during the past five years and has had a tremendous impact on the work of his colleagues in the Arabidopsis community. In 2009, his research contribution was named by *Science* magazine as one of the top 10 breakthroughs of the year.

Sean's discoveries on the chemical genetics approach resulted in his creating a small molecule library, the components of which show biological action toward plants and other organisms. By sharing these chemical libraries freely with our community, Sean has had additional far-reaching impacts on plant biology. His work led to a groundbreaking discovery of a family of genetically redundant ABA receptors, which was a critical advance for plant biologists interested in hormone action, as ABA has remained one of the major plant hormones where a clear receptor candidate has not been identified.

Sean is active in professional activities and is known globally for his pioneering and seminal research. As another supporter notes, he "has the combination of skills that is almost unique among plant biologists, which places him in an elite group of young scientists who are future leaders in the field of hormone signaling."

Charles Reid Barnes Life Membership Award

This is the oldest award, established in 1925 at the first annual meeting of the Society through the generosity of Dr. Charles A. Shull. It honors Dr. Charles Reid Barnes, the first professor of plant physiology at the University of Chicago. It is an annual award for meritorious work in plant biology; it provides a life membership in the Society to an individual who is at least 60 years old. Membership is not a requirement for the award, and if appropriate, every fifth award should be made to an outstanding plant biologist from outside the United States.



Peter K. Hepler

Peter Hepler is an extraordinary cell biologist who received the PhD degree at the University of Wisconsin with Eldon H. Newcomb while providing evidence that microtubules could align cellulose microfibrils during secondary wall deposition. After a few years first at Harvard and then Stanford, he is spending his career at the University of Massachusetts, Amherst. With Barry Palevitz, he found guard cell cellulose orienting in the wall according to the underlying microtubule orientation, and with Eduardo Zeiger he isolated and cultured guard cell protoplasts for the first time. He and his coworkers also discovered cross-bridging between microtubules in the mitotic spindle, leading to a new model of chromosome movement. Soon he and his colleagues reported that cytoplasmic streaming was powered by actin and myosin working like muscle fibers, giving further insight into subcellular action. By the early 1980s, Peter began to investigate the small concentrations of Ca^{2+} acting as a second messenger but found large supplies in the ER when the cell plate was forming with

pectin and Ca^{2+} after cell division. To investigate this further, he turned to germinating pollen because growth was localized at the tip, and vesicles containing wall precursors were focused there. He soon found that growth occurred in pulses out of phase with the precursor steps, leading to a method to separate the steps in vivo. He and his colleagues recently traced the pulsing action to a release of pectin by exocytosis. He proposed that the periodic release accelerates then decelerates the growth rate of the pollen tube to account for the pulsing action. During this distinguished career, Peter served as an editor of *Plant Physiology* and *The Plant Cell* and with his colleagues has written several highly cited reviews while he continues his collaborations and participation in many conferences worldwide.

Corresponding Membership Award

This honor, initially given in 1932, provides life membership and Society publications to distinguished plant biologists from outside the United States. The honor is conferred by election on the annual ballot. The committee selects no more than three (3) candidates, and these are placed on the ballot for approval of corresponding membership by majority vote. The president notifies successful candidates of their election. Election of a corresponding member is to be considered each year, and held if warranted, provided the election will not increase the number of corresponding members beyond two (2) percent of the dues-paying membership.

Carlos S. Andreo

Carlos Andreo is director of the Center for Studies of Photosynthesis and Biochemistry and professor of biochemistry at the National University of Rosario, Argentina. He has an outstanding record of achievement for his research on the function of plant proteins that play key roles in the conversion of solar energy into organic matter through photosynthetic processes. Research in Carlos's laboratory has focused on carbon assimilation in C_4 plants and the properties of the enzymes that drive this process. Through his expertise in biochemistry, his laboratory has purified critical enzymes of C_4 metabolism and provided

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ASPB President Nick Carpita presents the Corresponding Membership Award to Carlos Andreo. PHOTO BY NICOLE BURKART



ASPB President Nick Carpita presents the Corresponding Membership Award to Jiayang Li. PHOTO BY NICOLE BURKART

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insight into the essential amino acids required for catalytic activity and identified important regulatory mechanisms including binding of effectors, chemical modifications, and controls of oligomerization of these enzymes. His research has contributed significantly to our understanding of the biochemistry of C_4 plants and how this cycle functions to allow these plants to achieve the highest rates of photosynthesis and growth in the plant kingdom.

Carlos received his undergraduate degree from the Centro de Investigaciones del Instituto Politécnico Nacional de México and his graduate degrees from the National University of Rosario. He completed a Fulbright

research fellowship at Washington State University and Rockefeller Biotechnological Career and Guggenheim fellowships at the University of Nebraska. At the University of Rosario he has served as professor and director of the Department of Biological Chemistry and began his term as director of the Center for Studies of Photosynthesis and Biochemistry in 2006. Carlos has been a visiting professor at numerous universities including Cornell University, the University of Osnabrück, Germany, the University Católica de Valparaíso, Chile, and Nagoya University, Japan. He has supervised more than 35 graduate students.

He is a member of the Executive Committee of the International Society of Photosynthesis and has been a member of ASPB for over 25 years.

Jiayang Li

Jiayang Li is a professor in the Institute of Genetics and Developmental Biology at the Chinese Academy of Sciences, Beijing. His laboratory is working to improve many facets of rice growth and development and has applied a diversity of genetic and biochemical approaches to its studies. Jiayang has identified important quantitative trait loci linked to unique facets of rice shoot and root architecture and identified rice mutants with defects in strigolactone, cell

wall, and starch biosynthesis. These efforts have resulted in important insights into the controls of rice growth and development as well as identification of strategies for improving the yield and quality of rice that have resulted in numerous articles in high-impact journals including *Nature*, *Nature Genetics*, *Proceedings of the National Academy of Sciences*, *Annual Review of Plant Biology*, and *The Plant Cell*.

Jiayang received his PhD from Brandeis University; his MS from the Institute of Genetics, Chinese Academy of Sciences, Beijing; and his BA from Anhui Agricultural College, Hefei, China. He completed postdoctoral research at the Boyce Thompson Institute. He has served as the director of the Institute of Genetics and the Institute of Genetics and Developmental Biology at the Chinese Academy of Sciences and in 2001 was named an “Academician” of the Chinese Academy of Sciences, which is equivalent to membership in the U.S. National Academy of Sciences. He became vice president of the Chinese Academy of Sciences in 2004 and has continued to run a productive research laboratory in addition to this full-time policy making position. He also serves as president of the Genetics Society of China and on advisory boards including the Biotechnology Advisory Panel of DuPont Corporation. He has served as an editor for a number of journals, including *Cell Research*, *Plant Molecular Biology*, *Plant and Cell Physiology*, and *Trends in Biotechnology*.

Early Career Award

The Early Career Award was instituted by the Society's executive committee in 2005 to recognize outstanding research by scientists at the beginning of their careers. This award is a monetary award made annually for exceptionally creative, independent contributions by a member of the Society who is not more than five years post-PhD on January 1st of the year of the presentation.

Ravi Maruthachalam

Ravi Maruthachalam, a postdoctoral fellow at the University of California, Davis, is recognized for his contributions in plant reproductive biology. Ravi completed his



ASPSP President Nick Carpita presents the Early Career Award to Ravi Maruthachalam. PHOTO BY NICOLE BURKART

undergraduate and master's education in agriculture with specialization in plant breeding and genetics at Tamil Nadu Agricultural University, India. His PhD research was with Dr. Imran Siddiqi, Centre for Cellular and Molecular Biology, Hyderabad, India. His most important findings were the first demonstration that alteration of a single gene (DYAD/SWITCH1) in a sexual plant can bring about functional apomeiosis, a major component of apomixis, and this was published in *Nature* in 2008. Ravi has continued to pursue his interests in understanding meiosis as a postdoctoral fellow with Simon Chan since 2008. At UC Davis, in a series of publications in high-impact journals (*Nature*, *Science*), Ravi published fundamental discoveries on centromeric function and synthetic clonal reproduction through seeds. The work has potential applications for engineering artificial apomixis in crop plants that cannot normally undergo this process, and for the development of hybrid cultivars. Ravi and his mentor Simon Chan have maintained a commitment to apply this technology for the improvement of crops in developing countries. For all of his achievements, Ravi Maruthachalam is recognized with the 2011 Early Career Award for exceptional creativity that has not only advanced understanding of basic mechanisms of cellular function, but also has great potential to impact plant breeding.

Eric E. Conn Young Investigator Award

The Eric E. Conn Young Investigator Award, first given by the Society in 2011, honors Eric E. Conn's contributions in plant biology by recognizing young scientists who will be inspired to follow in his footsteps. The award recognizes not only outstanding research but also demonstrated excellence in outreach, public service, mentoring, or teaching by plant scientists at the beginning of their careers. This award is a monetary award made biennially for demonstrated commitment by a member of the Society who is not more than five years post-PhD on January 1st of the year of the presentation. It also provides one year membership to the Society.



Eric Conn personally presented the Eric E. Conn Young Investigator Award to Hiroshi Maeda. PHOTO BY NICOLE BURKART

Hiroshi Maeda

Hiroshi Maeda is recognized both for his outstanding contributions in the fields of plant stress physiology and aromatic amino acid biosynthesis and for his active participation in activities that promote the inclusion of others in the process of research. In the research area, Hiroshi defined a novel cell-type specific function for tocopherols in source-to-sink sugar transport via phloem parenchyma transfer cells. He also discovered that plastid-synthesized tocopherols modulate polyunsaturated fatty acids in extra-plastidic membranes. This work was recognized by Hiroshi's selection for the Anton Lang Memorial Graduate Student Award at Michigan State University. His work in the field of amino acid biosynthesis

led to identification of the last undiscovered gene in phenylalanine biosynthesis encoding prephenate aminotransferase, an activity initially biochemically characterized and reported by Eric Conn's group in 1986. These studies also uncovered post-transcriptional regulation of the shikimate pathway, not previously identified. Hiroshi is the first author of significant publications in high-profile journals, including *The Plant Cell*, *Nature Chemical Biology*, *Plant Physiology*, and *Current Opinion in Plant Biology*. All three of his papers in *The Plant Cell* have been highlighted as featured articles depicted on the journal cover, receiving recognition as a Research Highlight in *Nature Chemical Biology*. Outside his research activities, Hiroshi has made significant contributions to public service, outreach, and mentoring. He initiated the Plant Biology Student/Postdoc Seminar Series at Purdue University. He also took an active role in the 2009 Gordon Research Seminar on Plant Metabolic Engineering that resulted in his election as the chair of the 2011 Gordon Research Seminar. He is committed to excellence in teaching and has mentored six undergraduate and two graduate students, teaching them to be independent researchers.

Excellence in Education Award

This award was initiated in 1988 to recognize outstanding teaching, mentoring, and/or educational outreach in plant biology. It is a monetary award to be made annually in recognition of excellence in teaching, leadership in curricular development, or authorship of effective teaching materials in the science of plant biology.

Mary Williams

Mary Williams has a long history as an outstanding plant biology educator. From 1995 to 2010, Mary excelled as a professor at Harvey Mudd College. During that time, she developed a variety of novel inquiry-based exercises for plant biology, physiology, and general biology, some of which were highlighted at professional conferences and adopted at other universities. She also

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chaired the Teaching and Learning Committee and worked to formalize mentoring programs that supported the teaching of junior faculty. Her plant biology research grants also created many opportunities for Harvey Mudd undergraduates.

Mary's service to the educational mission of ASPB has been extensive. She served on the Education Committee for five years and chaired it for two, during which time she secured a dedicated minisymposium for Education and Outreach, raised the profile of education posters, and reenergized the evening Education Workshop. She has also written numerous education articles for the *ASPB News* and coordinated the meeting of the Primarily Undergraduate Institutions (PUI) group at the ASPB annual meeting.

With collaborators on the Education Committee, she received a grant from the ASPB Education Foundation in 2007 to generate and pilot inquiry-based activities to illustrate the "12 Principles of Plant Biology" that are now publicly available for middle school and high school teachers around the country.

