ASPB News

THE NEWSLETTER OF THE AMERICAN SOCIETY OF PLANT BIOLOGISTS

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Inside This Issue

Rob McClung Assumes Presidency October 1

Rob McClung

Rob McClung, Dartmouth College, is ASPB's new president. He succeeds Rick Amasino, University of Wisconsin, who becomes immediate past president on October 1. The Society's new president-elect is Sally Assmann, Pennsylvania State University.

Rob earned his bachelor's degree in biology at Queen's University in 1976 and his MSc in biology from Dalhousie University in 1979, investigating bacterial nitrogen fixation associated with the roots of *Spartina alterniflora* in salt marshes with David G. Patriquin. He continued these studies with Robert E. Davis at USDA–Beltsville. His PhD (1986) is from Michigan State University, where he worked with Barry K. Chelm studying the symbiosis between nitrogen-fixing bacteria and soybeans. His postdoctoral research from 1986 to 1988 with Jay C. Dunlap in the Biochemistry Department of Dartmouth Medical School introduced him to circadian rhythms in the model filamentous fungus, *Neurospora crassa.* In 1988 he joined the faculty in Biological Sciences at Dartmouth College, and in 2004 he became the associate dean for the sciences.

Rob's research at Dartmouth continues to focus on the basis of biological clocks, emphasizing the model plant *Arabidopsis thaliana* and, more recently,

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Cathie Martin to Become Editor of *The Plant Cell*

Cathie R. Martin has been appointed as editor-in-chief of *The Plant Cell* beginning January 1, 2008. She will succeed Rich Jorgensen, who has served as editor-in-chief since July 2003.

Cathie Martin

Cathie is a project leader in the Department of Cell and Developmental Biology at the John Innes Centre in Norwich, U.K., where she has been since 1983. She also serves as a professor at the Royal Holloway College of the University of London (since 2000), honorary professor at the University of East Anglia (since 2001), and Niels Bohr Visiting Professor at the University of Copenhagen (2006–2011). Prior to her appointment at the John Innes Centre, Cathie earned MA and PhD degrees and conducted postdoctoral work in plant biochemistry at the University of Cambridge, U.K.

Cathie's primary research focuses on MYB-related transcription factors that function in the regulation of secondary metabolism

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ASPB News

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Rob McClung
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Brassica rapa. The biological clock provides a fascinating challenge. How does an organism endogenously measure time and use that information to coordinate its physiology and behavior with the externally imposed cycle of day and night? The clock coordinates many aspects of biology, including basic metabolism and responses to biotic and abiotic stresses. In addition, environmental cues and the circadian clock contribute to the decision to reproduce. Proper coordination of the endogenous timing mechanism with the external day confers adaptive advantage, and impaired circadian function is associated with reduced fitness. In the context of climate change and the need to exploit increasingly marginal habitats, fuller understanding of the clock mechanism may offer strategies to improve crop productivity.

Rob's teaching has focused on genetics, molecular biology, and plant physiology, and he has taught both introductory genetics to first-year students and senior seminars in molecular genetics based on the primary literature. In 2002 his activities mentoring undergraduate women were recognized with a Dartmouth Women in Science Project Ten Year Mentorship Award. He currently heads the E. E. Just Program for Students in the Sciences, a program aimed at enhancing participation of underrepresented minorities, especially African Americans, in the sciences. He has served as a member of the ASPB Committee on Women in Plant Biology and as a member and chair of the Publications Committee.

Rob writes, "Even though I study time, I am perpetually amazed at how quickly it flies. It seems only days ago we were at Plant Biology in Chicago, and we will be together in Mérida before we know it (hurricane season permitting). Before then, though, I am sure I will continue to be amazed at the dedication and effectiveness of the members and staff of the Society. The Society publishes the top scientific journals in our field, and both are in excellent shape. Don Ort has spearheaded exciting initiatives at *Plant Physiology.* The editorship of *The Plant Cell* is about to pass from Rich Jorgensen to Cathie Martin. I want to thank Rich for his tireless efforts on behalf of the journal and wish the fullest success to Cathie. The Society is a tireless advocate of plant biology and agriculture on Capitol Hill, in educational institutions, and among the public. But in these and in all aspects of our enterprise we cannot become complacent. Much remains to be accomplished. Robert Frost (who studied up heah at Dartmouth) said it better, though:

'The woods are lovely, dark, and deep,

But I have promises to keep,

And miles to go before I sleep,

And miles to go before I sleep.'"

(Robert Frost, *Stopping by Woods on a Snowy Evening)*

Cathie Martin
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(such as anthocyanin biosynthesis), polarized cell expansion, and epidermal cell differentiation. Her work on transposable elements in *Antirrhihum* in the early 1980s led to the identification of a number of *MYB* genes that regulate anthocyanin biosynthesis and related phenylpropanoid pathways. More recent work has shown that petal epidermal cell shape controlled by the *MYB* gene *MIXTA* is a determining factor in pollinator behavior in *Antirrhinum.* Cathie's work has been instrumental in unraveling the complex interactions of MYB and basic helix-loop-helix transcription factors that regulate anthocyanin biosynthesis and control floral pigment patterning and epidermal cell shape in higher plants, both of which exert strong influence on pollinator behavior. A long-term goal of her work is to engineer these regulatory genes to modulate flux along the associated secondary metabolic pathways.

Cathie has been a dedicated member of *The Plant Cell* editorial board since 2001. As editor-in-chief, her vision for the journal includes maintaining and enhancing the strength of the editorial board; continuing emphasis on high scientific standards and publishing "full stories"; broadening the scope of the journal (for example, to include more high-quality work in evolutionary development, structural and comparative genomics, biotechnology, and studies in non-model plant species); and expanding the publication of reviews, commentaries, and opinion pieces. Cathie believes that Rich Jorgensen's strong emphasis on standards has provided benchmarks for good science publishing for journals far beyond *The Plant Cell,* and she will work to maintain and strengthen the journal's reputation in this area.

Cathie stated that she "will greatly enjoy the challenge of working with the Society and the wonderful staff of *The Plant Cell* to shape the journal for the future; to ensure that it remains the best journal for plant science research; and to guarantee not only that authors get a real sense of pride and achievement from having their work published in *The Plant Cell,* but also that readers remain excited and engaged by the scientific content of the journal."

Rick Amasino

President's Letter

(Note: A production error resulted in the duplication of a sentence in the printed version of the July/August *President's Letter.* The corrected version is online at http://www.aspb.org/newsletter/julaug07/01pl34_4.cfm.)

The Energy Pie

I sense that during the past year the public attitude has shifted appreciably toward acceptance of the scientific consensus on the effect of human activity on climate. Accordingly, the media has become less willing to provide a forum to those who deny the scientific consensus; providing such a forum would no longer be good for their ratings. I did not expect this shift to happen so quickly. Now that acceptance is less of an issue, it is incumbent on members of the scientific community to help foster public understanding of the details of energy and climate issues so that as a society we can make more informed decisions.

Although my own experience with public understanding of energy and climate issues is limited, it does indicate that there is much that ASPB members could contribute. For example, a friend recently noted that the United States could make a major contribution to mitigating climate change if the majority of U.S. residents shifted to driving completely electric vehicles. I asked if she had considered two questions. What fraction of total CO_2 emissions in the United States emanate from the transportation sector? (Answer: ~30%.) What percent of the electricity generated in the United States is derived from fossil fuels? (Answer: ~70%.) As ASPB members know, if a greater portion of the energy for the transportation sector were obtained from the electric grid, additional electrical power plants would need to be built, and those additional plants would likely burn fossil fuels.

Shifting to electric vehicles could have a substantial impact on the rate of atmospheric CO_2 increase if the CO_2 produced by fossil fuel burning power plants was captured and sequestered (it will probably be impractical to capture CO_2 from individual automobiles). The possibility that CO_2 capturing technology may be required in future power plants appears to be part of the motivation behind a recent surge in power plant construction; certain investors are betting that plants built soon may be "grandfathered" from possible future regulations such as a requirement for CO_2-capturing devices (1).

Another example: I was recently asked for my opinion about the following carbon offsetting program from The Conservation Fund (2).

> Go Zero with The Conservation Fund
>
> Climate change has become the biggest environmental issue of this century. But while most Americans agree that we must do something, the challenge seems too great, too complicated for any one of us to make a difference—until now.
>
> The Conservation Fund has launched a new program called Carbon Zero that makes it easy and affordable for individuals, corporations or even entire communities to Go Zero by measuring and then offsetting their carbon emissions—simply by planting trees.

The Conservation Fund site states that a tree can sequester, on average over a 100-year lifespan, a little over 20 lbs of CO_2 per year and that producing and combusting a gallon of gasoline releases approximately 20 lbs of CO_2. The site also notes that, to date, the Fund has planted 9 million trees. But one detail is needed to appreciate the magnitude of what would be required to offset the carbon emissions of, for example, just the automobile component of the U.S. transportation sector. Every year, U.S. drivers consume at least 150 billion gallons of gasoline (3). Thus, to offset the tailpipe emissions of U.S. drivers, 150 billion trees would need to be planted where forests do not already exist.

Is there sufficient land in the United States capable of supporting additional forests that collectively contain 150 billion trees? If 150 billion additional trees were grown in the United States, would this impact food and/or biofuel production? If we rely on other countries to sequester our CO_2 by planting trees, will they be able to sequester their own CO_2? Can we guarantee that such land will remain forested? Finally, as forests mature, their rate of CO_2 capture will decrease unless their biomass can be harvested and sequestered.

I recognize that organizations that restore or maintain forests can have an important role to play in mitigating climate change. Many small steps can collectively be significant, there are many tree-planting and forest-maintaining organizations in addition to The Conservation Fund, and forests are a critical component of the current global carbon balance. Indeed, in the past decade, clearing of tropical forests accounted for about 20% of the anthropogenic CO_2 increase in our atmosphere (4), an amount similar to that released by *total* fossil fuel use in the United States (not just the transportation sector). Much of the tropics remains forested, so there is an enormous pool of sequestered carbon in these ecosystems that will continue to be released if deforestation continues.

I am concerned, however, that the purchase of carbon offsets could lead to a sense of complacency among those who do not appreciate that there are not enough forest-based carbon offsets to offset all or

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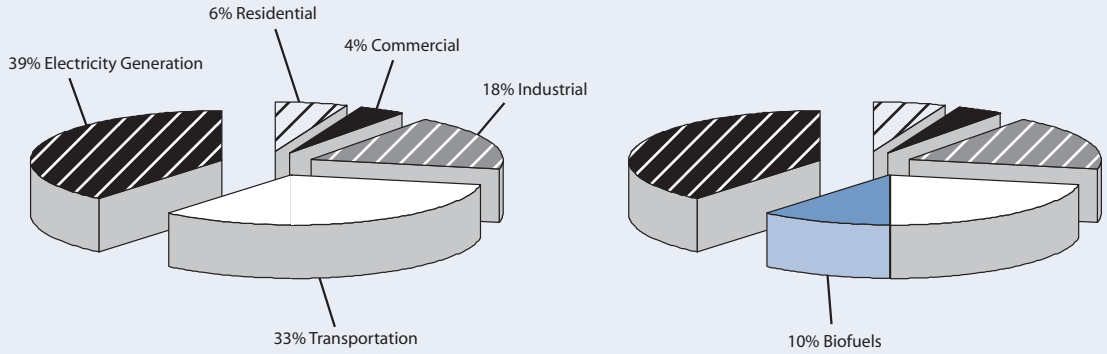

Figure 1. Fossil fuel use in the U.S. by sector. Data are from 2004.

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even most of the current CO_2 emissions. Indeed, I have encountered several stories in the mainstream media favorably portraying individuals whose justification for their well-above-average CO_2 emissions is that they have purchased carbon offsets. Although most media reports are favorable, the sale of carbon offsets has been compared to the practice, common during the Middle Ages, of selling indulgences to offset sins (5).

ASPB members recognize that, at present, multiple approaches will be required to reduce greenhouse gas emissions to levels that are thought to be necessary to prevent major disruptions in climate (6). It is important that we communicate this point to the public because much of the media coverage, as well as some of the political rhetoric, can give the false impression that there are a few simple routes to stabilizing atmospheric CO_2 levels such as tree planting, biomass conversion, and reinstating fuel efficiency standards for automobiles.

One way to effectively communicate this point is to depict the potential of a particular approach as a slice of the overall "energy pie." Consider biofuels from this perspective. A Department of Energy report estimates that cellulosic biomass could provide a carbon-neutral source of ~30% of U.S. transportation fuel needs (7). Given that the transportation sector accounts for ~30% of U.S. fossil fuel consumption (8), the potential contribution of cellulosic biofuels to the current U.S. fossil-fuel carbon footprint is 30% of 30%—i.e., approximately 10% (Figure 1).

At first glance, the cellulosic biofuels' slice of the overall energy pie might appear small. But given that addressing a problem of this magnitude will require a portfolio of approaches, a slice that comprises 10% of the pie is a major contribution. It is critical that we communicate both the promise of plant biology in contributing to renewable energy production along with a realistic assessment of the size of the slice of the pie that any particular approach can provide.

I want to end this final letter of my term by thanking the membership of ASPB for the honor of serving as president this past year. We have a great Society because it has so many involved members and a staff in Rockville that runs every aspect of our operation with an unsurpassed level of dedication and professionalism. As I move to the post of past president, our Society is fortunate to have Rob McClung as our president and Sally Assmann as our president-elect.

Rick Amasino
amasino@biochem.wisc.edu

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Sally Assmann Elected to Lead ASPB in 2008–2009

Sarah M. (Sally) Assmann becomes president-elect October 1 and is slated to become ASPB president next October for the 2008–2009 term.


Sally Assmann

Sally is currently the Waller Professor of Biology at Penn State University. She received her BA in biology from Williams College in 1980 and her PhD in biology from Stanford University in 1985 with Eduardo Zeiger. After a postdoctorate at the University of California, Riverside, with Rob Leonard, she joined the Organismic and Evolutionary Biology Department at Harvard University as an assistant professor in 1987 and continued there as an associate professor. In 1993, she moved to the Biology Department at Penn State.

Sally's research focuses on cellular signaling in plants, with a particular interest in guard cells. Her group takes a multilevel approach to elucidation of signal transduction cascades, drawing on methods ranging from single-cell electrophysiology and ionic imaging; to molecular genetic, genomic, and proteomics approaches; to whole plant physiology. Recently, Sally and her collaborators have initiated the use of systems biology methods to construct predictive models of guard cell signaling. Another major research focus of Sally's group is on the roles of heterotrimeric G-proteins in plant development and environmental response. She has demonstrated that these key signaling proteins regulate a diversity of ion transport, hormonal, and developmental processes.

Sally teaches introductory plant physiology to first-year undergraduates and a laboratory course on cell biology techniques to beginning graduate students. Her professional activities include grant review panels for NSF, DOE, and USDA; in 2004 she was program manager for the USDA Developmental Processes in Crop Species panel. Sally has served in an editorial capacity for a number of journals, including *Plant, Cell, & Environment, Plant and Cell Physiology,* and *Plant Physiology.* Since 1998 she has been a co-editor for *The Plant Cell,* where she is currently co-editor for a special Perspective Series on Large-Scale Biology. She is also currently guest editor for a *Plant, Cell, & Environment* special issue on guard cells. Other service to ASPB includes membership on the Publications Committee from 2000 to 2005, co-organizer of the "Biology of Transpiration" meeting held in 2006, and current service on the board of directors of the Education Foundation.

Sally's K–12 outreach activities include teaching special programs on plant biology to elementary school classes and production of "Roots of Discovery," a 30-minute science education video. Her most extensive outreach effort has been development of a week-long summer science camp on plant biology for 4th through 8th graders. The camp, "Magical Life in the Muggle World," used the popular Harry Potter series to engage children's interest in the subject of "herbology."

Sally is looking forward to working with the president, Rob McClung, and immediate past president, Rick Amasino, to further the aims of ASPB. While the scientific status of the Society is outstanding and its financial status solid, there are still challenges and opportunities to be met:

1. One of the most important contributions that ASPB makes to the international community of plant biologists is the publication of two premier journals, *Plant Physiology* and *The Plant Cell.* The Society will continue to face financial and philosophical issues associated with open access publishing.
2. ASPB members appreciate the value and importance of research on plants for human and planetary health. This knowledge must be effectively communicated to our representatives on Capitol Hill so that they understand the need for federal support of plant research, which inevitably competes with many other research communities for support.
3. ASPB must continue to support innovative K–12 and public outreach initiatives. Research in plant biology is highly relevant to a number of "in the news" topics, including biofuels and global warming. Such issues provide plant biologists with ready opportunities to engage and educate non-scientists.
4. Finally, the Society must continue to reach out to our minority, graduate student, and international members, to identify their needs and ensure that they are well served.

Danny Schnell Elected Secretary


Danny Schnell

Danny Schnell becomes ASPB secretary on October 1 and will serve for the next two years. The secretary is also chair of the Program Committee.

Danny is a faculty member in the Department of Biochemistry and Molecular Biology and a member of the Plant Biology Program at the University of Massachusetts, Amherst. He grew up on the high plains of western Nebraska and received his BS in life sciences from the University of Nebraska, Lincoln, in 1983. He completed his PhD at the University of California, Davis, in 1987 with Marilynn Etzler. During this period, he became increasingly interested in the processes of protein targeting and organelle biogenesis. His postdoctoral studies with Günter Blobel in the Laboratory of Cell Biology at Rockefeller University between 1988 and 1993 focused his interests on chloroplast biogenesis.

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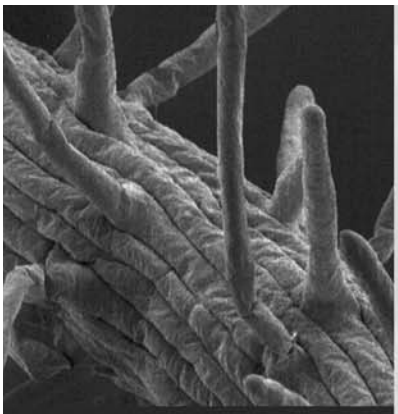

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Alan Jones Elected to Executive Committee

Alan Jones will join the ASPB Executive Committee as an elected member on October 1.


Alan Jones

Alan earned a BS degree in botany in 1978 from the University of Florida and a PhD in plant biology in 1983 from the University of Illinois at Urbana–Champaign. From 1983 to 1986, he was a postdoctoral research associate in the Department of Botany at the University of Wisconsin–Madison. He was assistant professor from 1986 to 1992 and associate professor from 1992 to 1999, and from 1999 to the present he has been professor of biology in the Program in Genetics and Molecular Biology at the University of North Carolina (UNC) at Chapel Hill. Since 2004 he has also been professor at the Department of Pharmacology at UNC.

Alan's research interests are in signal transduction through the heterotrimeric G protein coupled pathway, auxin and sugar sensing, cell surface receptors, extracellular regulation of cell proliferation, systems approaches to signaling networks, evolution of the heterotrimeric G protein complex, and K–12 education modules using Arabidopsis.

His professional activities and awards are many. Since 2005 he has been George and Alice Welsh Distinguished Term Professor at UNC. In 1996 he was Alexander von Humboldt Fellow, and since 1997 he has been Lifetime Fellow in the Alexander von Humboldt Foundation. He served on multiple NIH study sections and has participated in the Department of Energy Bioscience Program. He served on several NSF panels and was a member and panel manager of the USDA National Research Initiative Competitive Grants Program.

From 1998 through 2006, Alan was an editorial board member and then associate editor of the *Journal of Plant Growth Regulation.* His service to ASPB has included many activities. From 1991 to 1998, he was monitoring editor and, from 2005 to present, has been an associate editor of *Plant Physiology.* He was a member of the Constitution and Bylaws Committee from 1998 to 2001 and has served on the Program Committee since 2005.

Danny Schnell
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He took his first faculty position as an assistant professor in the Department of Biological Sciences at Rutgers University in New Jersey in 1993 and received tenure in 1998. In 2001, he moved to his present position, where he is full professor and head of the Department of Biochemistry and Molecular Biology. From 2002 to 2004, he also served as director of the Plant Biology Program.

A major focus of Danny's research continues to be the molecular mechanism of protein import into chloroplasts. In land plants, chloroplasts rely on the import of more than 3,000 different nucleus-encoded proteins to perform their essential roles in a vast array of plant metabolism, including amino acid and lipid synthesis, and photosynthesis. The studies in Danny's laboratory have combined biochemical and cell biological approaches with molecular genetics to identify and reveal the functions of the TOC–TIC protein import complexes. These molecular machines mediate selective targeting, membrane transport, and assembly of the majority of nucleus-encoded chloroplast proteins. More recently, the interests of his laboratory have expanded to include studies of the role of the protein import machinery in plant development. These studies indicate that the biogenesis of various plastid types relies on distinct but homologous TOC–TIC import pathways that have specialized in the import of specific classes of proteins. These different import pathways appear to be necessary to balance the essential physiological role of plastids in cellular metabolism with the demands of cellular differentiation and plant development.

Danny's teaching has focused on molecular biology, cell biology, and biochemistry at both the undergraduate and graduate levels. He has mentored more than two dozen undergraduate students, 17 graduate students, and 7 postdoctoral associates in his laboratory. His professional duties have included numerous grant panels for the NSF and permanent membership on the NIH Membrane Biology and Protein Processing Study Section. He currently serves on the editorial boards of *Plant Physiology* and *Molecular Biology of the Cell.* He has been actively involved in ASPB for many years, serving on the Program Planning Committee, Executive Committee, and Board of Trustees.

ASPB and BSA Unite in Chicago for Plant Biology & Botany 2007 Joint Congress

Historically, Chicago's prominence as a hub of the Midwest resulted from a geographically unique confluence of lakes, rivers, railroad networks, and cattle trains. In July, Chicago was the site of another impressive convergence, one comprising 2,798 plant biologists—members of four prominent plant societies—who came together from 55 countries to share achievements, puzzles, problems, and prospects in the vast fields that make up the plant sciences. A notable line-up of speakers transported attendees from their seats in downtown Chicago to such diverse places as the fields of Africa, the halls of Washington, DC, and U.S. elementary schools—all places where plant biologists have a profound impact on global and local issues.

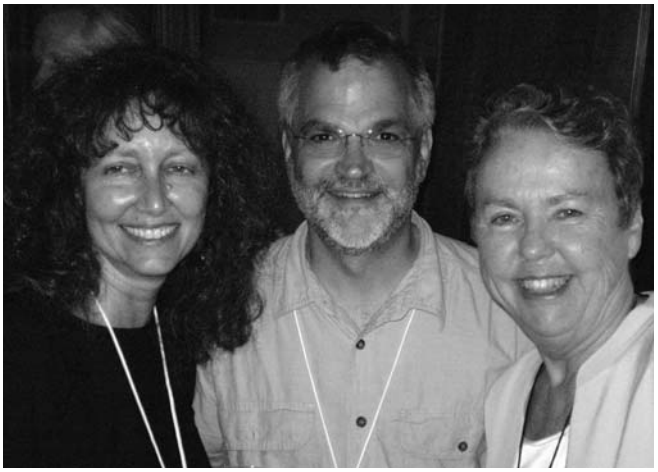
Over the five-day meeting, three plant societies—the Botanical Society of America, the American Fern Society, and the American Society of Plant Taxonomists—convened in concert with ASPB, creating a dynamic environment that spanned the breadth of plant biology research. Not since 1978—nearly 30 years ago—have ASPB and BSA held a joint meeting, a synergistic event that in the words of BSA President Christopher Haufler served to "present a total picture of plant biology research and education." According to Haufler, "More and more, the synthesis of information about plants is driving a lot of the questions we are trying to explore, so if we can bring together all of the elements, we are doing the right thing."