Mary currently serves as an honorary senior research fellow at the

University of Glasgow and is features editor for *The Plant Cell*, where she has primary responsibility for the journal's newest initiative, "Teaching Tools in Plant Biology." This project involves creating lectures on different subjects in plant biology that can be fashioned into individual lessons by educators around the world.

In summary, Mary has established herself as an outstanding plant biology educator and educational leader.



ASPB President Nick Carpita presents the Excellence in Education Award to Mary Williams.

Fellow of ASPB Award

Established in 2007, the Fellow of ASPB Award may be granted 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. Recipients of the Fellow of ASPB honor, which may be granted to no more than 0.2% of the current membership each year, receive a certificate of distinction and a lapel pin.



Bonnie Bartel
Rice University

Bonnie is recognized for her seminal research on microRNAs in plants and for characterizing the role of the endogenous auxin precursor, indole-3-butyric acid,

in auxin homeostasis and plant growth and development. Bonnie served on the Executive Committee from 2004 to 2007 and has been both a monitoring editor (2001–2003) and associate editor (2003 to present) of *Plant Physiology*. As an associate editor, Bonnie has helped organize several special issues of the journal. In addition, she has generously given her time to participate in ASPB mentoring workshops and to review the ASPB Summer Undergraduate Research Fellowship (SURF) awards.



Gerald Edwards
Washington State University

Gerry has an international reputation for his many major contributions to understanding photosynthetic carbon metabolism in higher

plants, especially characterizing the structural and biochemical diversity of C₄ species. In

2002, he was awarded the Charles F. Kettering Award for excellence in the field of photosynthesis. He has served ASPB as a member of the editorial board of *Plant Physiology* from 1981 to 1992, a member of the Publications Committee from 1987 to 1992, and the chair of the Charles F. Kettering Award Committee from 2005 to 2008.



Sheila McCormick
*Research Plant
Molecular Geneticist,
USDA/ARS-UC
Berkeley, Plant Gene
Expression Center*

Sheila is widely recognized for her research on plant reproduction, including the

bases of male and female gametophyte development, molecular basis of polarized pollen tube growth, and male–female interactions that underlie pollination and fertilization. She has served ASPB extensively through her role as associate editor (2005 to present), focus issue editor, and monitoring editor of *Plant Physiology* and by serving on and chairing the Stephen Hales Prize Committee (2010–2012). Sheila's commitment to improving science writing is also evident in the courses and workshops she has offered.



Katherine Osteryoung
*Michigan State
University*

Kathy is recognized for her pioneering studies of mechanisms underlying the control of organelle number and size.

She has identified a complex of interacting proteins, including plant-specific proteins, which regulate chloroplast division. She was a member of the ASPB Executive Committee from 2008 to 2011. She has been a monitoring editor of *Plant Physiology* (2005–2010) and is coeditor of a focus issue on Plastid Biology (2011). She has also served on the editorial

committee of *Annual Review of Plant Biology* (2006–2011) and on the Charles Reid Barnes Life Membership Award Committee, which she chaired in 2007–2008.



Linda Walling
*University of California,
Riverside*

Linda is recognized for her expertise in the areas of plant responses to wounding and plant–insect interactions. Her research has elucidated the roles of

wound-induced leucine aminopeptidases and the molecular responses of plants to white-fly infestation. She has been an active member of ASPB for nearly three decades, serving on the editorial board of *Plant Physiology* from 1989 to 1993 and as elected member of the Executive Committee from 2003 to 2006. Reflective of her passion for mentoring young scientists, Linda has generously contributed to numerous ASPB career development workshops.

Martin Gibbs Medal

The Martin Gibbs Medal was instituted by the Society's executive committee in 1993 to honor Martin Gibbs, editor of Plant Physiology from 1963 to 1992. The Gibbs Medal is presented biennially to an individual who has pioneered advances that have served to establish new directions of investigation in the plant sciences. The winner will receive the medal and will be invited to convene a Martin Gibbs Medal Symposium at the annual meeting of the following year.

Steve Kay

Steve's research program has centered on understanding the mechanism and regulation of biological clocks in both plants and animals. His early development of luciferase reporter and imaging techniques allowed him to identify clock mutant in *Arabidopsis*. The subsequent identification and cloning of the *TOC1* and *ZTL* genes initiated his progressive dissection of the plant clock and its many roles in transcriptional regulation of plant biology. Incorporation of biochemical techniques and genomics

approaches into his program provided the means to understand entrainment of the clock by light and other regulatory inputs, and the mechanisms that compensate for temperature and other environmental changes. Steve's laboratory continues to lead in defining the mechanistic relationships among components of the *Arabidopsis* clock in both genetic and biochemical detail.

It is noteworthy that Steve has also made comparably pioneering contributions to understanding photoreceptor and clock function in *Drosophila* and mice. In recognition of his broad scientific contributions, he was elected to the National Academy of Sciences in 2008 and as a fellow of the American Association for the Advancement of Science in 2009.

In addition to his research achievements,



ASPB President Nick Carpita (right) presents the Martin Gibbs Medal to Steve Kay.
PHOTO BY NICOLE BURKART

Steve is recognized as an exemplary citizen, someone who is willing to accept leadership and administrative tasks to advance the scientific community. Colleagues speak of him as an outstanding collaborator and mentor whose graduate students and postdoctoral fellows have gone on to make their own innovative contributions.

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Stephen Hales Prize

This award honors the Reverend Stephen Hales for his pioneering work in plant biology published in his 1727 book Vegetable Statics. It is a monetary award established in 1927 for a scientist, whether or not a member of the Society, who has served the science of plant biology in some noteworthy manner. The award is made annually. The recipient of the award is invited to address the Society on a subject in plant biology at the next annual meeting.

Susan Wessler

Sue Wessler is recognized for her continuing and outstanding contributions to plant science. Sue recently moved to UC Riverside, where she is a distinguished professor of genetics and holds the University of California Presidents Chair. She spent the previous 27 years of her career at the University of Georgia, where she most recently held the prestigious University of Georgia Foundation Chair in the Biological Sciences, which recognized both her scientific leadership and commitment to education.



During her career, Sue has made groundbreaking contributions to the field of transposon biology, specifically on the roles of transposable elements in gene and genome

evolution, an idea first proposed by Barbara McClintock. For example, Sue was the first to show that transposons can function as introns and that aberrant transposition events can lead to chromosome breakage and rearrangements. These contributions were recognized by her election to the National Academy of Sciences in 1998.

Since then, Sue's most significant contribution has been the discovery of miniature inverted repeat transposable elements (MITES), which she exploited in rice (at the time the only sequenced grass genome), and collaborations to develop the necessary bioinformatics tools for their analysis. In addition, she discovered PACK-MULE transposons in rice, which play important roles in gene shuffling and duplications and potentially produce genes with new functions. Her publication record is outstanding and will undoubtedly continue.

Sue has contributed extensively to educational initiatives, including coauthorship of a widely used genetics textbook, *Introduction to Genetic Analysis*, and the popular reference book *The Mutants of Maize*. As an HHMI professor, she has adapted what goes on in her research laboratory to an undergraduate teaching lab format, developing courses focusing on transposable elements in crop genomes.

Sue's service contributions are also exemplary and include serving as one of six associate editors of the *Proceedings of the National Academy of Sciences* and as a member of the board of directors of the Genetics Society of America. Sue has been an excellent mentor throughout her career and has served on numerous grant panels and advisory panels for other institutions. 



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Global Plant Council Forges Ahead

On June 28–29, the Global Plant Council (GPC) met in the beautiful city of Qingdao on the coast of eastern Shandong province in China. The GPC meeting was generously hosted by the Chinese Society of Plant Biology (CSPB) and expertly and smoothly organized by Professor Zuhua He, the secretary general of CSPB, and his team of capable assistants. Fourteen of the 20 GPC member societies were represented at the meeting, either by serving presidents or by the society's chosen representative.

The main focus of the meeting was to identify and discuss global challenges that human society is facing and for which a concerted action is needed from plant scientists around the world. The goal was to develop focused topic areas and a deployment strategy that would allow GPC to move forward into active participation in the global debates that can be informed and influenced by the work and talents of the plant science community: world hunger, human health and well-being, climate change, energy and biomaterials, and sustainability and environmental protection. During the meeting, GPC members decided that the best way forward was to generate two-page proposals to hold workshops on key issues related to global challenges and to seek funding for them. These workshops would bring together plant scientists, breeders, and other specialists from all over the globe with the necessary expertise to generate a road map as to how plant science can address, mitigate, or offer solutions for the issues that GPC plans to address.

The GPC identified nine key issues that it feels must be discussed and facilitated in the global plant community in greater depths. These nine key issues, in order of perceived priority for GPC action, are as follows.

- 1. Digital Seed Bank**—to provide a stable perpetuation of crop genetic diversity for future generations, initially focusing on those crops that provide most of the calories for the world food supply, by creating a digital database of genome sequences, phenotypic information, expression data, proteome and metabolome assessments, and so on, that would be open to all breeders and scientists and that would supplement physical long-term seed storage.
- 2. Local-Level Diversity and Yield Stability**—to provide a means by which breeding efforts targeted to specific environmental conditions, utilizing local germplasm that is being characterized around the world, can be facilitated and enhanced in the public sector.
- 3. Increasing/Enriching Agricultural Diversity**—to promote the deployment of underutilized seed and root crops and cropping systems that might have nutritional and environmental benefits, as well as a return to the farmers that are growing them.
- 4. Biofortification**—to advocate for development of new and existing crops that are more nutritious so that people receive the daily-required nutrients directly from unprocessed foods. Articulate what can be accomplished by conventional breeding and what might require alternative approaches, and advocate for open sharing of data and information regarding biofortification efforts.
- 5. The Plant Environment Metagenome**—to facilitate our understanding of the “whole plant” with a view toward crop improvement and sustainability. The “whole plant” includes not only the plant itself, but the entire microecology of interacting microorganisms within and upon its surfaces, both within an agricultural cropping system and in a natural environment.
- 6. Development of Medicinal Plant-Based Products**—to advocate ethnobotanical and natural product research and development of useful plant compounds for human health, as well as to establish the means by which new products can be efficiently tested and brought to market.
- 7. Species Information for Sustainable Adaptation Capability to Climate Change**—to explore/develop an approach toward facilitating natural and managed ecosystem adaptation to (or ameliorating the effects resulting from) changes in climate that are already taking place and to integrate existing plant interaction information into an ecosystem perspective for development of effective and predictive models.
- 8. Developing Perennial Rice/Wheat/Maize**—to promote a vision, where possible, for the conversion of current mega-crops to perennial forms to stabilize land use and inputs and to promote sustainability along with yield maintenance.
- 9. Sharing Information and Resources**—to develop a position statement for facilitating the global free exchange of information, phenotype and genotype data, and resources (including germplasm) that are in the public domain for approval by the GPC membership.

As you can imagine, each one of these topics and its perceived priority generated much spirited discussion within the group. GPC will now solicit input from plant scientists among all of the represented societies both during the development of the proposals and also as participants in the workshops once they are funded. Each member society will be asked to provide suggestions as to whom among their membership can provide expert and relevant input to these activities. GPC will also identify experts from other disciplines as needed for input and active participation to assure that GPC proposals and workshops will provide the best informed advice to the scientific commu-

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ASPB Seminar and Mentoring Program for Minority-Serving Institutions

The ASPB Minority Affairs Committee (MAC) sponsors an outreach program that provides funding for minority-serving institutions (MSIs) to host ASPB scientists who will present seminars, share their academic experiences, and mentor students. An important objective of the program, which is also supported by a grant to ASPB from the NSF, is to provide MSIs with access to scientists doing cutting-edge research in plant biology—scientists who can get the MSI students excited about plant biology. Of equal importance, the program allows ASPB scientists to mentor MSI students about career paths in science—whether academic, professional, or in industry.

Recently, MAC member John Harada, of the University of California, Davis, visited the University of Massachusetts, Boston (UMB). UMB is the most diverse public four-year higher education institution in New England: 42% of its students are students of color and 21% are under-represented minorities (URM). Also, 56% of UMB's undergraduate students are first-generation college students, 40% report speaking a language other than English at home, 86% receive financial aid, and 33% receive Pell grants. The visit was hosted by MAC member Adán Colón-Carmona, who is codirector of the NIH-funded Initiative for Maximizing Student Diversity (IMSD) Program and the Comprehensive Minority Institution/Cancer Center Partnership, a collaboration between UMB and the Dana Farber/Harvard Cancer Center. During the visit, John met with groups of between two to six students, most of whom were undergraduates; had lunch



Students Clarissa Sandoval, Celina Abundis, Katy Rivera, and Carlos Girón met with John Harada (second from right) during an ASPB-sponsored seminar and mentoring visit to the University of Massachusetts, Boston.

with students and faculty; and presented a seminar on a genomic dissection of seed development that was aimed primarily at an audience of upper-division undergraduate students. The perspectives of the visit from both the seminar speaker and the host are presented below.

Seminar Speaker John Harada

Most of the students with whom I met were part of the program administered by Adán, and they were involved in research projects, either on campus or at other universities in the Boston area that have joint programs with UMB. Therefore, a natural topic of conversation was the students' research projects. My discussions beyond research covered many areas, including the path that I took to get to my position as a professor and the opportunities that a higher degree would provide. The topic that dominated all of my discussions concerned how the students could best position themselves to gain entry into graduate schools.

A lasting impression of my visit was the difference between the UMB students with whom I spoke and those at my university.

Based on my discussions, it appeared that most of the UMB students work to support themselves and their families, and many are parents. They are frequently the first generation in their family to attend college, and they have families who are not familiar with the demands of academics and do not understand why students might need to move from Boston for graduate school. These students face many challenges not typically experienced by students at Research I universities.

Host Adán Colón-Carmona

What a wonderful opportunity to have someone like John Harada visit our campus. I teach plant physiology and discuss aspects of plant development, including the research from John's lab. To have the scientist whose lab produced the data that I discuss in my class visiting our campus was quite amazing. Students in my courses were able to put a face with the biology they were learning in class, and they were able to meet a world-renowned plant biologist. Mostly graduate and undergraduate students attend the Biology Department seminars at UMB. Although I do my best to schedule a couple of plant biology speakers every semester, being able to bring someone from afar is difficult. Therefore, the MAC and NSF funds for seminar speakers to visit an MSI provided an excellent opportunity for the whole UMB community to benefit from John's visit.

More important, John's visit provided a vehicle for me to coordinate his stay with the other professional development activities we schedule in conjunction with training activities of undergraduate programs we have on campus. Because our students all commute to campus and have busy lives, I scheduled a number of opportunities for them to speak with John aside from the seminar. I scheduled small group meetings and meals for John and URM undergraduates.

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nity, breeders and agricultural stakeholders, policy makers, and global organizations.

In addition to the development of these focused issue statements and action items, each member society reported on its own activities within the purview of the GPC mission. The list of activities is substantial, and the exchange opened up areas in which societies may choose to collaborate and maximize the impact of their individual programs. This is something that GPC will continue to promote and facilitate as a distinct value to our member societies.

Meanwhile, GPC is well along in the process of registering as a not-for-profit

organization, with our registration being implemented in Switzerland as a neutral base of operation. Our website, <http://www.globalplantcouncil.org>, is up and running, and we will continue to improve on its content and its utility. Suggestions are always welcome and should be directed to me. We will also continue to offer membership to plant science societies and other interested agricultural organizations around the world who have not yet signed up with GPC, and an active recruitment effort is under way.

The Botanical Society of Korea has kindly volunteered to host the next annual meeting of the Global Plant Council in Jeju, Korea, just prior to the IPMB Congress from October 21 through October 26, 2012.

I hope that this report on GPC's recent and ongoing activities will offer some insight into what the GPC is about, but should you require any further information, please visit our website or feel free to contact me. 

Mel Oliver
Executive Director
Global Plant Council
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ate students who are doing research and are considering graduate school. This provided students a chance to speak with someone who is not only a scientist, but also a plant biologist from a major research institution. They discussed the importance of continuing with a scientific career. As a faculty member leading efforts to increase URM participation in research on my campus, I believe it is paramount that we expose URM students to basic sciences, including plant biology.

Want to participate in the MSI seminar program?

MAC is recruiting ASPB members who are interested in broadening participation in plant biology and science in general, who

are doing excellent and exciting research, and who have strong communication and mentoring skills to take part in this program. Scientists interested in volunteering should send an e-mail to MAC chair MariaElena Zavala (mariaelena.zavala@csun.edu), stating their interest in the program, the title of their seminars (one of which might be research focused and the other of which may be more about career trajectories in science), and their activities in outreach. Volunteers selected by MAC will be listed on an ASPB web page to advertise their availability. We recommend that scientists selected to visit an MSI consult with their graduate recruiting office to learn of opportunities that can be passed along to MSI students during their visit. MSIs will be informed of the program and website. The institutions who wish to participate in the pro-

gram should initiate contact with the seminar speakers and apply to MAC for funding. Once approved, the MSI and ASPB scientist make arrangements for the seminar visit. 

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Members in the News

Stay up-to-date on news about plant science and ASPB members in the news by following ASPB's Plants in the News blog (<http://www.aspb.org/plantsinthenews>) and follow ASPB on Facebook (<http://facebook.com/myASPB>) and Twitter (<http://twitter.com/ASPB>).

Dominique Bergmann was featured as the "scientist to watch" in the June 2011 issue of *The Scientist* (<http://bit.ly/jluNkX>). She studies the molecular pathway of stomatal development to probe the concepts of cell polarity and asymmetry. This has been quite a year for Dominique, as she was recently named an HHMI-GBMF Investigator by the Howard Hughes Medical



Dominique Bergmann

Institute (HHMI) and Gordon and Betty More Foundation (GBMF), received a Presidential Early Career Award in Science and Engineering, and was honored with ASPB's 2010 Charles Albert Shull Award, delivering the award lecture at Plant Biology 2011. She is assistant professor of biology at Stanford University and an associate of the Stanford Institute for Stem Cell Biology and Regenerative Medicine. She has also served as a mentor for ASPB's Summer Undergraduate Research Fellowship (SURF) program.

Joe Ecker was honored with the George W. Beadle Award from the Genetics Society of America for outstanding contributions to the community of genetics researchers. He is recognized for his body of work on Arabidopsis, including serving as a "driving force" for the Arabidopsis Genome Sequencing Committee, and his pioneering discoveries on the role of ethylene. Joe was a guest on the August 8 episode of *Midday Edition*, a daily talk show on San Diego public radio station KPBS (<http://bit.ly/qM4643>). He discussed the promise of plant science and the recent mapping of *Arabidopsis thaliana*. He is a professor in the Plant Molecular and Cellular Biology Laboratory at the Salk Institute for Biological Studies and was recently named an HHMI-GBMF Investigator. He is



Joe Ecker

member of the National Academy of Sciences and received the academy's John J. Carty Award for the Advancement of Science in 2007. He is also the recipient of ASPB's 2005 Martin Gibbs Medal and was named one of the 50 Research Leaders of 2004 by *Scientific American*. Joe served as a monitoring editor for *Plant Physiology*.

Gonzalo M. Estavillo has received one of four Young Tall Poppy Science Awards from the Australian Institute of Policy & Science (AIPS) for the Australian Capital Territory (<http://bit.ly/pWnY7e>). He is a research associate in the laboratory of Professor Barry J. Pogson at Australian National University. The Tall Poppy Campaign was created by AIPS in 1998 to recognize and celebrate Australian intellectual and scientific excellence to inspire younger Australians to pursue science. Gonzalo was cited for his research on plant defense mechanisms as well as for his educational achievements, includ-



Gonzalo Estavillo

ing a set of experiments for second-year ANU students known as "The Plant Detectives." He has also received this year's Australian Society of Plant Scientists' Teaching Award.

Sarah Hake has been named as the Agricultural Research Service's (ARS's) Distinguished Senior Research Scientist

of 2010 in recognition of her work on plant genetic mechanisms (<http://bit.ly/jgnOt7>). In a news release announcing the award, ARS Administrator Edward Knipping said, "Her talent, skills, and achievements have broadened our understanding of basic plant biology and helped address the challenges associated with producing enough food in a world where the climate is changing and populations are on the rise." Sarah is director

of the ARS Plant Gene Expression Center in Albany, California. She is a member of the National Academy of Sciences and a fellow of AAAS. She received ASPB's Stephen Hales Prize in 2007



Ann Hirsch

and has served as a mentor for ASPB's SURF program. She was also a member of ASPB's Publications Committee and a coeditor for *The Plant Cell*.

Ann Hirsch has been named the 2011 recipient of the Botanical Society of America

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(BSA) Merit Award, BSA's highest honor (<http://bit.ly/ovTq6f>). Merit awardees are chosen based on their outstanding contributions to the BSA mission, including those who have demonstrated excellence in basic research, education, or public policy; or who have provided exceptional service to the professional botanical community; or who may have made contributions to a combination of these categories. Ann, who is professor of molecular, cell, and developmental biology at the University of California, Los Angeles, was recognized for her outstanding contributions in the research of plant-microbe interactions, bridging the interactions among genes, plant growth regulators, signal transductions, and microbes. She also has a long history of service to ASPB, serving as chair of the Women in Plant Biology Committee, as a member of the Education Committee and the Executive Committee, as a coeditor for *The Plant Cell*, and as a monitoring and associate editor for *Plant Physiology*. She was named to the inaugural class of Fellows of ASPB in 2007.

Ottoline Leyser wrote about her participation in SoapBox Science in a blog post on the website for *The Independent* (<http://bit.ly/nNehFW>). SoapBox Science is an event to encourage the participation of women in science sponsored by the London Zoological Society and the L'Oreal-UNESCO Women in Science program. Ottoline, and more than 10 other scientists, literally stood on boxes on London's South Bank to discuss science with passersby. She is professor of plant development and associate director of the Sainsbury Laboratory at the University of Cambridge. Ottoline is a fellow of the Royal Society and a member of EMBO, and she was appointed Commander of the Order of the British Empire in 2009. As the 2007 recipient of the Royal Society Rosalind Franklin Award, she



Ottoline Leyser



Sharon Long



Imara Perera



Pam Ronald

published *Mothers in Science: 64 Ways to Have It All*.

Sharon Long has been appointed by President Obama to the President's Committee on the National Medal of Science (<http://bit.ly/nUE1eX>). The committee helps the president evaluate the nominees for the medal, the nation's highest honor for U.S. scientists. Since its establishment in 1959, the National Medal of Science has been awarded to 468 distinguished scientists and engineers whose careers spanned decades of research and development. Sharon is the Steere-Pfizer Professor of Biological Sciences at Stanford University and previously served as Stanford's Dean of Humanities and Sciences and as an HHMI Investigator. She is a member of the National Academy of Sciences and a recipient of a MacArthur Fellowship and a Presidential Young Investigator Award. She received ASPB's Charles Albert Shull Award for young investigators in 1989 and was named to the inaugural class of ASPB Fellows in 2007. She has also served as a member of the editorial board for both *Plant Physiology* and *The Plant Cell*.

Imara Perera's research is out of this world—literally. Her experiment on the growth of plants in space hitched a ride to the International Space Station on the last Space Shuttle mission in August (<http://bit.ly/my25GW>). Her experiment may help future astronauts to grow their own food and use plants for oxygen in space. Her work has been picked up by a number of news venues, including WRAL-TV in Raleigh, *The*

Charlotte Observer, *The Fayetteville Observer*, the *Raleigh Public Record*, and LiveScience. Imara is a research assistant professor of plant biology at North Carolina State University.

Pam Ronald continues her outreach about plant biology, most recently contributing a guest blog post for *Scientific American* (<http://bit.ly/n6Vhjr>). The post, titled "Genetically Engineered Crops—What, How and Why," discusses the potential for genetically engineered crops to help feed a growing population without further damage to the environment and in the context of limited resources and a changing climate. Pam is professor of plant pathology at the University of California, Davis, and director of grass genetics for the Joint Bioenergy Institute. She is the coauthor, with her husband, of *Tomorrow's Table: Organic Farming, Genetics, and the Future of Food* and blogs at Tomorrow's Table. Pam is a former member and chair of the ASPB Public Affairs Committee.