ASPB President Rick Amasino also spoke to the significance of the joint meeting in his Welcome Address. "In the past, it was common to study a single molecule or a single plant organ," Amasino began, "but today in our Society, we study the integration and development at the whole plant level, and in other societies, it is important to study larger issues at the molecular level." The array of posters and minisymposia at the 2007 meeting offered attendees the opportunity to consider how their own area of research is interconnected with all levels of the plant and the plant community. As ASPB President-Elect Rob McClung put it, "It's all about getting out of your comfort zone and learning new things."

Hot Topics in the Windy City

Plant Biology Research in Sub-Saharan Africa

A highlight of this year's program was a major symposium on plant biology research being carried out in sub-Saharan Africa. Five speakers from the continent made the journey to Chicago to give attendees a glimpse of real success stories in plant biology research in Africa. Deborah Delmer of the University of California, Davis, organized the symposium and, in an introductory talk, provided an insightful overview of the challenges faced in African agriculture. Delmer admitted that she knew very little about plant biology in Africa before she began working in international agriculture with the Rockefeller Foundation five years ago. Similarly, she reckoned that many ASPB members had little idea of the work going on there. "Many members were surprised at the quality of the science and the skill of the speakers," Delmer said after the meeting. "Similarly, it is important for young Africans to get exposure to the



(From left) Kathy Osteryoung, Dean DellaPenna, and Debby Delmer enjoy a party hosted by ASPB President Rick Amasino.

(From left) BSA President Christopher Haufler, ASPB President Rick Amasino, Judge John Jones, and BSA Program Director Karen Renzaglia. Judge Jones drew a standing ovation after his talk.

Ed Kaleikau of USDA–NRI (left) congratulates ASPB President Rick Amasino on his successful President's Symposium at the close of the ASPB annual meeting.

people and types of science ASPB members engage in," she continued.

Scientists in Africa face a range of obstacles that may seem foreign to those in the West. According to Delmer, most sub-Saharan African countries do not have agencies equivalent to the NSF, DOE, or USDA that fund basic research. In addition, most African countries lack laboratory infrastructure, training opportunities for scientists, and access to high-speed Internet and online journals. The science presented at the symposium was evidence that top-notch research is happening in Africa despite the odds.

Mande Semon, a researcher at the African Rice Center in the Republic of Benin, presented work that seeks to understand the population structure and evolution of rice species native to Africa using a genomics approach. According to Semon, this work has promising implications for breeding and management programs for domesticated rice species in Africa.

Cosmos Magorokosho followed with a presentation on maize diversity in countries such as Zimbabwe, Zambia, and Malawi. A researcher at the International Maize and Wheat Improvement Center in Kenya, Magorokosho collected and analyzed maize populations from different agroecological zones to look for variations among and relationships between African landraces and commercially bred varieties. Magorokosho believes that these data will aid breeding efforts to create a much-needed drought-tolerant maize for sub-Saharan Africa, where maize has replaced sorghum and millet as the main staple food crop.

James Ogwang of the Namulonge Agricultural Research Institute in Uganda shared a success story in biological control as applied to an invasive water hyacinth strangling the Lake Victoria ecosystem. From the time it moved into the lake in 1989, the "world's worst water weed" had covered 12,000 hectares of the lake by 1999, causing severe socioeconomic, ecological, health, and industrial problems. An integrated approach that included the mechanical removal of the weed in concert with the more essential introduction of two weevil species reduced the pesky biomass by 90%, a truly remarkable feat in the field of biological control. This talk was an all-conference favorite for Robin Walker, a graduate student at the University of Connecticut, who commented afterward, "I was fascinated by how the community there is being challenged and how plants are impacting their life as detriments to fishing and hydropower production."

In a time when commercializing genetically engineered crops to solve real-world agricultural problems is increasingly difficult for Western university researchers because of the hurdles of patents and deregulation, two researchers from the University of Cape Town in South Africa highlighted a promising case for the application of genetic engineering in the control of maize streak virus. In a tag-team effort, graduate student Bette Owor and postdoctoral researcher Dianne Shepherd, both from Jennifer Thompson's lab at the University of Cape Town, explained how they are using pathogen-derived resistance to engineer maize that is resistant to a virus that can cause up to 100% yield loss in susceptible maize varieties. Not only are they the first

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group to develop a transgenic line resistant to the maize streak virus, but their work has resulted in the first genetically modified crop to be developed through an "all-African" endeavor—no small feat indeed.

Alternative Renewable Energy Solutions

In light of the worldwide petroleum crisis, plant biologists are playing an important role in developing alternative renewable energy solutions. Thus, the symposium on bioenergy crops was much anticipated and well attended. Even before the symposium was held, attendees such as Madhavan Soundararajan from the University of Nebraska were looking forward to it after perusing the excellent posters on the topic during an early poster session. The symposium, organized by Stephen Long from the University of Illinois, highlighted the promise of various crops for biofuels production. The potential of shrub willow, maize, sweet sorghum, and perennial grasses such as *Miscanthus* and switchgrass were all examined in the series of four talks. The speakers focused on breeding approaches, genetic diversity, carbon assimilation, growing season variability, and systems approaches being taken to improve crops that hold promise as important bioenergy crops. Frank Dohleman, graduate student at the University of Illinois, ASPB ambassador, and a speaker in this symposium, was especially excited to see this topic included in the 2007 program. "[As a field], we've worked on food crops and we've started to optimize what those can produce. Now we need to start to optimize fuel production, and there are different things that go into that," he said.

Scientific Evidence in the Courts

Perhaps one of the most appreciated talks of Plant Biology 2007 came from someone who is not himself a plant biologist but who has made a fundamental contribution to science. Judge John E. Jones III, who delivered the plenary speech "Judicial Independence and Scientific Evidence," presided over the landmark case of *Kitzmiller v. Dover School District* in 2005 and ruled that the teaching of intelligent design within public school science classes is unconstitutional. Met with a standing ovation, Judge Jones discussed the process he went through in arriving at his decision and his hope that by making a broad decision, similar cases will be deterred in the future. He also touched on the important role scientists play in providing sound information in such cases. Mary Lou Guerinot, past ASPB president and a professor at Dartmouth, was especially "pumped" following Judge Jones's talk: "For those of us who have to teach evolution, it was really nice to hear from the guy who we regard as our hero," she said, echoing the thoughts of many.

ASPB Education Foundation Board Chair Jim Siedow (left) and ASPB President Rick Amasino thank Tuajuanda Jordan for her presentation at the Minority Affairs Luncheon.

Judge John E. Jones III delivers the plenary speech "Judicial Independence and Scientific Evidence."

Plant Biology 2007 Priorities

Minority Affairs

At the annual luncheon of the Minority Affairs Committee (MAC), travel grant recipients were recognized, and attendees learned about the MAC's ongoing initiatives such as the Diversity Bank, a resource for funding and mentoring opportunities that support members of underrepresented minorities pursuing studies in the plant sciences (see related article on page 18).

Tuajuanda Jordan, former associate dean of arts and sciences at Xavier University and now at the Howard Hughes Medical Institute, provided an insightful overview of how recent and current policy has affected the recruitment and retention of professionals from minority groups in the fields of science and mathematics. In her talk, Jordan addressed whether current legislative policies will enhance or impede the progress of underrepresented minorities obtaining degrees in the sciences. She dissected the effects of the No Child Left Behind Act and the Higher Education Reconciliation Act of 2005.

According to Jordan, despite their original intent, these policies have widened the gap among the haves and have-nots and have particularly affected minority groups. Jordan cited reports showing that U.S. precollege students have fallen in rank in science literacy. "We have to look at this pipeline of how we train our students to become scientists," she said. After examining the dismal effects of recent policies, Jordan presented a more optimistic outlook. "It's appropriate that we are in Chicago, where Jesse Jackson used to always say 'Keep hope alive,'" she said.

Karen Koch falls prey to President-Elect Rob McClung's antics. Unbeknownst to Rob, however, Don McCarty is avenging her by preparing to place a napkin on Rob's head. Witness to this spectacle are Hemayet Ullah, Nick Carpita (secretary), and Rick Amasino (president). The occasion was the Executive Committee dinner Friday night, July 6.

Attendees at ASPB's Lab Leadership Workshop network with speaker Wendy Boss (facing camera at left).

According to Jordan, hope came when Congress asked a panel of high-powered individuals to come together to talk about "the state of the union when it comes to science and math." She believed that if the recommendations of this panel are implemented, the number of members of underrepresented minorities receiving degrees in science and math will increase in the not-so-distant future. Specifically, Jordan predicted that members of underrepresented minorities will represent 50% of undergraduate and graduate degree recipients in science and math by 2050. In terms of the plant sciences, she noted that increasing minority-group graduates is "an even bigger challenge . . . and even more difficult for kids in urban areas because they don't see plants. But there is hope out there." Jordan was enthusiastic about the potential of tools such as Fast Plants in urban schools to expose students to the study of plants.

Anthony DePass, chair of the Minority Affairs Committee, applauded Jordan's talk. "Essentially, it helped MAC bring forth national issues for discussion and served to educate members of the Society," he said. "The talk encouraged discussion of issues that affect minorities but that also go beyond the Society and plant biology."

Following her talk, Jordan complimented the Society for bringing minority issues to the forefront. "There are some other larger societies that are going that way," she said, "but I think what is really good about this Society is that it seems like it is more personalized, and people really do care about the issues."

The MAC symposium "Plants and Human Nutrition" highlighted the research of four scientists studying the production of healthier oils, the evolution of diet in Native American Indian populations, nutritional genomics, and the breeding of nematode-resistant cotton varieties. Following her talk, Eugenia Winston, a Chicago native who works on nematode resistance in cotton, commented on her own educational experiences and the importance of mentoring. "What made a difference in my life were the people who mentored me," she began. "A couple of people took a vested interest in me and said, 'OK, this girl is from Chicago, and that's OK. She doesn't know much about what we're doing, but hey we're going to take her under our wing, because you are the one that is going to go on and disseminate this information.'" Winston encouraged the "next generation" in a brief pep talk, which she wrapped up as follows: "If I can make it up here, you guys can make it up here as well."

Women in Plant Biology

At the Women in Plant Biology Committee luncheon, Jo Handlesman gave a talk titled, "The Women Don't Need Fixing: The Role of Institutions in Advancing the Participation of Women in Science." She asked why, given the representation of women in PhD programs in the past 20 years, there are not more women in leadership positions in science. Handlesman, professor at the University of Wisconsin–Madison, served on a panel that produced a recent report for the National Academy of Sciences titled *Beyond Bias and Barriers: Fulfilling the Potential of Women in Academic Science and Engineering.* She presented the study's methods and findings to luncheon attendees in the hope that those present would share the findings of the study at their own institutions. The report recommended the implementation of leadership workshops with a diversity component and provided strategies for overcoming gender biases.

Handlesman also offered suggestions to professional societies for working toward a more balanced professoriate. "Professional societies have a special sort of bully pulpit to use to advocate for equality and fairness and to promote the equality of women in science," she said. She pointed out how the lab leadership workshop held before the official 2007 meeting, at which she also spoke, was a great forum for training people at early stages

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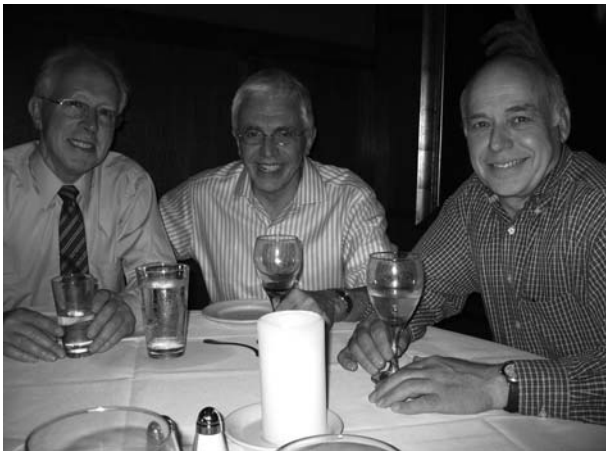

Editors-in-chief past and present at the ASPB Editorial Board Dinner at Gioco: Maarten Chrispeels, Ralph Quatrano, and Don Ort.