Susan Singer has been honored as the 2011 recipient of BSA's Charles Edwin Bessey Teaching Award in recognition of her teaching and outstanding commitment to education (<http://bit.ly/qftUnZ>). She is the Laurence McKinley Gould Professor of the Natural Sciences at Carleton College and studies the evolution, genetics, and development of flowering in legumes and also does research on genomics learning. She also previously directed Carleton's Perlman Center for Learning and Teaching and served as a program officer at the National Science

Foundation. A member of numerous boards and committees related to science education, Susan currently serves as a member of the board of directors of the ASPB Education Foundation and was a member and chair of ASPB's Education Committee. She is a fellow of AAAS and received ASPB's Excellence in Teaching Award in 2004.



Susan Singer



Steven Strauss



Sue Wessler

Steven Strauss has received the prestigious Barrington-Moore Memorial Award from the Society of American Foresters in recognition of outstanding achievements in biological research leading to the advancement of forestry (<http://bit.ly/qUzOPr>). Steven, who is a university distinguished professor in the Department of Forest Ecosystems and Society at Oregon State University (OSU), has been a leader in forest biotechnology and created the Tree Biosafety and Genomics Research Cooperative. His work has led to the development of methods to reduced undesired gene flow from transgenic populations, helped improve public acceptance of biotechnology, and reduced environmental impacts. Steve also

holds a joint appointment in OSU's interdepartmental Molecular and Cellular Biology Program and directs the OSU Program for Outreach in Resource Biotechnology, aimed at promoting public understanding of biotechnology issues. He is a fellow of AAAS and has received the Institute of Forest Biotechnology's Forest Biotechnologist of the Year Award (2009), Oregon State University's Distinguished Professor Award (2008), and the Stanford Institute for the Environment's Leopold Leadership Fellow Award in 2005. He is also a three-time recipient of outreach and education grants from the ASPB Education Foundation.

Susan Wessler has been named the recipient of the FASEB 2012 Excellence in Science Award from the Federation of American Societies for Experimental Biol-

ogy (<http://bit.ly/lxvdIu>). The award recognizes women whose outstanding career achievements in biological science have contributed significantly to further our understanding of a particular discipline by excellence in research. Sue is distinguished professor of genetics at the University of California, Riverside, where she conducts

research on plant transposable elements. She is a member of the National Academy of Sciences and recently began a four-year term as the academy's home secretary. Sue is also a fellow of AAAS and the American Academy of Arts and Sciences and the recipient of ASPB's 2011 Stephen Hales Prize. Long committed to education, she is a former HHMI professor and a current member of ASPB's Education Committee. She has also served as coeditor of *The Plant Cell* and associate editor of *Plant Physiology*. 

Compiled by Adam P. Fagen, PhD
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Brief Information About Individual Programs

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

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

Award From \$1,000 to \$6,000.

Deadlines October 1, December 1; notification in February and April.

Lewis and Clark Fund for Exploration and Field Research

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

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

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

Deadline February 1; notification in May.

Lewis and Clark Fund for Exploration and Field Research in Astrobiology

Scope The American Philosophical Society and the NASA Astrobiology Institute have partnered to promote the continued exploration of the world around us through a new program of research grants in support of astrobiological field studies undertaken by graduate students and by post-doctoral and junior scientists and scholars.

Eligibility Grants will be available to graduate students, postdoctoral students, and junior scientists who wish to participate in field studies for their theses or for other purposes. Undergraduates are not eligible.

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

Deadline February 1; notification in May.

Information updated July 2011.

Information About All Programs

Purpose, scope

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

Eligibility

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

Tax information

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

Contact information

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



Membership Corner

ASPB members share a common goal of promoting the growth, development, and outreach of plant biology as a pure and applied science. This column features some of the dedicated and innovative members of ASPB who believe that membership in our Society is crucial to the future of plant biology. If you are interested in contributing to this feature, please contact ASPB Membership at info@aspb.org.



Name: Devaiah Kambiranda

Title: Research Associate

Place of Work or School: Florida A&M University

Research Area: Plant physiology and molecular breeding of grapes and raspberry

Member since: June 2009

1. Has being a member of ASPB helped you in your career? If so, how?

It has been great to be a part of a society devoted to plant biology. I have been reading *Plant Physiology* and *The Plant Cell* to learn new information regarding plant science. ASPB also has a list of nearly 5,000 members in its directory, which is helpful for communicating and networking.

2. Why has being a member of ASPB been important?

For plant scientists, including myself, ASPB provides opportunities to present research to fellow scientists in the same fields. This allows us to learn what other plant biologists are doing and to understand applications of the most recent technologies in plant science.

3. Was someone instrumental in getting you to join ASPB?

Yes, many colleagues are members of ASPB. I wanted to join ASPB since grad school.

4. What would you tell nonmembers to encourage them to join?

ASPB has a unique network of plant biologists—if you want to connect to them, join ASPB. I would tell them that being a member of ASPB is important for their career in plant biology. There are opportunities to interact with other plant scientists through various ASPB meetings.

5. Have you found a job or hired anyone using ASPB job postings or networking at the annual meeting?

Yes, I found a job through ASPB job postings. Once I have my working group, I definitely will use this facility for hiring.

6. Do you still read print journals? If so, where do you usually read them: work, home, library, in the car, or on the bus?

I rarely read print journals. Most often, I access journals on the web.

7. Have there been any issues in plant biology in which you thought ASPB should be involved or that led you to consider becoming active in the governance of the Society, and if so, what were they?

No.

8. What could ASPB do better?

ASPB, as one of the world's top organizations in plant biology, should try to provide additional travel grants for students and researchers from developing countries so that they can participate in annual meetings and meet fellow plant biologists.

9. What do you see as the most important role for scientific societies such as ASPB?

The most important role is to develop programs and curricula that encour-

age undergraduate students to join plant biology.

10. What advice would you give to a plant scientist just starting out?

Choose plant science—it is one of the most exciting areas of research in biology.

11. What do you think is the most important discovery in plant biology over the past year, and why?

I think studies on ABA receptors in plants and the discovery of pyrabactin that can switch on ABA receptors is one of the important discoveries. For decades, scientists have explored ABA receptors without much success. If a chemical can activate the receptors, it could be used widely in agriculture.

12. What do you think is the next “big thing” in plant biology?

I believe the next big thing is studying gene regulation by small RNAs.

13. What are you reading these days?

I am reading publications on gene expression during fruit development and proteomics.

14. What do you still have left to learn?

The process of learning never ends. 🍷



This column provides just a small sample of the content from ASPB public affairs, including material provided by ASPB's government relations consultants, Lewis-Burke Associates LLC. Also be sure to check out the ASPB Washington Report, Plant Biology Policy blog, Funding Opportunities blog, and Plants in the News blog. Please visit <http://www.aspb.org/publicaffairs> for the most up-to-date news.

Changes to NSF Biological Sciences Proposals May Limit Applications

Several divisions in the National Science Foundation's Biological Sciences Directorate are implementing new mechanisms for submitting grant proposals to the core programs.

The core programs in the Division of Integrative Organismal Systems (IOS) and Division of Environmental Biology (DEB) will be implementing an annual cycle of preliminary and full proposals (<http://bit.ly/r40N9V>). Prospective grantees will submit preliminary core proposals beginning in January 2012. Following review by a panel of outside experts, each applicant will be notified of a binding decision to *Invite* or *Not Invite* submission of a full proposal. Each investigator is limited to submitting two preliminary proposals a year to either division, whether as a principal investigator, co-PI, or lead senior investigator of a subaward.

All proposals submitted to DEB or IOS in response to the core program solicitations and several other programs must pass the preliminary proposal stage. Please check the program solicitation carefully for the changes to your programs.

In addition, the Division of Molecular and Cellular Biosciences (MCB) is moving from a six-month cycle to an eight-month cycle for its four core clusters: biomolecular dynamics, structure, and function; cellular processes; genetic mechanisms; and networks and regulation (<http://bit.ly/kpmEAQ>). Investigators may only submit one proposal per cycle as a PI or co-PI.

One goal of these new procedures is to reduce the burdens on the PI and reviewer communities associated with intensifying competition for limited funds. A second

is to better manage proposal processing in the face of growing proposal submission numbers while maintaining the high quality of the merit review process and resulting funding selections.

What do you think of these changes? E-mail afagen@aspb.org with your thoughts and potential impacts—positive and negative—on your own research and career.

Pam Ronald Delivers AAAS Valentine Lecture

On June 21, ASPB member Pamela Ronald, of the University of California, Davis, delivered the Charles Valentine Riley Memorial Lecture at the American Association for the Advancement of Science (AAAS) in Washington, D.C. She described the need to utilize new agricultural technologies—along with sustainable farming methods—to feed a growing human population with increasingly limited resources. Food production for a growing population—expected to exceed 9 billion by 2050—will have to be done on essentially the same land area while using less water.

Genetically improved crops can be much more limited in their use of water or pesticides. For example, China decreased its insecticide use by 156 million pounds following the introduction of Bt cotton. And there are varieties of rice that are tolerant of floods, especially important since a quarter of the world's rice—a staple crop for 3 billion people—is grown in flood-prone areas.

Pam argued that concerns about genetic engineering are not based on evidence. "After 14 years of cultivation and a cumulative total of nearly 2 billion acres planted," she said, "not a single instance of harm to human health or the environment has resulted from commercialization of genetically

To keep up-to-date on ASPB's public affairs activities, please join the Public Affairs group (<http://www.aspb.org/publicaffairs>) on the ASPB website and look for us on Facebook (<http://facebook.com/myASPB>) and Twitter (<http://twitter.com/ASPB>).

engineered crops." All methods of breeding introduce genetic changes with a risk of unintended sequences, so regulation should focus on the characteristics of the variety, not the mechanism for creating it.

Following Pam's talk, there was a discussion moderated by ASPB member and current AAAS President Nina Fedoroff. Panelists included Michael Clegg, Donald Bren Professor of Biological Sciences at the University of California, Irvine, and foreign secretary of the National Academy of Sciences; L. Val Giddings, senior fellow for innovation and research and development at the Information Technology and Innovation Foundation; John D. Hardin, Jr., owner of Hardin Farms; and Mark Rosegrant, director of the Environment and Production Technology Division for the International Food Policy Research Institute.

This is the second year for the Valentine Lecture; the inaugural speaker last year was ASPB member Roger Beachy, who spoke when he was still director of USDA's National Institute of Food and Agriculture.

HHS Releases Final Financial Conflict of Interest Rule

On August 23, the U.S. Department of Health and Human Services (HHS) issued the final rule amending the agency's extramural financial conflict of interest policy. The final rule shifts responsibility for reporting a significant financial interest to HHS from the investigator to the institution. This

marks the first time the rule has been revised since the policy was promulgated in 1995. This rule will also affect recipients of National Institutes of Health (NIH) funding, as the agency resides within HHS. Major changes to the 1995 rule include the following:

- a requirement for investigators to disclose all of their significant financial interests related to their institutional responsibilities to their institutions;
- a lowering of the monetary threshold requiring disclosure from \$10,000 to \$5,000;
- a requirement for institutions to report to the Public Health Service additional information on identified financial conflicts of interest and how they are being managed;
- increased flexibility for reporting of travel reimbursements, a point advocated for by the extramural community;
- a requirement for institutions to make certain information concerning identified significant financial interests held by senior/key personnel accessible to the public; and
- a requirement that investigators complete training related to these regulations and their institution's financial conflict of interest policy.

The rule becomes effective within 30 days of its publication in the *Federal Register*, and grantees are expected to be in compliance by August 24, 2012.

Impact of Debt Ceiling Increase on Science and Education

In August, the U.S. Congress passed the bipartisan Budget Control Act of 2011 with a vote of 74–26 in the Senate and 269–161 in the House. The bill raised the nation's debt ceiling, thus preventing a possible government default on August 2.

Members of the ASPB community may be curious about the impact of this bill on the scientific and educational communities. Here are some key takeaways:

- The Budget Control Act of 2011 largely resembles recent proposals introduced by House Republicans and Senate Democrats in capping discretionary spending for the next 10 years and requiring future deficit reduction to be determined by a joint congressional committee and approved by Congress by December 23, 2011.
- The discretionary spending cap for fiscal year (FY) 2012 would be \$24 billion above the levels currently governing the House appropriations bills. The agreement, however, would establish “firewalls” around security and nonsecurity spending so that funding could not be redistributed between the two categories of spending.
- While the plan would not initially cut federal science and education programs, these and other programs subject to annual appropriations could be subject to funding cuts in the deficit reduction package that must pass Congress before the end of 2011.

The bill would cap discretionary spending levels at \$1.043 trillion in FY2012, a slight reduction from FY2011. Caps on discretionary spending would gradually increase to \$1.234 trillion by FY2021 and save an estimated \$917 billion over that time frame. The firewall around security spending would include funding for the Department of Defense, the Department of Homeland Security, the Department of Veterans Affairs, the National Nuclear Security Administration, the intelligence community management account, and Function 150 programs (State Department and international assistance).

The bill allowed the president to raise the debt ceiling by \$400 billion in August and by another \$500 billion after that. Future increases in the debt ceiling, which will be required by the end of 2011, would be subject to passage of another \$1.2 trillion to \$1.5 trillion in deficit reduction over the next nine years, which may include both

spending cuts and revenue raisers. Should Congress fail to pass a deficit reduction measure by December 23 that reduces the deficit by at least \$1.2 trillion, the bill would force across-the-board cuts totaling \$1.2 trillion. Such cuts would be equally divided between security and nonsecurity programs to provide incentive for both Republicans and Democrats to broker a deal. Social Security, Medicaid, veterans' benefits, and other essential benefits would be exempt from cuts. Cuts to Medicare are capped at 2% and are limited to funding for providers.

Finally, the bill includes a provision requiring both the House and the Senate to vote on a balanced budget amendment to the Constitution before the end of the year. The debt limit increase, however, is not contingent on passage of the amendment, as it was in an earlier House version of this legislation.

NIH Study Shows Black Scientists Less Likely to Win Federal Research Grants

A study commissioned by the National Institutes of Health (NIH) has revealed that black scientists are less likely to receive an NIH grant than white scientists, even after controlling for differences in institutions and academic track records (<http://bit.ly/osNalt>). The results of the study by Ginther et al.—conducted by researchers at the University of Kansas, NIH, and Discovery Logic/Thomson Reuters—were published in the August 19 issue of *Science*.

According to the study of 83,000 grant applications from 2000 to 2006, the success rate for white scientists was about 29%, but only 16% for black scientists. Even after controlling for statistical differences between the pools (applicants' educational background, country of origin, training, previous research awards, publication record, and employer characteristics), the gap was still about 10%.

The prevailing view seems to be that these findings are not a result of overt racism. Rather, it may be an example of unconscious bias or an effect of black scientists' tending to

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keep a lower scientific profile. Even though applicants' race and ethnicity are not shared with study sections, Ginther et al. speculate that reviewers often know the applicant, and it is often not difficult to determine the applicant's race from characteristics such as his or her name or academic history. There may also be differences in the quality of educational and mentoring experiences; Ginther et al. argue that even small differences may accumulate to have large cumulative effects.

Another troubling finding is that black PhD scientists were also significantly underrepresented in the pool of proposals for R01 awards, NIH's main investigator-initiated research grant mechanism. Black scientists submitted only 1.4% of all R01 applications, compared with 3.2% for Hispanics and 16% for Asians. This means that only 185 of the 23,400 R01 grants in the study went to black scientists.

NIH has announced that it has established two task forces to follow up on the study and conduct experiments such as reviewing applications with the names of the applicant and institution removed. The agency will also recruit more early-career researchers and scientists of color to serve on review panels, providing them with a better understanding of how to write successful proposals.

The study did not find statistically significant differences for Hispanic or Asian scientists, once controlling for language difficulties.

NSF Releases Draft Plan for Implementation of Scientific Integrity Principles

On August 4, NSF released a draft version of its scientific integrity policy for public comment and review. The draft policy, which would affect NSF employees, contractors, and grantees, incorporates recommendations from President Obama and the White House Office of Science and Technology Policy. Among the provisions of the draft policy, the document addresses ethical conduct in the

merit review process, research misconduct, and protection for whistle-blowers.

Highlights of the draft scientific integrity guidelines include the following:

- NSF grantees and staff may express their views as private citizens, but they must specify that they are not speaking on behalf of or as representatives of NSF.
- NSF plans to revise the way it accepts suggestions for members of its Federal Advisory Committee and will issue a *Federal Register* notice at least once a year to notify a wider community about the NSF advisory committees.
- NSF staff are permitted to attend scientific outreach activities, participate in educational institutions and scientific or professional societies, and serve on an editorial board, as long as written permission is obtained by the staff's supervisor or ethics counselor.

Additional information, including the NSF draft plan, is available at <http://1.usa.gov/pbMy41>.

Selected Funding Opportunities

- *NSF/Gates Foundation: Basic Research to Enable Agricultural Development (BREAD)* to support innovative basic scientific research designed to address key constraints to small-holder agriculture in the developing world—<http://bit.ly/oQf62Z>
- *NSF: Innovation Corps (I-Corps)* to assess the readiness of emerging technology concepts for transitioning into valuable new products through a public-private partnership—<http://bit.ly/oXATpZ>
- *NSF: Industry/University Cooperative Research Centers Program (I/UCRC)* to develop long-term partnerships among industry, academe, and government—<http://bit.ly/mVhJXd>
- *NSF: Advances in Biological Informatics (ABI)* to encourage new approaches to the analysis and dissemination of biological knowledge for the benefit of both the

scientific community and the broader public—<http://bit.ly/nnvQqe>

- *NSF: Research Coordination Networks (RCN)* to advance a field or create new directions in research or education—<http://bit.ly/qBtUBh>
- *NIH Director's Pioneer Award Program* to support individual scientists of exceptional creativity who propose pioneering—and possibly transforming—approaches to major challenges in biomedical and behavioral research—<http://bit.ly/pEOX4Y>
- *NIH Director's New Innovator Award Program* to support exceptionally creative new investigators who propose highly innovative projects that have the potential for unusually high impact—<http://bit.ly/r2SVDc>
- *Fulbright/USIEF: Obama-Singh 21st Century Knowledge Initiative* to strengthen collaboration and build partnerships between American and Indian institutions of higher education—<http://bit.ly/pzvU3g>

To stay up-to-date on funding opportunities, see the *Funding Opportunities in Plant Biology* blog at <http://www.aspb.org/fundingblog>; e-mail subscription and RSS feed are available. 

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Advocacy 101: Stand Up for Plant Science Public Affairs Workshop: Becoming an Effective Advocate for Plant Biology

It seems especially appropriate that an organization of plant biologists would have a strong grassroots network to call upon in standing up for plant science. That was the motivation for the Public Affairs Workshop at Plant Biology 2011, which engaged a committed group of university faculty, postdoctoral researchers, and graduate students in a conversation about public advocacy for plant biology.

The session began with a brief history of public affairs at ASPB by Jim Siedow, a current member of the Public Affairs Committee and Society leader when ASPB jumped into advocacy in the early 1990s. Jim highlighted the beginnings of the committee, including trips to Washington with fellow ASPB members Roger Beachy, Sharon Long, and Hans Kende. Their successes in influencing public funding for plant biology research and desire for an increased Washington presence for ASPB led to the hiring of the first ASPB public affairs director in 1993.

Since those early days, ASPB has maintained its presence in Washington, now under the direction of Adam Fagen. ASPB has also brought on Lewis-Burke Associates, a government relations firm specializing in research and education, to enable the Society to be as active and effective as possible in taking advantage of opportunities to promote plant science. April Burke, founder and president of Lewis-Burke, gave her view on the present state of plant science funding in Washington: while the outlook is bleak for many government-funded programs, she believes that funding of plant science research will likely be largely spared. However, the plant science community should not rest on its laurels, but must be proactive in engaging a Congress and a public concerned about government spending. Therefore, it is crucial for members to get involved and convince

the public of the benefits of plant science research. Moreover, ASPB must continue to play a leadership role as a voice for plant biology to the federal government. April emphasized that it is a time of opportunity as well as challenge, and ASPB is working to take full advantage of opportunities to promote the interests of the membership.

Bridget Glynn, April's colleague at Lewis-Burke, followed up with tips for communicating with legislators, making the case for robust funding of scientific research and plant biology in particular (see side bar). As many members will know, research in plant science is supported by funding from several federal agencies, including the National Science Foundation, the Department of Energy, the Department of Agriculture, and the National Institutes of Health. Funding levels for each agency—and subunits within the agency—are set by Congress. Your legislators need to hear from you, their constituents, about why this support is necessary. Effective and regular communication with your elected senators, representative, and their staff is vital to maintain funding for scientific research and to ensure science plays a role in the policy-making process. ASPB plays an active role, but legislators want to hear from those who put them in office—and who could vote them out.

There are many ways for you to get involved in advocacy through ASPB at each level, whether you're still in training or nearing retirement, in industry or academia. For more information on what you can do, please visit <http://www.aspb.org/publicaffairs> or contact ASPB's public affairs director Adam Fagen at afagen@aspb.org.

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kmunkvold@aspb.org



Jim Siedow gives a history of ASPB's engagement in public affairs.

PHOTO BY NICOLE BURKART

Tips for Communicating with Congress

Meeting with your members of Congress is easier than you think! Just follow the simple steps below.

Options for scheduling a meeting

- Request a meeting with your member of Congress in your home state during a district work period or with the staffer who handles scientific research or appropriations issues.
- E-mail and fax an invitation on letterhead to the district scheduler inviting your member of Congress to visit your university/institute/laboratory. Tips and format for writing a letter are available at <http://www.aspb.org/publicaffairs/editorial/congress.cfm>.
- If you are traveling to the Washington, D.C., area and would like to meet with your representatives or relevant staff at their Capitol Hill office, ask for the appropriate D.C. contacts instead of those in the district office. Be sure to let ASPB's Public Affairs Director Adam Fagen (afagen@aspb.org) know you are coming!

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ASPB Member Pat Schnable Gives Capitol Hill Seminar on the Future of Our Food

Pat Schnable, ASPB Public Affairs Committee member and Baker Professor of Agronomy at Iowa State University, addressed a standing-room-only crowd of congressional staffers, agency representatives, and others interested in scientific research in a hearing room for the U.S. House of Representatives Committee on Agriculture. The presentation was part of the National Coalition for Food and Agriculture Research's (National C-FAR; <http://www.ncfar.org>) "Lunch~N~Learn" seminar series.

The seminar, titled "Mapping for the Future of Our Food," focused on the importance of public-sector funding for plant science research and development in boosting crop yields amid increasing demands for plant-based products including food, feed, fiber, and fuel. Pat called for innovation in addressing potential challenges, namely decreasing

amounts of arable land, increasing costs and undesirable ecological impacts of agricultural inputs, and coping with climate variability.

Pat highlighted the value of next-generation sequencing technologies in linking genes to crop traits, resulting in ultimate improvements in yield, disease and pest resistance, and nutrient utilization. He sees traditional breeding and genetic engineering as complementary approaches in meeting this goal. He stressed that U.S. involvement in agricultural research is essential. In the absence of federal support for scientific research in these areas, other countries have the means to do this research and will profit in areas such as intellectual property—including patents on genes associated with beneficial traits—and job growth at the expense of the U.S. economy. He emphasized that the time between the initial research and a finished



Pat Schnable on Capitol Hill

crop variety displaying an enhanced trait is on the scale of a decade or more—so now is the time to make continuous public investments to address anticipated challenges ahead. 🌱

Kathy R. Munkvold, PhD
 ASPB Plant Science Policy Fellow
 kmunkvold@aspb.org

Please let us know if you will be delivering seminars or briefings to policy makers so we can highlight your participation in the *ASPB News* and on the ASPB website.

Debby Delmer Receives ASPB Leadership in Science Public Service Award, Highlights Importance of Translational Research

Former ASPB president Deborah Delmer was selected as this year's recipient of the ASPB Leadership in Science Public Service Award both for her distinguished research career studying cellulose biosynthesis and her commitment to public service in science. After a faculty career at the University of California, Davis, Debby has also served in leadership and consulting roles for the National Science Foundation (NSF), the Rockefeller Foundation, and the Bill & Melinda Gates Foundation.