Peter Hepler, John Boyer and his wife Jean, and Nick Carpita at the Fellows reception.

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in their careers in being fair and equitable employers later on.

Handlesman believes that the National Academy of Sciences report offers program ideas that in theory should not be difficult to implement in closing the current gender gap. "If universities, professional societies, federal funding agencies, and the rest of the scientific community collaborated on this and really had the will to implement some of these programs, we think that we could achieve equity in science in a very short period of time—like 10 to 20 years."

Wendy Boss, professor at North Carolina State University, was last year's WIPB luncheon speaker and attended this year's luncheon. "We've got to have more diversity in all areas—race, color, and creed—and so I think the Society needs to keep working on it," she said. "We have some strong young women coming in, and we just have to show them through the senior leadership."

Undergraduate Poster Session

Undergraduate research was highlighted at the undergraduate poster session. Rising undergraduates were in the limelight as they presented their research in a special session that helped kick off the meeting. Students represented institutions from around the country and abroad and presented work that covered a broad spectrum of topics in plant biology. Charnise Goodings, a rising junior at the University of the Virgin Islands, had never attended a large scientific meeting before and was pleased with the number of people who came by her poster. Noemi Guerrero, a senior at the University of Florida, was also thrilled to have the opportunity to share her research. "It's great to see so many undergraduates here. This is a great opportunity for us to get experience and to see what other people are working on," she said.

Melissa Hamner was a meeting veteran; she had attended the Boston meeting in 2006, which she said confirmed her desire to go into plant biology after switching from premedicine at Trinity University. "I feel like my research is better this year," she said. Hamner was a 2006 Summer Undergraduate Research Fellowship (SURF) recipient and has been conducting her research under the guidance of James Shinkle.

Ambassador's Club

One year following its inception, the ASPB Ambassador's Club, strengthened in its numbers, met to set more goals at its second annual luncheon. The ASPB Membership Committee established the Ambassador's Club to increase awareness of and participation in ASPB among graduate students. Committee Chair Mel Oliver and his inaugural team of graduate student ambassadors initiated the program last year in Boston with the idea that graduate students are the best people to help increase their fellow students' interest in ASPB membership.

According to Jeremy Coate, a student ambassador at Cornell University, the program is going well. "We've all taken different approaches. Cornell has an active graduate student association for plant biology, and so within that context, I've been talking about the Society and what it can do in terms of serving graduate students," he said. Coate is now looking forward to expanding his approach using less traditional ways of communicating with students.

Another veteran ambassador, Colleen Dougherty, a student at Michigan State University, was pleased to see that graduate student membership is up by 8% this year. "At Michigan State, we've had pizza parties where we talk about ASPB that have really brought the community together," she said.

Ambassador Vijaya Pasapula from Texas Tech spread the word about ASPB at scientific meetings held on his campus last year.

Career Workshops

Young plant scientists benefited from career workshops aimed at showing the broad spectrum of jobs available to plant biologists and offering advice on finding a postdoctoral position that fits. Those just beginning their career had the opportunity to dine with more senior professionals, who also offered advice to the next generation of plant scientists at two concurrent workshops.

The first featured speakers from industry, publishing, academia, and policy, and the second advised those headed down the academic track on how to have a fulfilling postdoctoral experience. Speakers presented their views on what the postdoc options are in industry versus academia, how to get funding, how to balance research and teaching, how to find a good mentor, and what principal investigators are looking for in a postdoc. Terry Delaney, professor at the University of Vermont, participated in the latter workshop and felt that it was beneficial to those who attended. "There's a lot of anxiety about what happens next," Delaney said.

In Closing

No ASPB meeting is complete without the final party featuring the annual opportunity to see the incredible dance moves that plant researchers have practiced in the lab during the months preceding each year's meeting. Chicago was no exception: Members of all participating societies danced the night away to the tunes of Chicago's own award-winning Brave Combo.

As attendees packed up their posters and bid farewell to their fellow phytophiles, some were already anticipating Plant Biology 2008, to be held in Mérida, Mexico, in conjunction with the Sociedad Mexicana de Bioquímica. President-elect Rob McClung, who will preside over that meeting as a "puppet in the hands of Jean and Wendy," is already very excited about ASPB going to Mexico. "ASPB has a long history of meeting with the Canadian society. I think it's going to be important to interact more effectively with our colleagues in Mexico, Central America, and South America. Science is globalizing, and ASPB must as well," McClung said during the final day of the 2007 meeting. "Reaching out to different scientific areas and scientific communities is a positive thing that brings about exciting new opportunities."

Hasta la vista en 2008!

www.aspb.org/pb-2008

Overheard in Chicago . . .

"I love these meetings for the networking. I like the fact that this meeting is big, and the lead investigators all come to it. So when I come to this meeting, I know I am going to see people who I know and want to talk to."

"I usually go to horticulture meetings, but I wanted to branch out and get more broad, because ultimately I want to teach biology."

"I had to go to way too many breakfast meetings."

"Something that I am benefiting from is that the meeting is joint with other societies, and there is so much to hear about."

"We need chairs at the poster sessions. It is hard for those of us who are getting older to stand here for three or four hours. And hard to eat balancing these little dishes."

"As someone who has moved to work in industry, I think it is even more important for me to come to this meeting to keep up on what trends are developing in the plant sciences. If you don't come to these meetings, you don't get that feel for where the field is going."

"It's too large. The young people like to be at small meetings to network, and you lose the networking when it's this big."

"I come to Plant Biology because I do plant physiology; that is my research, and Plant Biology is the best venue for me to meet my colleagues and form collaborations and also disseminate my research to the general public."

"There are just too many posters to browse through for people who like to browse."

"This is the first ASPB meeting I've been to. I came to learn more plant biology, because I come from a mammalian system background."

"The microphone announcements in the exhibition hall are awful!"

"I am having a lot of fun running into people I haven't seen in a long time. I walk around posters, and I find interesting posters, but just as often I run into people I know—we enjoy talking science but also just talking about life."

"I think the synergy that comes out of having several groups doing different stuff together and exposing them makes up for any inconveniences that come out of it."

Plant Biology & Botany
2007 JOINT CONGRESS


CUSTOM SIZED
CHAMBERS


CHICAGO

How the ASPB MAC Recognition Travel Award Helped Me Realize My Goals and Objectives in Chicago

Clifford Louime, Research Associate, Center for Viticulture and Small Fruit Research, Florida Agricultural and Mechanical University, Tallahassee
http://www.famu.edu/oldsite/acad/colleges/cesta/vit-faculty.htm

I received an ASPB MAC (Minority Affairs Committee) Recognition Award that enabled me to attend the 2007 ASPB annual meeting in Chicago this past July. The goal of this award is to increase participation of underrepresented minorities and those teaching them in the Society's scholarship by providing individuals with the opportunity to attend ASPB's annual meeting. The award covered travel, food and lodging, and the registration fee for the conference. Coming from Florida A&M University, a minority-serving institution (MSI) where resources are very limited, it would have been almost impossible for me to attend Plant Biology 2007 without this award. This was also the case for several other MAC Recognition awardees who attended the meeting as well. They represented several institutions across the nation, including Louisiana State University, Mississippi State University, and Bowie State University.

During a "meet and greet" with other awardees and ASPB representatives, we all got acquainted and learned about the different institutions we were from and our various interests, expectations, and research areas. We were also presented with the Society's goals and vision. I was particularly impressed by ASPB's commitment to inclusion initiatives, a commitment that was amply demonstrated when three presidents showed up for the MAC meeting.

The Society rightfully recognizes the importance of minority representation in the field of plant biology and has undertaken several programs to address it (or the lack thereof). One initiative is the creation of a Diversity Bank (http://www.aspb.org/diversitybank/), which is a resource tool for plant biologists to exchange information and to help MSIs enhance their research and teaching capacities. Few other scientific societies have such an elaborate program. The time and efforts invested in such programs are to be applauded.

This plant biology meeting was also one of the highlights of my career as a young investigator. As you may be aware, at most MSIs the focus is more on teaching than research. Therefore, I have been exposed mostly to the more applied aspects of plant biology. Before heading to Chicago I set as one of my goals to learn about new developments in functional genomics that could be directly applied to my current research initiatives. This goal was met the first day, when I had the chance to describe my research projects to two colleagues from Purdue University, both of whom offered very interesting feedback. Their constructive comments have served a dual purpose: I not only acquired the most current information about microarray and real-time PCR tools, I also broadened my knowledge of the field. Having extensive experiences in genomics, my new colleagues from Purdue pointed out potential problems with the technologies that I may encounter during the course of my study, including some experimental pitfalls to avoid, and they shared tips on how to generate quality publishable data. In addition, our exchange generated new ideas about different areas of research, such as how my current project might be expanded to address the emerging field of metabolomics.

The Chicago meeting also provided me with the opportunity to gain experience making presentations. I presented a poster on chalcone synthase, which operates in the flavonoid biosynthetic pathway and is involved in the interactions of plants with their environment. By presenting my research findings to others and listening to their comments, I was able to expand my research focus and add another component to my data analysis. In addition, I was able to expand my network of contacts while strengthening existing ones.

The most memorable moment was my conversation with a scientist from Maryland to whom I was complaining about how hard it is to publish these days and how my last paper was rejected by a journal. Imagine my surprise when I realized that he was the editor-in-chief of the journal that declined my manuscript! He explained the review process to me and told me what the journal expectations are in order for me to get published next time around. We laughed about the coincidence and promised to work closely to make sure I get published.

I also vividly recall my visit to the NSF/USDA/DOE booth, where I learned a great deal about funding opportunities and met program officers from each of these federal agencies. They provided up-to-date information on grants available for training, research, and other professional activities. I took this information back to the FAMU campus and shared it with other faculty members and staff, who will benefit greatly from it.

Possible employment opportunities were also numerous in Chicago; some informal discussions with a scientist from Texas let me know what is expected of new hires. The Exhibit Hall even contributed to the successful outcomes from the meeting, as vendors exhibited their latest products and presented the newest tools for conducting research.

In all, the Chicago experience was very positive for me, and ASPB's commitment will have a lasting impact on me and my institution. I would like to express my gratitude to the ASPB MAC for providing me with this opportunity, and I can't wait for Mexico 2008!

Award Honorees at Plant Biology 2007

Congratulations to the winners of this year's ASPB awards. The following presentations were made during the Saturday, July 7, ASPB Awards Ceremony at the Plant Biology & Botany 2007 Joint Congress in Chicago.

ASPB President Rick Amasino (left) with 2007 award winners (from left) Patricia Léon, John Boyer, Sarah Hake, Rich Jorgensen, Roger Hangarter, Sam Zeeman, Elena Shpak, Derek Bewley, Nicola Harrison-Lowe, and Winslow Briggs.

ASPB–Pioneer Hi-Bred International Graduate Student Prize

The ASPB–Pioneer Hi-Bred International Graduate Student Prize is an investment in our nation's future scientists and is intended to recognize and encourage innovative research and leadership in an area of plant biology related to important crops. This year's nominees have pursued an extraordinary range of research projects that address a diversity of important questions relevant to crop systems. The Award Committee was impressed by the academic records and research projects of all the nominees.