Debby began her award lecture at Plant Biology 2011 by describing her motivation to transition from basic research to a service-oriented position. In 2001, while still in the

midst of an accomplished career in research, she was reminded of her father's words on combining a fascination with science with helping people in his profession as a doctor. She began to feel a similar urge to more directly contribute to the needs of society with her plant science expertise and took a position as associate director for food security at the Rockefeller Foundation. Even after leaving Rockefeller, she has continued to consult on issues of plant science and food security for the Gates Foundation. She also served as



Debby Delmer receives the ASPB Leadership in Science Public Service Award from ASPB President Nick Carpita (left) and Public Affairs Committee chair Richard Sayre.

PHOTO BY NICOLE BURKART

the inaugural program manager for the BREAD (Basic Research to Enable Agricultural Development) program, which is jointly sponsored by NSF and the Gates Foundation.

Since leaving academic research, Debby has witnessed the impacts of plant science translational research on agriculture in developing nations from submergence tolerance in rice to integration of the Bt toxin gene into cowpea in West Africa. She emphasized the progress made with traditional breeding due to marker-assisted selection and next-generation sequencing technologies, as well as the potential impacts of work on genome elimination in accelerating the breeding process.

The future of agriculture in developing nations faces many challenges, many of which lie outside the scope of plant biology research, involving communication, energy, water rights, and land ownership issues. Still, Debby remains optimistic. Field trials are now under way for genetically engineered crop plants in Africa, and continued collaborations among industry, academia, and private and public research sponsors to improve agriculture in the developing world will move us toward our goals to feed a growing global population.

Debby was ASPB president in 1999–2000 and also served as chair of ASPB's International Committee. She was named to the inaugural class of ASPB Fellows and was a monitoring editor for *Plant Physiology*. She was elected to membership in the National Academy of Sciences in 2004.

The Leadership in Science Public Service Award is bestowed annually by the ASPB Public Affairs Committee, with the recipient delivering an address at the annual meeting. See http://my.aspb.org/?PublicAff_Leadership for information about submitting nominations as well as a list of previous recipients. 

Kathy R. Munkvold, PhD
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Communicating with Congress *continued from page 39*

The contact information for the D.C. and district offices of your representative and senators can be found at <http://www.house.gov> and <http://www.senate.gov>.

The meeting

In advance

- Contact your university's government relations office about the meeting.
- Develop talking points and a 30-second "elevator speech" with your key message.
- Prepare a simple (nontechnical) one-page, leave-behind handout that explains your research/program.
- Research the members of Congress with whom you'll be meeting, including their voting record (<http://thomas.gov>).
- Wear business attire (a business suit and comfortable shoes).
- Be on time for your meeting, but be prepared to wait.

What to do and say

- Introduce yourself, state your affiliation, and have a business card for the member of Congress and each staff member. Remember to use correct titles (i.e., Senator or Representative).
- Consider bringing a background document on plant biology from ASPB (available at <http://www.aspb.org/publicaffairs>).
- Offer a short description of your research and your reason for being there—what you hope to achieve from the conversation (e.g., the member's support for science funding).

- Assume a nonscientist audience and highlight the broader impacts of your research. Tell a compelling story. Make it personal, if appropriate.
- Tie it home to the district. For example, how many jobs will be created? What is the economic impact of the research?
- Anticipate questions that you may be asked and have concise answers in mind.
- If asked a question and you don't know the answer, don't speculate; say that you will find out and get back with the answer—and do so promptly.
- If you are in a group, select a group leader. Take turns speaking briefly.
- Do not engage in a debate or be negative. Be careful not to denigrate other programs or suggest that support for another program be reduced in order to fund your priority.
- Remember: you may be the science expert, but members of Congress and their staff are the policy experts.
- Also remember that members of Congress consider many factors when making a decision and must balance often-competing priorities and conflicting advice.

The follow-up

- Say thank you and follow up within 48 hours.
- Provide any answers to questions that were not answered in the meeting.
- Continue communication in the future. 



Kindred Spirits: Sharing Research and Instruction Ideas for Faculty at Primarily Undergraduate Institutions

When I was first asked to host the Primarily Undergraduate Institution (PUI) networking event at Plant Biology 2011 in Minneapolis, I will confess that I hesitated. I knew that the event had been a tradition at ASPB annual meetings for many years and had been hosted by a number of well-known



Len Pysh



Amy Clore



Ken Helm

and well-respected faculty at some highly regarded PUIs, so I knew that the bar had been set high. But I was encouraged by Katie Engen on the ASPB staff, who told me that she would take care of much of the administrative work required (which she did—with much thanks!), and all I would need to do would be to facilitate the actual event.

The PUI networking event was among the first of the events of the meeting, scheduled to begin at 9:00 a.m. on Saturday, August 6, even before the official start of the meeting. I learned my first lesson about hosting an event at larger meetings—sometimes locations for events get changed! Thankfully, most of the attendees figured out where the event was being held and, while we got off to a later start than the time posted, it appeared all of the attendees had productive and interesting conversations around their respective tables before we began the “formal” portion of the breakfast.

Amy Clore (New College of Florida) and Ken Helm (Siena College) began the formal portion by providing information about ASPB’s Summer Undergraduate Research Fellowships (SURF), which provide a \$4,000 stipend and \$700 for materials to 15 undergraduates to conduct summer research at both research-intensive universities and PUIs (<http://www.aspb.org/SURF>). This past round,

the SURF panel received more than 100 applications, a significant increase over the previous year’s pool. The program is growing, but the opportunity for support is still reasonable and, as I shared with the participants, the program “is a good experience for those students who are serious about attending graduate school, as it provides them an opportunity to develop and communicate their ideas about a project to a committee, much like they will have to do in graduate school.”



Kathy Archer

Kathy Archer (Trinity College) then solicited input to begin developing a Concept Inventory for Plant Biology, based on the 12 Principles of Plant Biology offered by ASPB (<http://www.aspb.org/12principles>). In brief (and with apologies to Kathy, who can provide a more thorough explanation), a concept inventory is a tool to determine whether students have grasped the core concepts of a field and have overcome the common misconceptions that students share about that area of inquiry. Usually presented as a set of multiple-choice

questions, a concept inventory does not focus so much on minute details as larger concepts. Anyone who would like more information about, or is interested in helping develop, this plant biology concept inventory should contact Kathy at EKathleen.Archer@trincoll.edu.

Finally, Diane Okamu-

ro, program director for the Plant Genome Research Program at the National Science Foundation (NSF), gave a brief presentation on new opportunities for funding at NSF. Diane has been a consistent attendee at the PUI networking event—in fact, she and I first met at the PUI networking event in Seattle



Diane Okamura

several years ago. Her continued presence is testimony to the importance of research and networking at PUIs.

After these more formal presentations, each of the

nearly 40 attendees shared his or her name, institution, and teaching responsibilities. Second lesson learned: nearly everyone at a PUI teaches a course in plant physiology and is familiar with the biology of plants from what occurs at the molecular level to what occurs at the ecological levels. Although we are often trained in a very narrow field of inquiry in obtaining our PhD, plant biology faculty have both the opportunity and the challenge of becoming much more broadly

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Plant Biology 2011 Education Posters

Implementing Inquiry-Based Laboratory Activities and Using Improved Strategies for Teaching Basic Biological Concepts

A healthy variety of posters focusing on the science of teaching and learning biology were presented and explored during Plant Biology 2011. The posters highlighted the increasing effort by ASPB members to train the next generation of plant scientists through hands-on laboratory experiences and use of model plant systems. Overall, this year's set of posters revealed the interest of ASPB researchers in developing new and simplified teaching tools for science educators. Among the 20 education posters this year, six discussed the effectiveness of inquiry-based learning in research skill acquisition and assimilation of content materials by students. The remaining posters showcased the success of simplified instructional approaches and easy-to-use model plants in making plant science lessons attractive to K-12 and undergraduate students.

Dimuth Siritunga from the University of Puerto Rico, Mayagüez, offered two posters: "Implementation of Inquiry-Based Plant Tissue Culture Laboratory Modules in Minority Undergraduate Teaching Laboratory" and "Large-Scale Implementation of Culturally Relevant Research Modules in Minority Undergraduate Teaching Laboratory: Assessment of Cassava Diversity in Puerto Rico." Together, these posters demonstrated the notable effectiveness of student-centered learning and incorporation of research experience as an integral part of biology education for all students. A full description of Dimuth's ongoing work on how to successfully integrate teaching and research can be found in

the article on the education minisymposium in this issue (see page 44).

Similarly, William Lorinette and colleagues from Wilkes University and Yale University described the use of indica and japonica subspecies of rice to study hybrid vigor at the molecular level in a senior level, research-based

Available to Students and Educators," by Uwe Hilgert (Cold Spring Harbor Laboratory); "Undergraduate Research Results from 10 Year Program," by Eliezer S. Louzada, et al. (Texas A&M University-Kingsville; University of Texas-Pan American); and "Using 'The Amazing Lab' as a Teaching Tool in an

Introductory Biology Lab Course," by Jodie Ramsay (Northern State University). These projects each exemplify the effort that scientists and teachers are making to demystify plant biology and make the learning of basic biological concepts easy for everyone, including students not majoring in science. Maryann Herman's (St. John Fisher College) poster was uniquely innovative in that it featured



PHOTO BY NICOLE BURKART

course in their poster, titled "Research-Based Course Studying Differential Gene Regulation in Rice fl Hybrids." Overall, the students who attended the course evaluated it to be the best course they took during their college career.

Other posters full of clever ideas included: "Teaching Plant Biology with Heirloom Tomatoes," by Gloria Muday and Hanya Chrispeels (Wake Forest University); "Growing Plant Public Understanding of Plant Genetics," by Steve Van Nocker (Michigan State University); "RET Education Through Networks and Mechanisms Underlying Crop Resistance to Fusarium Root Rots," by David Lightfoot (Southern Illinois University Carbondale); "Constructing a Plant Biology Concept Inventory," by Kathleen Archer (Trinity College); "iPlant Initiatives Make High-Level Genome Analysis Broadly

how to use a popular science novel, *The Botany of Desire* by Michael Pollan, to woo her mostly premedical students to consider career opportunities in plant science.

The diversity of education posters presented at the 2011 meeting is an indication of the commitment of ASPB scientists to take science from the bench to the classroom. The benefit of a student-centered approach and introduction of inquiry-based laboratory experience into course curricula was very well documented. For more detailed information about ASPB education initiatives, please review the resources, events, and online networking options at <http://www.aspb.org/education>. 

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Plant Biology 2011 Education Minisymposium

Engaging Students in Research, Researching What They Learn

The Education and Outreach minisymposium organized by the Education Committee for Plant Biology 2011 featured four speakers, three of whom are engaged in NSF-sponsored research programs on various aspects of plant genetics and physiology.

David Lightfoot, Southern Illinois University Carbondale (SIUC), described his Research Experiences for Teachers (RET) program titled “Education through Networks and Mechanisms Underlying Crop Resistance to *Fusarium* Root Rots (FRR).” The project developed and deployed classroom research kits to high schools, allowing teachers and students not only to easily and rapidly score quantitative variation in soybean infection by the fungal pathogen *Fusarium*, but also to quickly and cheaply identify the location and nature of genes underlying quantitative variation to FRR in soybean. *Fusarium* was selected because infection can result in sudden death syndrome, which is a familiar disease with symptoms such as damping off, root rot, and leaf scorch that can be easily scored by students. The soybean population tested by students consists of 1,000 immortal recombinant inbred lines carrying a distributed set of 26 quantitative trait loci for resistance to *Fusarium* infection. The soybeans are grown using a hydroponics kit developed by Dexter Wakefield, Department of Plant, Soil Science, and Agricultural Systems at SIUC. Data collected by high school participants will permit accurate mapping of these genes using mapping software programs, DNA marker databases, interacting protein network databases, and physical localization to bacterial artificial chromosome containing candidate genes. Preparation of new publications in peer-reviewed journals that recognize student and teacher involvement will constitute another important outcome.



Plant Biology 2011 ASPB Education and Outreach minisymposium participants were (left to right) David Lightfoot, Michael Neff, Kathleen Archer, John Cushman (chair), and Dimuth Siritunga.

Michael Neff, Washington State University, presented “Light-Mediated Germination in Lettuce Seeds: Resurrection of a Classic Plant Physiology Lab Exercise,” in which he and two of his undergraduate students resurrected the classic 1952 experiment by H. A. Borthwick and colleagues that demonstrated that red light stimulates—whereas far-red light inhibits—the germination of certain varieties of lettuce seeds such as Grand Rapids. As noted during the past 20 years, most lettuce varieties no longer require red light to induce germination, a trait bred out of these varieties to ensure that farmers recover reliable and even germination rates for their lettuce crops. To revive this time-honored exercise, Michael ordered all Grand Rapids-derived lettuce seeds from Johnny’s Select Seed Company and tested them for their germination characteristics to find one variety, Waldman’s Dark Green, which retained phytochrome-mediated red/far-red control of seed germination. The group also showed how students could use lettuce leaves as an inexpensive far-red light filter to inhibit germination, an important and inexpensive addition to this exercise demonstrating the biological relevance of red/far-red control of

seed germination. More information about this classic plant physiology experiment can be found in the publication (1).

Dimuth Siritunga, University of Puerto Rico, Mayagüez, described his distinctive teaching efforts toward “Large-Scale Implementation of Culturally Relevant Research Modules in Minority Undergraduate Teaching Laboratory: Assessment of Cassava Diversity in Puerto Rico.” Cassava is the world’s fifth-ranked crop eaten directly by humans and is widely consumed in Puerto Rico, although not as a staple food. Dimuth developed an innovative laboratory module in an upper-division genetics course in which the students collect samples from different villages and townships within Puerto Rico and apply molecular biology techniques, including simple sequence repeat (SSR) marker analysis, to assess the genetic makeup of each cassava sample. The project has resulted in the successful evaluation of cassava diversity in Puerto Rico and is the first study of its kind in the Caribbean. This lab module involves more than 600 students per year, many from backgrounds traditionally underrepresented in science, and provides much needed hands-on experience in the use of modern molecular biology tools. Assessment of the lab module content and learning perceptions revealed that this novel teaching approach allows the students to gain an enhanced understanding of the scientific process, increased proficiency with molecular methods, and increased confidence as researchers by engaging the students in an authentic research project. The lab module is now being modified to assess the genetic diversity of other important crops in Puerto Rico, such as sweet potato. More details about this innovative and highly effective laboratory module can be found in the publication (2).



ASPB Catalyzes Implementation of *Vision and Change* in Undergraduate Biology Education

ASPB was proud to host a participatory workshop on implementation of the recommendations from *Vision and Change in Undergraduate Biology Education: A Call to Action* within the plant biology community. The workshop was sponsored by a grant to ASPB from the National Science Foundation's Division of Undergraduate Education (Award #DUE-1125988). A full article about the workshop and follow-up activities will be published in a subsequent issue of the *ASPB News*.

The Vision & Change report is available at <http://visionandchange.org>. To stay informed and participate in the coming changes, join the ASPB Higher Education Interest Group or the ASPB Vision & Change blog.

Lastly, **Kathleen Archer**, Trinity College, presented her ambitious program for “Constructing a Plant Biology Concept Inventory.” A concept inventory is a set of questions that probe understanding of fundamental concepts or ideas within a particular discipline. Typically, such inventories comprise multiple-choice questions with common misconceptions (or distractors) embedded within the answer options, normally written in plain, jargon-free language, so that conceptual understanding, rather than vocabulary, is tested. A typical example question might be: Which gases do plants take up? Students often answer only CO₂ because they focus entirely on photosynthesis, which is incorrect, of course, as plants take up *both* CO₂ and O₂. To effectively assess learning relevant to particular concept inventories, pretests are often administered to assess areas of weakness in a student's knowledge base, followed by posttests to objectively demonstrate areas in which students have learned or not learned. Administering such assessments of concept inventories over several years can demonstrate the effectiveness

of different teaching techniques and strategies. Existing concept inventories in biology generally focus on specific subdisciplines such as genetics or natural selection. While plant biology questions are often embedded in these subdisciplinary inventories, they are usually limited to photosynthesis. However, as of yet, there are no college-level plant biology concept inventories available. Thus, the overall goal of the project is to construct a comprehensive learning inventory for plant biology by (1) determining concepts to be tested by formulating questions, (2) testing and collecting common student misconceptions in the form of authentic student responses for use as distractors, (3) validating the questions by faculty, and (4) repeating the testing of questions with students so that the concept inventory questions are thoroughly vetted, are clear and unambiguous, minimize the use of disciplinary jargon, and target conceptual understanding. Once established, concept inventories should be published in leading peer-reviewed journals for science education. Researchers and teachers interested in helping to develop this

college-level plant biology concept inventory are invited to contact Kathy directly at EKathleen.Archer@trincoll.edu with their ideas regarding key concepts to test, experience with misconceptions encountered, and suggestions to improve question clarity and correctness.

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Reference

1. Neff, M.M., Sanderson, L., and Tedor, D. (2009). Light-mediated germination in lettuce seeds: Resurrection of a classic plant physiology lab exercise. *The American Biology Teacher* 71: 367–370.
2. Siritunga, D., Montero-Rojas, M., Carrero, K., Toro, G., Vélez, A., and Carrero-Martínez, F. (2011). Culturally relevant research to the masses: Large-scale laboratory module implementations in upper-division genetics and cell biology teaching laboratories. *CBE—Life Sciences Education* 10: 287–297.

Education Booth a Thoroughfare of Education and Outreach Ideas in Minneapolis

The ASPB Education Booth at Plant Biology 2011 in Minneapolis (August 6–9) featured a broad spectrum of education and outreach resources for the plant biology community. With a new walk-through layout, the booth was a popular place to visit in the main exhibit hall to discuss educational ideas, efforts, and activities for all learning levels. The booth was sponsored by the ASPB Education Committee and Education Foundation and coordinated by Education Committee member Chad Jordan (North Carolina State University).

Winners of the highly competitive 2011 Education Booth Competition for Innovative Instruction were on-site to showcase their ongoing efforts to expand plant science education. Celia Knight (University of Leeds, UK) met with booth visitors to discuss the Gatsby Plants Project, which is a multi-faceted effort to excite undergraduate students about the developments in career opportunities in the plant sciences. Celia displayed a video that highlighted an annual summer school for rising sophomores at different UK universities. Students who attend the summer school hear from scientists on various important areas of plant biology and get hands-on laboratory experience that helps them discover the value of plants and plant biology as a potential course of study. Celia also showed visitors the Gatsby Plants TREE (Tool for Research Engaged Education) website, which contains searchable and downloadable lectures, movies, and lab activities in several areas of plant biology; the website is



Paul Williams (University of Wisconsin–Madison) talks with a large group of booth visitors about the history of the Wisconsin Fast Plants Program and innovative strategies for using Fast Plants in education and outreach. Several of the materials Paul has developed, including examples of Bottle Biology hanging on the right, surround him in the booth.



Bahay Gulle and John Cushman (University of Nevada, Reno) pose beside their display titled “Plants Got Rhythm.” Behind the display piece was a table with a hands-on lab experiment on circadian-linked pH changes in CAM plants.

freely accessible at <http://www.gatsbyplants.leeds.ac.uk/TR>.

John Cushman and Bahay Gulle (University of Nevada, Reno) presented an interactive display called “Plants Got Rhythm,” which focused on circadian clock control of numerous physiological and developmental processes in plants. The display was composed of an image-rich panel backdrop filled with information and images on circadian rhythms. The centerpiece of the display was



Paul Williams (left) enthralled a crowd of Fast Plants enthusiasts.

a mounted iPad that played several videos of circadian-associated phenomena, which was aptly accompanied by *I Got Rhythm* by Gershwin. John and Bahay also demonstrated a hands-on activity where visitors could observe a rhythmic change in vacuolar pH of the CAM plant *Mysemrbryanthemum crystallinum* (ice plant). As a humorous nod to photosynthesis, the display included solar-powered “dancing” flowers that proved to be a hit with all who visited the display.

Paul Williams (University of Wisconsin–Madison), developer of the ever-popular

Wisconsin Fast Plants (<http://www.fastplants.org>), was on-site to demonstrate how Fast Plants can be used in teaching and outreach. Paul spoke with hundreds of visitors about how to get started with their own rapid-cycling Brassica projects, including handouts with tips and strategies for growing the plants, building simple plant growth chambers, and designing inquiry-guided activities based on the plants. He also showed examples of ways to convert ordinary plastic soda bottles and other inexpensive materials into hanging bottle gardens, also known as Bottle Biology (<http://www.bottlebiology.org>). Visitors

learned how Bottle Biology can be used to teach about plant growth, decomposition, and ecology in the classroom at multiple levels.

This segment of booth resources was further enhanced as Scott Woody (University of Wisconsin–Madison) demonstrated the many uses of self-compatible Fast Plants (FPsc), which are analogs of the Wisconsin Fast Plants lines. Along with Rick Amasino, Scott has developed FPsc into a tool that can be used by teachers and students to explore everything from simple Mendelian inheritance to molecular genetics and genomics using an inquiry-based approach. FPsc is also scalable and allows students to conduct everything from simple observational studies using mutant alleles to molecular marker and mapping analyses.

The Mother of Thousands—a.k.a. MOT—Challenge was another featured component of the Education Booth. Tom Bryan, Paul's newest protégé and undergraduate student at the University of Wisconsin–Madison, described ongoing efforts (led by Tom) to coordinate a competition where groups at different institutions grow Mother of Thousands plants (*Kalanchoe* sp.) in varying environmental conditions. The goal of the challenge is to identify environmental conditions that result in the fastest growth and asexual propagation of plantlets, for which the plant



Tom Bryan introduces the latest campus craze for science buffs—the MOT Challenge!



Scott Woody (left) explains teaching and research options with FPsc.

is well known. Booth visitors walked away with plantlets produced by the Mother of Thousands plants on-site to help get them started with their own challenge team.

As always, there were a bevy of education and outreach resources on hand sponsored or developed by the Education Committee and Education Foundation. Committee members Erin Dolan (now at the University of Georgia) and George Ude (Bowie State University) joined Katie Engen of ASPB to talk with attendees about how to use the resources in their own education and outreach efforts. Committee members handed out newly redesigned bookmarks illustrating the 12 Principles of Plant Biology and several CDs containing Inquiry-Based Labs

for the 12 Principles. Former committee members Jeffrey Coker, Jane Ellis, and Mary Williams developed the latter, and an electronic version is available at <http://www.aspb.org/12Labs>. CDs of the Plant Clippings video series developed by Ken Korth (University of Arkansas) were also available.

Several classroom-ready teaching materials were made available in preassembled packets that included several worksheets, many of which are freely available online at ASPB's website, and information on ASPB education and outreach efforts in which faculty can become involved.

Accompanying these materials was a video showcasing winners of the Chlorofilms video contest, which was developed by Dan Cosgrove (Penn State University) and funded by the Education Foundation Grants Program. A 3-D display on Using Biotechnology for Sustainability (<http://www.ucbiotech.org>), authored by Peggy Lemaux and Barbara Alonso (University of California, Berkeley), was also unveiled and accompanied by the popular Fun and Games with Food and Genetics baseball cards on DNA, plant breeding, and genetics.

In a continuation from the 2010 booth in Montréal, this year's booth contained a Science Education Reference Center with books on effective teaching, learning, and assessment strategies for visitors to examine. Copies of several science education research journals were also made available for visitors to take, as were copies of the *Vision and Change in Undergraduate Biology Education* (<http://visionandchange.org>) and a packet of information from the National Science Foundation on submitting education grant proposals.

Rounding out the booth was the Hot Topics in Science Education Discussions corner, where visitors met with speakers at scheduled times throughout the meeting for small-group discussions on educational trends and

continued on page 49

Plant Biology 2011 Undergraduate Poster Session *Fresh and Future Connections*

ASPB undergraduates presented their research posters to a wide variety of interested visitors during the research networking event held Saturday, August 6, at the start of Plant Biology 2011. The event was scheduled intentionally just as the meeting opened in order to catalyze a conference—and career—of networking opportunities for these accomplished students and the faculty, mentors, and other established scientists interested in nurturing them.