Nicola Harrison-Lowe

The winner of the 2007 ASPB–Pioneer Hi-Bred International Graduate Student Prize is Nicola Harrison-Lowe, a graduate student at the University of Michigan in the laboratory of Laura Olsen. Nicola graduated with honors from Eastern Michigan University with a BS in chemistry and biology. Her dissertation research began with a specific focus on the role of plant autophagy during plant development and stress responses. Her current research involves using a variety of innovative approaches to understand the role of Autophagy Protein 6 (ATG6). To her surprise, she found that ATG6 is of particular importance during post-microsporogenesis pollen development. Funded in part by a fellowship from a cellular biotechnology training program, Nicola's research is uncovering new insights into the biochemical and molecular mechanisms by which ATG6 functions. The results of her research will shed new light on the role of autophagy during various stages of plant development, as well as during stress responses. In addition to her commitment to basic plant biology research, Nicola also is developing excellent teaching and leadership skills. She has a long-term interest in whole plant physiology, including bioremediation and biofuels. She eventually plans to use her talents in the academic setting and for educational outreach activities, though industry still holds some appeal as well.

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 1 of the year of the presentation.

Elena Shpak

Elena Shpak was selected for the Early Career Award because of her outstanding accomplishments in two different areas of research in plant cell and molecular biology and her potential for continued creative contribution. She is recognized for achievements in both plant biochemistry and plant development. Elena earned a doctorate in biochemistry in only four years at Ohio University under the supervision of Professor Marcia J. Kieliszewski. She avoided the "safe" projects in her adviser's laboratory and instead took on and solved the challenging question of what might be the determinants of hydroxyproline-O-glycosylation, resulting in a seminal paper dealing with hydroxyproline-O-glycosylation codes. In addition to the high-profile peer-reviewed publications that resulted from her doctoral research project, she also con-

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tributed to numerous U.S. international patents and patent applications and a license agreement. Elena subsequently completed postdoctoral studies in the Department of Biology at the University of Washington with Professor Keiko Torii. There, she is credited with making three major contributions to our understanding of the ERECTA receptor tyrosine kinase.

After spending a year as a biology instructor at California State University in Fullerton, Elena joined the faculty at the University of Tennessee in 2006, where she has established a research program to study ERECTA-mediated signaling and to understand how plant organ primordia develop. Both her PhD and postdoctoral mentors indicate that she had an enormous impact on the direction of research in their own groups and, despite her youth, she is already attributed with excellent mentoring skills. Elena is described as "impressive," a "high flier with a creative flair for research," a "whiz at the bench," and a "terrific scientific companion" with the potential to contribute "fundamental textbook-level insights into plant growth and development."

Adolph E. Gude, Jr. Award

This monetary award honors the Gude Family, who made possible the establishment of the Gude Plant Science Center. The award, established by the Society and first given in 1983, is made triennially to a scientist or lay person in recognition of outstanding service to the science of plant biology.

Winslow R. Briggs

Winslow Briggs will receive the 2007 Gude Award for his outstanding service to the plant science community. Winslow was a member of the editorial board of *Annual Review of Plant Physiology and Plant Molecular Biology* for over 30 years, including 21 years as editor; served as president of the American Society of Plant Physiologists, the California Botanical Society, and the American Institute of Biological Sciences; organized several Gordon conferences and international meetings; and, for 20 years, was director of the Plant Biology Department of the Carnegie Institution of Washington.

Many students have been mentored and many visitors hosted in Winslow's laboratory. His contributions have helped shape the fields of plant physiology in general, and of photomorphogenesis in particular. Our present understanding of blue light photoreception comes in large measure from his 40-year personal quest. Winslow has shown by example how great science and great humanity can go together, how great science is always a team effort, and how joyful it can be.

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 40 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.*

Samuel C. Zeeman

Sam Zeeman is this year's recipient of the Charles A. Shull Award for pioneering research leading to the discovery of new proteins and pathways in starch synthesis and degradation in leaves. This is a topic that is of broad interest to plant biologists and also has relevance to food processing and human health and nutrition. As a graduate student in the laboratory of the late Professor Tom ap Rees at Cambridge University, Sam isolated Arabidopsis mutants altered in their ability to mobilize leaf starch. These mutants were then investigated further during postdoctoral research at the John Innes Centre, where Sam worked with Professor Alison Smith. The mutants established an entirely new pathway of starch mobilization from darkened leaves that involves export of maltose from chloroplasts on a novel maltose transporter (MEX1). In the cytosol, maltose is converted to glucose, not by a simple hydrolysis reaction as might be expected but via a transglucosylation reaction that produces glucose and a glucosylated acceptor. Sam's discovery that leaves have a different pathway of starch breakdown from that in cereal endosperm and legume seeds has forced a revision of many textbook schemes. Another exciting discovery concerns the essential role for dephosphorylation of either starch itself or starch-metabolizing enzymes in regulation of starch mobilization.

As an independent investigator at the University of Bern and now the prestigious ETH in Zurich, Sam continues to explore the intricacies of starch metabolism and the signaling and control networks that link this metabolism to plant growth. The European Molecular Biology Organization has recognized his outstanding achievements at a young age by electing him as an EMBO Young Investigator. Sam has also dedicated himself to collaboration in research and has already fostered a worldwide spirit of collaboration among groups working on primary carbohydrate metabolism in Arabidopsis.

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 sixty 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.

John S. Boyer

John Boyer is the DuPont Professor of Biochemistry/Biophysics Emeritus at the University of Delaware. He received a BA in biology from Swarthmore College in 1959. He completed an MS in 1961 at the University of Wisconsin and received a PhD in 1964 from Duke University with a major in plant physiology under the advice of Professor Paul J. Kramer.

John has had a stellar career at the University of Illinois, Texas A&M University, and the University of Delaware. He is nationally recognized for his many contributions in the area of plant–water relations and crop adaptation to drought, with a focus on the impact of water deficits on growth, photosynthesis, and reproductive development. He has trained more than 40 graduate students and postdocs and published more than 160 refereed papers. John is also a gifted educator. Many of his own graduate students have gone on to enjoy influential research careers, which reflects the high quality of training they received in John's program.

John coauthored with Paul Kramer the standard textbook *Water Relations of Plants and Soils* in 1995. He served on many national committees and editorial boards, including *Plant Physiology* (1971–1992). He served as president of the American Society of Plant Physiologists from 1981 to 1982. His accomplishments have brought distinction and outstanding international recognition to his program, with honors including election to the National Academy of Sciences in 1990 and as a Corresponding Fellow of the Australian Academy of Sciences in 2005.

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 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 percent of the dues-paying membership.

J. Derek Bewley

J. Derek Bewley is university professor emeritus at the University of Guelph, where he has been a faculty member since 1985. He began his scientific career in the United Kingdom, obtaining both a BSc (1965) and PhD (1968) from Queen Elizabeth College, University of London. The topic of his PhD dissertation, under the supervision of Michael Black, was on the role of gibberellins in germination of light-sensitive lettuce. A postdoctoral training opportunity brought him to North America and the lab of Abe Marcus at the Institute for Cancer Research in Philadelphia, where he studied the role of initiation factors in protein synthesis of wheat embryos. He was hired as an assistant professor in the Department of Biology at the University of Calgary in 1970 and quickly advanced through the academic ranks, becoming a full professor in 1977. In 1985 he moved to the University of Guelph to become chair of the Department of Botany, where he reorganized the department, hired many new faculty, and increased graduate student enrollment. During his long career, Derek has shared his broad knowledge of plant biology with colleagues at universities throughout the world by holding appointments as visiting scientist, visiting professor, or distinguished fellow at the University of London; McGill University; The John Innes Centre; the University of Adelaide; and the University of California, Davis, among others.

Derek is one of the foremost international experts on seed biology. His original research has made fundamental advances in the areas of seed storage protein synthesis and degradation, seed development, water relations, somatic embryogenesis, germination, and dormancy. His seminal work on the role of endosperm identified this tissue as a key for regulation of radical emergence in seeds. He and his colleagues showed that endosperm weakening was a prerequisite for germination and that cell wall polymers contributed to endosperm rigidity, and they identified the principal enzymes responsible for wall loosening and seed germination. Derek's group also linked ABA with seed development, showing that ABA levels correlated with storage protein accumulation. This paved the way for consideration that ABA was not just an inhibitor of germination but rather had multiple and profound effects on seed development.

To date, Derek has published over 250 peer-reviewed articles, book chapters, review articles, and books on these topics and is on the ISI Highly Cited Author list, with over 5,000 citations accumulated. Today's plant scientists have undoubtedly been educated about seed biology from the definitive texts that Derek wrote with Michael Black: *Physiology and Biochemistry of Seeds* (1978, 1982) and *Seeds: Physiology of Development and Germination* (1985, 1994). Their most recent effort, an edited volume of over 500 articles titled *Encyclopedia of Seeds: Science, Technology. and Uses,* will certainly continue to inform and educate the next generation of plant biologists.

Derek has been a lifelong supporter of both ASPB and our sister society, the Canadian Society of Plant Physiologists, and has been a leader in promoting cooperation between these societies. He is a past president of CSPP and organized a joint conference of the two societies in Toronto (1989). He was a monitoring editor of *Plant Physiology* from 1992 to 1995. He is also an elected fellow of the Royal Society of Canada (FRSC, 1982). Among a list of awards too numerous to include in their entirety, several are quite noteworthy, including a Gold Medal Award from the CSPP for professional achievements (1992), the Career Excellence in Research Award from Sigma Xi (1993), and the Distinguished Biologist Award from the Canadian Council of University Biology Chairs (1994).

Wilhelm Gruissem

Wilhelm (Willi) Gruissem is one of the pioneers in the field of plant molecular biology. Willi and his collaborators can include many "firsts" among the work they have published, including establishment of an efficient in vitro transcription system; uncovering the many fundamental aspects of isoprenoid biosynthesis, protein prenylation, and IP3 signaling; and the first identification and functional analysis of plant retinoblastoma proteins. When Willi first established a research group at the

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University of California at Berkeley in the 1980s, the main focus was on plastid development, regulation of plastid gene expression, isoprenoid synthesis, and communication between plastids and the nucleus. Today his work encompasses both basic plant biology research as well applied research, aimed toward improving food quality. Current projects in his group at the Swiss Federal Institute of Technology (ETH) in Zurich range from the development of tools for proteome analysis and bioinformatics to understanding the complex machinery of cell cycle regulation and differentiation; to functional genomics of plant isoprenoid synthesis; to biotechnology of cassava, rice, and wheat. His research productivity and quality are documented by over 150 peer-reviewed articles that appear in the best journals in the field.

Willi's devotion to the enhancement of crops through genetic engineering is well known throughout Europe, and his leadership skills in this arena are valued internationally. He is currently serving as president of the European Society of Plant Sciences and has consulted with numerous granting agencies, governments, companies, and institutions around the world. His scientific expertise is also routinely sought by top-tier journals, including those published by ASPB *(Plant Physiology* and *The Plant Cell),* where he has held co-editor and associate editor positions in recent years. He has been editor-in-chief of *Plant Molecular Biology* since 2001. Willi has also had a major influence on plant biology through the publication of the ASPB-sponsored textbook *Biochemistry & Molecular Biology of Plants,* which he developed and edited with his Berkeley colleagues Bob Buchanan and Russell Jones. This book has been used in countless courses in the United States and abroad; has been translated into Chinese, Japanese, and Italian; and has received several accolades and awards. Willi is an elected fellow of the American Association for the Advancement of Science, was recognized as a UC Chancellor's Professor, and won the 2003 Anniversary Prize of the Eiselen Foundation Ulm, Germany.