Ken Helm and Amy Clore

“Overall, I was certainly impressed by the quality of the work as well as the presentations. The students as a group were quite professional in engaging folks who came by to take a look at their work. Many attendees approached me to comment on the high quality of the undergraduate research at the poster session and the impressive level of maturity of the presenters this year. . . . The vast majority of SURFers in particular intend to go on in biology in graduate school, many specifically in plant biology (and closely related disciplines).”

—Amy Clore, SURF cochair

“The growth of the undergraduate poster session is really impressive. Hats off to all the mentors for their hard work.”

—Nick Carpita, ASPB president



Benjamin Kohanloo (left) and Nick Carpita



Rachael Grundman (left) and Peggy Lemaux

“What impressed me the most was the professionalism of the students in presenting their work and the enthusiasm of the mentors in interacting with the students. I think both sides benefited tremendously, and it was a terrific send-off for the students, setting the stage for the rest of the meeting.”

—Peggy Lemaux

ASPB president-elect (2012–2013)



Cynthia Perry and Steven Huber

“It was wonderful to attend the undergraduate poster session and see so many posters. Unfortunately, I only made it partway through the room because students were so engaging and excited about their work, and neither of us wanted to stop the conversation. I could have easily spent another hour talking with the presenters. I’m looking forward to next year’s undergraduate poster session!”

—Steve Huber

ASPB president-elect (2011–2012)

“I participated in the undergraduate networking poster session as an undergrad, and I wanted to let you know not only what a great opportunity it was, but also how much fun I had doing it. Each of the individuals I spoke with was very welcoming and was truly interested in my research. At the time, I had no idea who any of these people were, so when I saw them on stage giving talks or realized they were ASPB executives, I was blown away. It was also great to share my research and network with other undergraduates. Thanks!”

—Andrew Spencley, UC Berkeley

Outstanding Outreach Opportunities with Education Foundation Grants

ASPB supports innovative outreach resources developed by Society members to advance the knowledge and appreciation of plant biology. The Education Foundation board seeks projects that enrich public understanding of the

- importance of plants to the sustainable production of medicine, food, fibers, and fuels;
- critical role plants play in sustaining functional ecosystems in changing environments;
- latest developments in plant biotechnologies, including genetic modifications that enhance the disease and stress resistance of crops;
- contributions and discoveries from plants that improve human health and well-being; and/or
- range of careers related to plant biology or available to plant biologists.

Congratulations to the 2011 ASPB Education Foundation Grant Program Award recipients!

TRAINED—Translating Research on *Arabidopsis* Into a Network of Educational Resources

Erich Grotewold and Jelena Brkljacic—Ohio State University

Plants iView

Andrew Leakey—University of Illinois

Helping Education Resources Go Viral!

Peggy Lemaux—University of California, Berkeley

12 Principles of Plant Biology Coloring and Activity Book with “Draw a Plant” Instrument

Alan Jones—University of North Carolina
Jane Ellis—Presbyterian College

Education Booth *continued from page 47*

issues of special interest. The discussions at this year’s meeting ranged from those on professional science master’s degrees in plant biology, led by Joan Huber (University of Illinois at Urbana–Champaign), to a bioinformatics platform called DNA Subway (from the Dolan DNA Learning Center at Cold Spring Harbor Laboratory). When discussions were not being held, large video monitors played a montage of slides with information about plant science education and outreach initiatives coordinated or sponsored at least in part by ASPB. A video providing an overview of the acclaimed sLowlife Exhibit developed by Roger Hangarter (Indiana University) also was displayed.

For more information about the 2012 Education Booth Competition for Innovative Instruction, hosting a Hot Topics in Science Education Discussion, or other education and outreach initiatives in development for the next meeting in Austin, please contact Katie Engen (katie@aspb.org) or Chad Jordan (cvjordan@ncstate.edu). 

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Kindred Spirits *continued from page 42*

trained in order to be successful at our home institutions. (Third lesson learned: some of us even teach “animal” courses.)

By this time, unfortunately, we had reached the end of the allotted time (there just never seems to be enough), and it was time to attend the undergraduate poster session, which included not only posters by all of the 2010 SURF awardees, but also posters from any undergraduates who were attending the meeting. It was quite a collection of topics and interests!

I enjoyed the event because it gave me the opportunity to meet other faculty members and a few soon-to-be faculty members who are currently serving at or planning to serve at PUIs. I appreciated hearing some of the challenges faced by those at other institutions. (I hope to focus more on this going forward.) For me, this event offered a renewed focus for us to think about ways that members of ASPB who serve at PUIs can better connect so that we can encourage each other, use our strengths and knowledge as resources, and perhaps facilitate those coming to positions at PUIs in the future to

be better prepared to face the challenges of both the classroom and the research lab. To coordinate with the PUI network, consider joining ASPB’s online user group for PUI faculty (<http://my.aspb.org/members/group.asp?id=67868>). Additionally, I invite any and all suggestions about how best to develop this network and attain these goals. Please e-mail me your ideas or questions, and I look forward to seeing y’all (see, getting ready for Texas already!) next year in Austin. 

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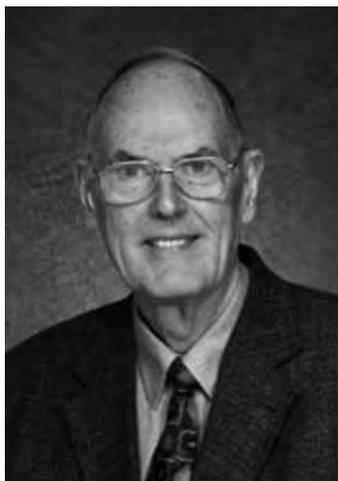


Meinhart H. Zenk

Meinhart Zenk, member and principal investigator at the Donald Danforth Plant Science Center, St. Louis, Missouri, and adjunct professor at the Department of Anesthesiology at Washington University, passed away after a long illness on July 5, 2011, at the age of 78. He was born in the small town of Donauwoerth on the Danube River in Southern Germany only a few days after the *Machtergreifung* of Adolf Hitler on January 30, 1933, and thus belonged to a generation that was just conscious enough at the time to carry the impressions of war (which had not left a male relative of his alive) and total collapse into adulthood.

Initially choosing chemistry as his major, Meinhart transferred to biology at the University of Munich, obtained a research assistantship at Purdue University, and returned in 1958 with a master of science in plant physiology. Only a year later, he was awarded his PhD with a thesis on indole-3-acetic acid activation and conjugation. After only another four years, he qualified for inauguration as an academic lecturer, in the *Habilitation*, a peculiarity of the academic system of German-speaking countries, now considered obsolete by many but defended by him up to his old age. His first series of publications were published either exclusively under his own name or together with one of his PhD students. He had no scientific father, mother, or mentor, did not come from a "school," and was essentially a self-made scientist. He went his own way and followed his vision from the very start with pioneering work.

In his subsequent studies on the biosynthesis of various aromatic compounds in plants, such as benzoic and hydroxycinnamic acids, quinones, and so on, he developed supreme mastership in the chemical and



Meinhart Zenk

enzymatic microsyntheses of radioactively labeled precursors and the purification and painstaking stepwise degradation of the labeled products for determination of the incorporation patterns. These were the heroic days before the advent of the use of stable isotopes, HPLC, immunoassays, GC- or LC-MS, NMR, and such in phytochemical and biosynthetic studies. But when these techniques became available, he always was among the first to adopt and exploit them to their full extent. While these talents won him the respect of the natural products chemists, his virtuosity in the identification, isolation, and characterization of enzymes of plant secondary metabolism, especially of those involved in the activation and stepwise reduction of lignin precursors, gave him early leadership in the rather tricky biochemistry of this metabolism.

In 1968, Meinhart became the first incumbent of the chair of plant physiology at the newly founded University of the Ruhr in Bochum and prominently contributed to its rising scientific reputation in the following dozen years or so. Here he began to explore the potential of plant cell cultures in the production of secondary compounds. While their industrial application would never meet the high expectations, Meinhart would later declare plant cell cultures "a pot of gold" in his chase of the enzymes of secondary metabolism. Cell cultures also turned out to be invaluable in the study of the regulation of secondary metabolism (by e.g., auxins, octadecanoid pathway intermediates, jasmonates). Now, starting a cell culture from some exotic species is more an art than a science, and it requires a great deal of experience and patience. Meinhart had care-

fully read the notable work *Vom Kriege* (*On War*, 1832) by Carl von Clausewitz, a Prussian military theorist, and he planned his scientific work farsightedly and meticulously like campaigns. Information would not leak until success was certain. Even to many in the Bochum group, it came as a surprise that his interest had turned to alkaloids. Meinhart's entrée into the alkaloid field occurred with a bang, because the enzymatic studies had revealed beyond doubt that strictosidine, rather than vincoside (as believed by eminent researchers in the field), is the precursor of the indole alkaloids. A vast number of studies on alkaloid biosyntheses followed, too numerous to be cited here in detail. This work was now done at the University of Munich, where Meinhart held the chair of pharmaceutical biology from 1980 to 1999. It culminated in the painstaking identification of the 16 enzymes involved in the biosynthesis of morphine, the king of all drugs.

The Web of Knowledge chart of citations of Meinhart's publications shows a highly respectable and steady number of 100–150 per year for the years 1968–1985; from then on a steep and steady increase to almost 700 per year in the first years of the new millennium can be seen, which brought Meinhart into the ISI list of Highly Cited Authors in Plant and Animal Sciences 1984–2004. Was this the scientific community's fascination with alkaloid biosynthesis? No, it was the response to the almost serendipitous discovery of the phytochelatin, the heavy-metal-binding peptides, biosynthetically derived from glutathione, in plants, which was published in *Science* in 1985 and was followed by a series of articles that all stirred enormous interest. We see a confirmation here that the number of citations is not reliable as an indicator of the intellectual level or the originality of a publication, since Meinhart's subsequent involvement in the elucidation of the enzymatic steps of the non-mevalonate pathway of terpenoid biosynthesis was in no way less exacting.

After retirement from Munich University and an interlude as honorary professor at the University of Halle–Wittenberg, Meinhart and his wife, Toni Kutchan, moved to St. Louis in 2006, where both assumed positions at the Donald Danforth Plant Science Center. Here, his last major contribution—and legacy—was the proof that mammals synthesize their own morphine from distant precursors. What will this discovery mean to pain research?

While none of Meinhart's collaborators has been mentioned here by name, this must be so with Toni. It was she who brought the dimension of molecular biology to the Munich lab in the 1980s, who pursued a distinguished independent career in Halle and St. Louis, and who was a wonderful and much-loved companion to Meinhart.

Meinhart restlessly paced and paved the unending paths of plant secondary metabolism. This was the passion of his life. Even though he could sometimes offend people—friends not excepted—by prejudiced opinions and caustic remarks and letters, he was a highly sensitive man with an exquisitely developed sense of beauty in art, music, and lyrics. And there is so much beauty in his work!

Suffice it to say that Meinhart received numerous awards and distinctions for his work. For readers of the *ASPB News*, it may be of particular interest to know that the first of his three honorary doctoral degrees was awarded by Purdue University in 1991, that he was elected as foreign associate of the National Academy of Sciences in 1992 and as fellow of the American Society of

Pharmacognosy in 2007, and that he was given the Phytochemical Pioneer Award of the Phytochemical Society of North America in 2010. 

“Most of us are bricklayers. We are happy to add a stone to the edifice of science. . . . A rare few have the vision of an architect.” (Christian de Duve on Fritz Lipmann)

Meinhart was an architect.

Nikolaus Amrhein
Swiss Federal Institute of Technology, Zurich



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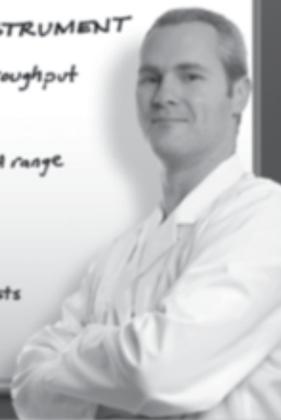
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Samples per run	96
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Light source power	One 700mW LED, 470nm
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