His distinguished scientific career began in Germany, where he obtained both his MSc (1977) and PhD (1979) from the University of Bonn. Subsequently, he held postdoctoral research associate positions at the University of Marburg, Germany (1979–1980), and the University of Colorado, Boulder (1981–1983). He was hired as assistant professor in what was then the Department of Botany at the University of California at Berkeley during 1984. He was promoted with remarkable speed, becoming full professor in 1990, and served as chair of the Department of Plant and Microbial Biology from 1993 to 1998. During his time at Berkeley, he was also a leader of the university–industry alliance and served as director of the PMB–Novartis Collaborative Research Program for several years. He returned to Europe in 2000 as professor of plant biotechnology at the ETH. His leadership skills continue to serve the scientific community through his positions as co-director of the Functional Genomics Center Zurich (2001–present) and chair of the Institute of Plant Sciences ETH Zurich (2004–2005) and the Zurich–Basel Plant Science Center (2004–2006).

Patricia M. Léon

Patricia Léon was born in Mexico and obtained a broad and extensive education both in Mexico and the United States. After undergraduate studies in biology at the Universidad Nacional de México (BSc, 1982), she obtained two master's degrees, the first in biomedical research at the Instituto de Investigationes Biomedicas, UNAM (1985), and the second earned during time spent at Stanford University (MSc 1987) in the lab of Virginia Walbot. Her work on the regulation of gene expression in maize mitochondria from a male sterile line revealed the presence of a linear plasmid that had apparently captured tRNA genes. Patricia returned to Mexico for PhD studies at the Biomedical Research Centro de Fijación del Nitrógeno in Cuernavaca. Her thesis (1991) was on the use of a transient assay system to study gene regulation in *Phaseolus vulgaris.*

As a Pew Scholar, Patricia returned to the United States for postdoctoral work with Jen Sheen at Massachusetts General Hospital. During that period she isolated several Arabidopsis glucose-insensitive (gin) mutants, providing the first evidence for an important connection between sugar and hormone signaling pathways and establishing the basis for further work in Sheen's and her own laboratories. Since 1991 she has been on the faculty of the Instituto de Biotecnología, UNAM, in Cuernavaca Morelos, and was promoted to professor in 1997.

Current research in Patricia's laboratory focuses on two main areas: molecular events involved in chloroplast differentiation and the complex intersection between sugar sensing and hormone signaling. The lab studies both of these problems with a powerful combination of molecular genetics, biochemistry, and physiology. Major contributions to understanding of isoprenoid biosynthesis came from her work on the dissection of the MEP (methylerythritol phosphate) pathway in chloroplasts and identification of CLA1, whose gene product catalyzes the first enzymatic step of this pathway. The pathway is necessary for the synthesis of plant hormones (GA and ABA) and for generation of plastid carotenoids. Future work in her group will continue to exploit a large collection of plastid development mutants to uncover additional secrets of chloroplast biogenesis. Her second set of projects deals with how glucose acts as a hormone-like molecule to mediate metabolic and developmental responses in plants. The work of Léon, Sheen, and colleagues has already led to the widespread acceptance that both ABA biosynthesis and signaling are integrated with sugar signaling networks. Moreover, identification of the transcription factor ABI4 gives a starting point for further understanding of a complex gene regulation network that underlies these interconnected systems. These and other works have been published in many highly cited articles in top-tier journals.

Patricia's research excellence has been

recognized by the prestigious Howard Hughes Medical Institute, and she was awarded one of a handful of Latin American HHMI International Fellow positions in 2002. Her expertise also serves the community through scientific review for many top-tier journals and funding agencies. Notably, she has diligently served as a co-editor for *The Plant Cell* since 2003, where her opinion is highly valued by the editor-in-chief and her fellow co-editors.

Excellence in Teaching Award

This award was initiated in 1988 to recognize outstanding teaching in plant biology. It is an award to be made not more than triennially in recognition of excellence in teaching, leadership in curricular development, or authorship of effective teaching materials in the science of plant biology.

Roger Hangarter

Roger Hangarter is the 2007 ASPB Excellence in Teaching Award recipient. Roger has been selected to receive this award because of his strong commitment to undergraduate and graduate education and his remarkable contribution to engaging students of all ages in the biology of plants. He not only maintains an active, internationally recognized research program, but also serves as an excellent teacher and inspiring mentor. He has developed the "Plants in Motion" website, which has allowed numerous educators to show their students the fascinating growth and topic movements of plants. This website has been cited in numerous articles and journals, including *Science.* In addition, Roger developed, together with Dennis DeHart, s*L*owlife, an art installation including video pieces, live plants, prints, and pieces created from plants and fungi. This exhibit has been presented at Indiana University and the United States Botanic Garden in Washington, D.C., serving as a broad educational outreach tool. Roger also developed "Plant Dance," an interactive exhibit about plants for children. Plant Dance has been on display in St. Paul, Minn., Durham, N.C., and Berkeley, Calif., and continues to travel throughout the country. Roger created *Return of the 17-Year Cicadas,* a short film documenting the 17-year cicada emergence in 2004. The film won the Science and Engineering Visualization Award from NSF and the journal *Science.* Lastly, Roger has contributed plant time-lapse movies to educational agencies and exhibits in various nations.

We in the plant community owe a debt of gratitude to Roger for providing all of us with the tools to excite our students and for showing the public the dynamic life of plants. He is a tireless advocate for plant biology and plant biologists.

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 1993. 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 the following year.*

Richard A. Jorgensen

Rich Jorgensen has been awarded the 2007 Martin Gibbs Medal for his pioneering work leading to the discovery of RNA interference (RNAi). The work on cosuppression and epigenetic gene silencing, conducted in plants by Rich and his coworkers, significantly contributed to the present understanding of the scientific and practical importance of RNAi. For several years following the initial publication on cosuppression by Napoli, Lemieux, and Jorgensen *(Plant Cell* 2: 279–289 [1990]), Rich was the leading spokesperson for the diversity of RNA-based regulatory mechanisms in plants. Subsequent mechanistic studies in diverse plant, animal, protist, and fungal species established the universality of these mechanisms. The seminal contributions to this field made by the Jorgensen laboratory over the past 17 years make him particularly deserving of the high level of recognition bestowed by the Martin Gibbs Medal.

Cosuppression, as first described and defined by Napoli et al. (1990), is the reduction of endogenous host gene expression resulting from attempts to overexpress the homologous transgene. This seminal work demonstrated that cosuppression required homology between coding sequences and that the epigenetic state was not heritable in the absence of the inducing transgene. Over the years, the term *cosuppression* was first replaced by mechanistic terms such as *post-transcriptional gene silencing (PTGS)* and now *RNAi.* Rich developed petunia as the model system for his cosuppression experiments because it offered convenient, elegant flower pigmentation pattern phenotypes, which were useful for distinguishing the sometimes infrequent epigenetic events. One very important observation was that silencing of chalcone synthase occurred at strikingly different efficiencies and produced a variety of flower color patterns depending on the nature of the transgene construct. Rich and his coworkers made the critical observation that constructs not engineered for overexpression were only competent to induce RNAi if the transgene was integrated in the genome as an inverted repeat, leading directly to our current understanding of the importance of double-stranded RNA in RNAi.

Rich was quick to recognize the potential significance of systemically transmitted RNA in an information "superhighway." He proposed that the capacity of plants to traffic RNA via the phloem and plasmodesmata, taken together with the ability of RNA to imprint homologous DNA in a cell-, tissue-, or organ-specific manner, might store information in chromatin about the developmental and physiological history of the plant. This stored memory could conceivably be modified, reprogrammed, or reset by new information.

The impact on biology, agriculture, and medicine of these new concepts will surely continue to expand over the coming decades. Rich's pioneering contributions in this area are clearly reflected in the literature and underlie the diverse array of biological roles played by RNAi. He has influenced the field far beyond his key publications and

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review articles. The medical implications of RNAi are only just beginning to be exploited, including potential therapies for viral infections (e.g., hepatitis-C, HIV), degenerative diseases (e.g., macular degeneration, ALS, and Type II diabetes), and cancer (e.g., HIV-related lymphoma). These potential benefits to mankind began with Rich and his colleagues' careful and insightful observations of fundamental genetic mechanisms in petunia.

Stephen Hales Prize

This award honors the Reverend Stephen Hales for his pioneering work in plant biology published in his 1727 book Vegetable Staticks. *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.*

Sarah Hake

Sarah Hake has made pioneering contributions to our fundamental understanding of plant developmental biology that span the scientific disciplines of evolution, genetics, cell biology, and plant molecular biology. She has been a vigorous advocate of plant biology at the national level and to the general public. She has served the plant biology community diligently through her distinguished work on the advisory boards for TIGR and MaizeGDB. She has served ASPB as a member of the Publications and Charles Albert Shull Award Committees and through her service on the editorial board of *The Plant Cell.*

Sarah's groundbreaking research with the Knotted mutant of maize, using the then-novel method of transposon tagging, led to the isolation of the first plant homeobox gene, knotted1. That plants contained homeodomain proteins provided an important link to their animal counterparts and critical data for evolutionary theory. Her subsequent work verified that kn1 functioned as a master regulatory gene in the maintenance of apical meristems and hence plant architecture. Her work has demonstrated the importance of homeodomain-type proteins in the regulation of genetic pathways controlling plant shoot architecture, inflorescence architecture, and embryonic and reproductive development and will have a major agronomic impact through improvement strategies for grain production.

Sarah and her coworkers also discovered the importance of transcription factor movement between cells in a highly specific manner, moving across a single cell layer in the apical meristem via plasmodesmata. This pioneering work provided evidence that plants use plasmodesmata to transport critical regulatory proteins to adjacent cells where they function during morphogenesis and development. This established the new paradigm that plant development is dependent not only on where and when transcription factors are expressed, but also where and when these factors move.

Fellow of ASPB

An Introduction to the Inaugural Class of 2007

Over the past two years, ASPB has developed the Fellow of ASPB Award to recognize and honor long-term members of the Society who have made major contributions to the discipline in diverse areas that include research, education, mentoring, outreach, and professional and public service. Having formed a committee to establish the nomination and selection criteria for the honor, ASPB announced the award earlier this year and solicited nominations in conjunction with the annual awards nomination process.

The Society realized that with so many distinguished and long-serving plant scientists eligible to receive the award, it would be both necessary and appropriate to name a large inaugural class. Indeed, over 50 fellows had been named, and their awards were announced during ASPB's annual meeting in Chicago in July. Once you have read about the members of this inaugural class of ASPB Fellows, please begin thinking about other Society members whose long-term contributions to plant biology and service to the Society would render them worthy of nomination for future Fellows Awards, an honor that may be bestowed annually on up to only 0.2% of the current membership.

It is simply impossible to introduce over four dozen heroes of plant biology and succinctly summarize their contributions to ASPB and plant science as a whole. Nevertheless, it is important to let you know at least a little about the distinguished scientists that received recognition as ASPB Fellows this year, including, in parentheses after their names, the year in which they joined the Society. Please welcome ASPB's 2007 Fellows.

Nick Carpita
Chair, ASPB Fellows Committee

Charles Arntzen (1966)
Regents Professor, Arizona State University

Charlie's primary research interest was photosynthesis, but his current interests lie in plant molecular biology and protein engineering, as well as the use of plant biotechnology for the enhancement of food quality and value, the expression of pharmacologically active products in transgenic plants, and ways to overcome health and agricultural constraints in the developing world. Charlie has been secretary–treasurer and then president of the Midwest Section, an elected member of the Executive Committee, and member of the Education Foundation board of directors. He has served on the editorial board of *Plant Physiology* and was ASPB president in 1985. He received the Shull Award in 1979 and the Hoagland Award in 1994.

Sarah M. (Sally) Assmann (1983)
Professor, Penn State University

Sally is recognized for her research on plant signal transduction mechanisms. She currently serves on the board of directors of the Education Foundation and is ASPB president-elect for 2007–2008. She has served as monitoring editor for *Plant Physiology* (1994–1997) and has been a coeditor of *The Plant Cell* since 1998. She has also served on the Publications Committee (2000–2005) and was co-organizer of the Biology of Transpiration meeting held in 2006.

Neil Baker (1975)
Professor, University of Essex, England
Neil is well known for elucidating the factors that determine the efficiency of light utilization in photosynthesis. He has served on the editorial board of *Plant Physiology* and has been monitoring editor since 1998. He was member and chair of the Corresponding Membership Award Committee and is currently a member of the Charles F. Kettering Award Committee.

Wendy Boss (1975)
Professor, North Carolina State University
Wendy is recognized for her studies on how inositol lipid biosynthesis is regulated in plants and what cellular processes are intertwined with the metabolism of phosphoinositides. She also aims to redesign plants to withstand increased stress by expressing genes from extremophiles. Wendy has served as member and head of the board of trustees and as an elected member of the Executive Committee. She was associate editor of *Plant Physiology.* A featured speaker at the Women in Plant Biology luncheon in 2006, Wendy also initiated a program sponsored by the Good Works Program to fund workshops in countries with emerging research programs.

John Boyer (1963)
Professor, University of Delaware
John has researched the metabolic mechanisms of losses in plant growth under saline or dehydrating conditions. His studies began at the level of the whole plant but use methods in biophysics, biochemistry, and molecular biology. He has been editorial board member and monitoring editor for *Plant Physiology,* and he has served as a member of the Future Planning and Life Member Committees. John served as an elected member of the Executive Committee and as ASPB president in 1981. He received the Shull Award in 1977 and the Barnes Life Membership Award in 2007.

Winslow Briggs (1955)
Director Emeritus, Carnegie Institution of Washington
Winslow is well known for his studies of plant photoreceptors and the effects of light on plant physiology and development. Mentor of more than 50 plant scientists, he received the Stephen Hales Prize in 1994 and the Adolf Gude Award in 2007. He has served on the editorial board and as monitoring editor of *Plant Physiology.* He was an editor of *Annual Review of Plant Physiology and Plant Molecular Biology* for well over 30 years. He was ASPB president in 1975.

Bob Buchanan (1967)
Professor, University of California at Berkeley
Bob researches photosynthesis, seed germination, and microbial biochemistry. He served for many years on the editorial board of *Plant Physiology* and was coeditor of the renowned ASPB textbook *Biochemistry & Molecular Biology of Plants.* He was the founding chair of the International Committee and serves on the Corresponding Membership Committee. He was ASPB president in 1995. Bob received the Kettering Award in 1998 and the Hales Prize in 2005.

Joe Cherry (1970)
Professor Emeritus, Auburn University
Joe is known for his studies on plant growth and development, the biochemistry of seed development, and heat-shock proteins. Joe served on the editorial board of *Plant Physiology.* He also served as secretary and president of the Midwest Section. A former member of the Program and Public Affairs Committees, Joe was ASPB secretary from 1981 to 1983 and president in 1984. He received the Barnes Life Membership Award in 2004.

Maarten Chrispeels (1963)
Professor, University of California San Diego
Maarten's major research contributions are in the secretion of proteins, the transport and posttranslational modifications of vacuolar proteins, and the discovery and analysis of water channel proteins or aquaporins. He maintains a keen interest in biotechnology and its role in agricultural development and food production in the world. He was on the editorial board and served as associate editor and later editor-in-chief of *Plant Physiology* (1992–1999). He also served as a member of the Executive Committee and is author of *Plants, Genes, and Crop Biotechnology,* published by Jones & Bartlett.

Adrienne Clarke (1981)
Professor, University of Melbourne, Australia
Adrienne is known for her studies of the molecular basis of self-incompatibility, the chemistry and biology of arabinogalactan proteins, and proteinase inhibitors and their use in the control of insect development. She has served as an elected member of the Executive Committee and on the International Committee. She was a coeditor of *The Plant Cell* from 1991 to 1996.

Robert Cleland (1959)
Professor Emeritus, University of Washington
Bob is well known for his research on the mechanisms by which plant cell elongation is controlled, particularly through control of mechanical properties of the cell walls of elongating tissues and the way in which auxin induces a loosening of the cell wall. With David Rayle, he formulated the acid-growth theory explaining the action of auxin in wall loosening. Bob served on the editorial board of *Plant Physiology* from 1965 to 1980. He also served as member and chair of the Barnes Life Membership Committee. He has served as an elected member of the Executive Committee, as ASPB secretary from 1971 to 1973, and as president in 1974.

Mary Clutter (1956)
Former Assistant Director National Science Foundation
As former assistant director of the National Science Foundation, Mary was responsible for the Biological Sciences Directorate that supports all major areas of fundamental research in biology, but she has been a strong advocate for plant biology. She is a

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member of numerous professional societies and has served on the board of directors of the American Association for the Advancement of Science (AAAS). She is a fellow of AAAS and of the Association for Women in Science.

Dan Cosgrove (1979)
Professor, Penn State University
Dan is known for his studies of the biophysics and photocontrol of cell wall loosening and for his discovery of expansins. Dan has served on the editorial board of *Plant Physiology* and has been chair of the Education Foundation, as well as serving on numerous committees. He was ASPB president in 2000 and received the Shull Award in 1991.

Deborah Delmer (1967)
Professor Emeritus, University of California, Davis, and Former Associate Director of Food Security, Rockefeller Foundation
Debby's major area of research has been the biosynthesis and structure of the plant cell wall, with special interest in the biosynthesis of cellulose. At the Rockefeller Foundation, she dealt with issues in international agriculture. She has served on the editorial board of *Plant Physiology* and as member and chair of the Gude Prize and International Committees. She was an elected member of Executive Committee and was ASPB president in 1999.

Machi Dilworth (1973)
Division Director, National Science Foundation
Machi serves as director of Biological Infrastructure at the National Science Foundation and has been a strong advocate for plant biology. She served as reviews editor for *The Plant Cell* and as member and chair of the Publications Committee. Machi received the Gude Prize in 1998.

Arthur Galston (1948)
Professor Emeritus, Yale University
Art is recognized for his work on phototropism and the physiology of polyamines in plants. In 1949, he provided the first evidence that riboflavin, rather than carotene, is the photoreceptor in phototropism. Art served on the editorial board of *Plant Physiology* and as a member of several committees. He was ASPB president in 1962.

Elisabeth Gantt (1969)
Professor, University of Maryland
Elisabeth's research interests have focused on photosynthesis, especially on how oxygen-evolving organisms maximize the absorption and utilization of light energy. She has served as a member and chair of the Publications Committee and as a member of the Future Planning, Public Responsibilities, Awards, and Public Affairs Committees. She was the representative to the American Institute of Biological Sciences from 1994 to 1995. She was an elected member of the Executive Committee, ASPB secretary from 1985 to 1987, and ASPB president in 1988. She continues to serve on the Kettering Award Committee. Elisabeth was awarded the Hales Prize in 2002.

Robert Goldberg (1977)
Professor, University of California Los Angeles
Bob's research goal is to establish the genes and gene networks required for seed development. He envisioned and was the founding editor-in-chief of *The Plant Cell* and was founding chair of the Education Foundation. He conceived and starred in the ASPB Education Foundation film *History's Harvest: Where Food Comes From.*

Mary Helen Goldsmith (1958)
Professor, Yale University
Mary Helen is known for her pioneering work in polar auxin transport and auxin-induced growth, with a focus on the role of H^+-ATPases and ion channels in cell elongation. Mary Helen served on numerous committees, including the Corresponding Membership, Education, and Public Affairs Committees. She was an elected member of the Executive Committee that advocated the founding of *The Plant Cell.* Mary Helen was ASPB president in 1991.

Wilhelm Gruissem (1986)
Professor, Federal Institute of Technology, Switzerland
Willi's research focuses on fundamental plant processes, including cell cycle regulation and differentiation and functional genomics of isoprenoid synthesis. He is also developing new tools for proteome analysis and bioinformatics, including Genevestigator. He was associate editor and coeditor of *The Plant Cell* from 1990 to 1995 and feature editor of *Plant Physiology* from 2000 to 2002. He was coeditor of the renowned ASPB textbook *Biochemistry & Molecular Biology of Plants,* and he was named Corresponding Member in 2007.

Thomas Guilfoyle (1970)
Professor, University of Missouri
Tom is acknowledged for his pioneering research on transcriptional regulation, auxin-regulated gene expression, and auxin signaling. He has served on the editorial board and as associate editor of *Plant Physiology* (1992–1995). Tom has been a coeditor of *The Plant Cell* since 2003. He also served on the Publications Committee.

Roger Hangarter (1979)
Professor, Indiana University
Roger investigates the physiological and molecular mechanisms by which plants perceive and respond to environmental stimuli. Roger is creator of the Plants in Motion website and of s*L*owlife, an art installation that is exhibited nationally. He also created an award-winning film documenting the return of the 17-year cicadas. Roger has served on the editorial board of *Plant Physiology* and has been a member of the Program, Public Affairs, and Pioneer Student Award Committees. He served as ASPB secretary from 2001 to 2003 and was ASPB president in 2004. Roger received the Excellence in Teaching Award in 2007.

Peter Hepler (1976)
Professor, University of Massachusetts
Peter's prime areas of research have been the structure and physiology of plant cells during division, growth, and development,

with specific attention to the roles of the cytoskeleton and regulatory ions. Peter served as coeditor of an ASPB *Current Topics in Plant Physiology* volume on Calcium in Plant Growth and Development and has served on the editorial board and as associate editor of *Plant Physiology.* He has been an editorial board member of *The Plant Cell* since 2003. He has also served on the Minority Affairs Committee.

Ann Hirsch (1972)
Professor, University of California Los Angeles
Ann's major area of research is in plant–microbe interactions, especially symbiotic interactions, and the signal transduction pathways related to nodulin gene expression. She served as monitoring editor, associate editor, and feature editor of *Plant Physiology,* and she has been a coeditor of *The Plant Cell* since 2003. She is the founding editor and writer for ASPB's Women Pioneers in Plant Biology website (1999 to present). She served as an elected member of the Executive Committee and as chair of the Women in Plant Biology Committee.

Thomas K. Hodges (1961)
Professor Emeritus, Purdue University
Tom is well known for his pioneering studies on the biochemistry of ion transport across cell membranes and genetic engineering of crop plants. He was a member of the editorial board of *Plant Physiology* and a member and chair of the Long-Range Planning Committee that initiated *The Plant Cell,* member and chair of the Charles Reid Barnes Life Membership and Corresponding Members Committees, and an elected member of the Executive Committee. He also served as representative to the American Institute of Biological Sciences. He was president of the Midwest Section. Tom received the Shull Award in 1975.

Steven Huber (1975)
Professor, USDA–Agricultural Research Service, University of Illinois
Steve is renowned for his work on regulatory mechanisms controlling carbon–nitrogen metabolism in plant source and sink tissues and their impact on growth and development and crop yield. He was a member of the editorial board and then monitoring editor of *Plant Physiology.* He served on the Life Membership and Shull Award Committees and is presently an elected member of the Executive Committee.

Andre Jagendorf (1951)
Professor, Cornell University
Andre is recognized for his work in photophosphorylation, where his demonstration of ATP synthesis driven by a transmembrane pH gradient in the dark validated Mitchell's chemiosmotic hypothesis. Andre served on the editorial board for *Plant Physiology* and on the editorial committee of *Annual Review of Plant Physiology.* He was ASPB president in 1967. Andre received the Kettering Award in 1978 and the Barnes Life Membership Award in 1989.

Russell Jones (1965)
Professor, University of California at Berkeley
Russ is well known for his research on hormone action in seeds, with an emphasis on the cereal aleurone. He served as a member of the editorial board and then associate editor of *Plant Physiology.* Russ received the Charles Reid Barnes Life Membership Award in 2002. He served as ASPB president in 1993. He is coeditor of ASPB's *Biochemistry & Molecular Biology of Plants.*

Rich Jorgensen (1995)
Professor, University of Arizona
Rich's current research interests include RNA silencing mechanisms in plants, applications of sense-RNA silencing to functional genomics, and chromatin-based control of gene expression. Rich served on the Program Committee from 1998 to 2002. He served as organizer and chair of ASPB's special conference on plant genetics. He was a coeditor of *The Plant Cell* from 2000 to 2003 and is currently editor-in-chief.

Kenneth Keegstra (1977)
Professor, Michigan State University
Ken is recognized for his research on the biogenesis of chloroplasts, especially the import of cytoplasmically synthesized proteins, and on the biosynthesis of plant cell wall components, especially the noncellulosic polysaccharides. He served on the editorial board of *Plant Physiology* and was an elected member of the Executive Committee and a member of the Board of Trustees. He was ASPB president in 1997. Ken received the Hales Prize in 2006.

Joe Key (1958)
Professor Emeritus, University of Georgia
Joe is recognized for his pioneering work on auxin-regulated transcription of RNAs essential for cell elongation and for the expression and characterization of environmental stress–regulated genes and proteins. Joe was an associate editor of *Plant Physiology* and has served on numerous committees. He was an elected member of the Executive Committee and a member of the Board of Trustees. He was also secretary–treasurer, vice president, and president of the Midwest Section. He was ASPB president in 1976. Joe received the Barnes Life Membership Award in 2000.

Leon Kochian (1979)
Professor, USDA–Agricultural Research Service, Cornell University
Leon is well known for his work on root biology and ion transport processes as they relate to mineral nutrient acquisition and plant responses to environmental stresses, phytoremediation, and gene identification for traits that facilitate crop improvement in these areas. Leon is a monitoring editor for *Plant Physiology.* He has also served on the Futures Committee.

Brian Larkins (1973)
Associate Vice Chancellor for Research, University of Nebraska
Brian is known for his research on molecular and cellular aspects of seed development. He has served on the editorial boards of *Plant Physiology* and *The Plant Cell*

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(1989–1993) and was editor-in-chief of *The Plant Cell* from 1993 to 1998. He was also an elected member of the Executive Committee and served as ASPB president in 1998. He received the Shull Award in 1983 and the Hoagland Award in 1997.

Christopher Leaver (1966)
Professor, University of Oxford, England
Chris has established an internationally recognized group studying mitochondrial genome organization, expression, and function in higher plants; the regulation of mitochondrial biogenesis and function during plant development; and programmed cell death in plants. He has a strong interest in the public understanding of science and has been actively involved in the current debate on genetically modified crops in the United Kingdom and Europe. He served on the editorial board of *Plant Physiology* and was elected Corresponding Member in 2003.

Sharon Long (1974)
Professor and Dean, Stanford University
Sharon has advanced the understanding of the process of nitrogen fixation and the signaling pathways used by nitrogen-fixing bacteria and plants, addressing questions relevant to agricultural productivity and to energy conservation. She has been a member of several education committees, including the Committee on Undergraduate Science education, the Bio2010 project, and the Board on Science Education. Sharon has served on the editorial boards of both journals, as well as on the Shull Award Committee. She received the Shull Award in 1989.

William Lucas (1975)
Professor, University of California, Davis
Bill has contributed key observations, methodologies, and insights that have promoted and redirected the study of plasmodesmal biology. His work has supported the concept that plasmodesmata serve regulatory roles, mediating the cell-to-cell movement of proteins and ribonucleoprotein complexes. He has served on the Program and Shull Awards Committees and was on the editorial board of *Plant Physiology* for 15 years. Since 2003, he has been a coeditor of *The Plant Cell.* He received the Gibbs Medal in 1997.

William Ogren (1964)
Retired, USDA–Agricultural Research Service, University of Illinois
Bill is well known for his studies on the biochemistry, physiology, and molecular genetics of photosynthesis and photorespiration. Bill served on the editorial board and then as associate editor of *Plant Physiology* and had an eight-year tenure on the Executive Committee in various capacities. He has served on the Futures and Monographs Committees, and he received the 1986 Kettering Award. Bill was ASPB secretary from 1987 to 1989 and president in 1990.

Don Ort (1971)
Professor, USDA–Agricultural Research Service, University of Illinois
Don is an international expert in photosynthesis research, currently specializing in the impacts of abiotic factors, including climate change on photosynthetic performance. Don has served on the editorial board, then as associate editor, and currently as editor-in-chief of *Plant Physiology.* He served on the Education Foundation and was chair of the Board of Trustees from 1999 to 2001. He was ASPB secretary from 1993 to 1995 and president in 1996. Don received the Kettering Award in 2006.

Bernard Phinney (1952)
Professor Emeritus, University of California, Los Angeles
Bernie continues a distinguished career in determining the structure, metabolism, and function of gibberellins. He received the Hales Prize in 1984 in recognition of his successful efforts to use chemistry, genetics, and physiology to unravel the gibberellin biosynthetic pathway in maize and was named Charles Reid Barnes Life Member in 1987. He has served on the Stephen Hales Prize and Barnes Life Committees, as well as on the editorial board of *Plant Physiology.* Bernie was ASPB president in 1989.

Ralph Quatrano (1968)
Professor, Washington University
Ralph is recognized for his research on how plant cells establish polarity and how they regulate gene expression in response to abscisic acid during desiccation. He is a strong advocate for the use of *Physcomitrella* to solve otherwise recalcitrant problems of plant biology. Ralph served on the editorial board of *The Plant Cell* for 15 years, the last five as editor-in-chief. He was ASPB president in 1992, and he established the Public Affairs Committee and served as its first chair.

Robert Rabson (1952)
Former Program Director, U.S. Department of Energy
Bob created a new program in the Department of Energy to fund basic plant and microbial biology research affecting energy sciences. He was an exceptional advocate of plant biology. Bob served as ASPB treasurer from 1989 to 1991, as a member of the Board of Trustees, and on the Publications Committee. He received the Gude Prize in 1986.

Natasha Raikhel (1986)
Professor, University of California, Riverside
Natasha's research is on the signals that target proteins to the nucleus and to the vacuole of plant cells and the identification of the genes and gene products required for vesicle-mediated protein transport in the secretory pathway. She served as a member of Publications and Shull Award Committees and of the editorial boards for both *Plant Physiology* and *The Plant Cell,* and she was editor-in-chief of *Plant Physiology* from 2000 to 2005. She was an elected member of the Executive Committee. Natasha received the Hales Prize in 2004.

Doug Randall (1969)
Professor, University of Missouri
Doug is known for his studies of metabolism regulation in plants, in particular, the pyruvate dehydrogenase complex as a primary site at which photosynthetic carbon

metabolism interacts with mitochondrial respiration and photorespiration. Doug served on the editorial board of *Plant Physiology* and was member of the Publications, Life Membership, Program, Public Affairs, and Constitution and Bylaws Committees. He has also served on the Education Foundation and Board of Trustees. Doug was ASPB secretary from 1991 to 1993. He received the Barnes Life Membership in 2006.

Clarence "Bud" Ryan (1968)
Professor, Washington State University
Bud is renowned for his studies of polypeptide hormones and receptors, the structure and function of proteinase inhibitors, and wound-induced signaling for plant defense. Bud served on the editorial board of *Plant Physiology* and was president of the Western Section. He received the Hales Prize in 1992.

Thomas Sharkey (1976)
Professor, University of Wisconsin
Tom studies the physiology of photosynthesis, especially the exchange of carbon dioxide and isoprene between plants and the atmosphere and the export of carbon from the Calvin cycle. He was a member of the Program Committee, and the Hoagland Award Committee and was chair of the Public Affairs Committee. He was on the editorial board of *Plant Physiology*, including five years as monitoring editor. He has also has served as secretary–treasurer, vice-chair, and chair of the Midwest section.

James Siedow (1976)
Vice Provost for Research, Duke University
Jim's research has focused on plant respiratory processes, specifically the nature and regulation of the cyanide-resistant respiratory pathway found in plant mitochondria. His university honored him with the Trinity College Distinguished Teaching Award in 1984. He served on the editorial board and was an associate editor of *Plant Physiology.* He was chair of the Board of Trustees and chair and long-time member of the Public Affairs Committee. He is currently chair of the Education Foundation. Jim was ASPB secretary from 1989 to 1991 and president in 1994.

Chris R. Somerville (1979)
Director, Carnegie Institution of Washington
Chris has focused on the molecular genetics of Arabidopsis in a broad range of topics, including photorespiration, starch metabolism, lipid metabolism, polysaccharide synthesis, and aspects of development. He was a member of the special committee that envisioned *The Plant Cell* and served on the Publications and Shull Awards Committees. He served on the editorial board and then as monitoring editor of *Plant Physiology,* and he was associate editor of *The Plant Cell.* He is a founding editor of ASPB's online *Arabidopsis Book.* He received the Shull Award in 1987 and the first Gibbs Medal in 1993.

L. Andrew Staehelin (1980)
Professor Emeritus, University of Colorado
Andrew is recognized for his research on the functional organization and dynamic properties of the organelles and cytoskeletal arrays that produce new plant cell walls during cytokinesis and allow cell walls to expand during cell growth. Andrew has served on the editorial board of *Plant Physiology* and on the Barnes Life Award Committee. He was founder and organizer of the new Keystone and Gordon Conferences for plant cell biology.

Heven Sze (1971)
Professor, University of Maryland
Heven is noted for her work on the discovery of transporters for essential minerals and toxic ions, vacuolar H^+-ATPases, and calcium transport. Heven served on the editorial board, as monitoring editor, and as features editor for *Plant Physiology.* She also served on the Program, Future, Gibbs Medal, and Corresponding Member Committees. She is currently Mid-Atlantic section representative to the Executive Committee.

Lincoln Taiz (1972)
Professor, University of California, Santa Cruz
Linc is renowned for his work on cell wall mobilization in barley aleurone layers; cell wall biophysics; and the structure, function, and evolution of vacuolar H^+-ATPases. Linc served on the editorial board of *Plant Physiology* and is the author of several ASPB-sponsored publications. His textbook with Eduardo Zeigler, *Plant Physiology,* serves as the authoritative text for students entering the plant biology community.

Tony Trewavas (1994)
Professor, University of Edinburgh, Scotland
Tony is well known for his investigations of the role of calcium in signal transduction during plant development. His notable achievements include the construction of transgenic luminous plants in the early 1990s and the establishment of Ca^{2+} as a primary transduction pathway in plant cells. Tony served on the editorial board of *Plant Physiology* and received the Corresponding Membership Award in 1999.

Masamitsu Wada (1986)
Professor, National Institute for Basic Biology, Japan
Masamitsu's research has involved elucidating the mechanisms of photomorphogenesis from photoperception to final responses through signal transduction pathways. His work on chloroplast photorelocation movement serves as an elegant model to study photomorphogenesis. Since 2003, Masamitsu has been a coeditor of *The Plant Cell.* He received the Corresponding Membership Award in 2005.

Jan Zeevaart (1961)
Professor, Michigan State University
Jan is renowned for his research on the physiology of flowering; the structure, biosynthesis, and function of gibberellins; and the regulation of abscisic acid biosynthesis. Jan served on the editorial board and then as monitoring editor and associate editor of *Plant Physiology* from 1998 to 2003. He also has served on the Corresponding Membership, Constitution and Bylaws, and Awards Committees. Jan received the Hales Prize in 2000.

THE ROAD TO MÉRIDA

Pan American Congress on Plants and BioEnergy: June 22–25, 2008
Plant Biology 2008: June 26–July 1, 2008

www.aspb.org/meetings/merida.cfm

In 2008 ASPB will hold a new conference on plants and bioenergy immediately preceding its annual meeting in Mérida, Mexico. To help you prepare for these meetings, each issue of the *ASPB News* will provide important information. This first segment of "The Road to Mérida" provides travel information and passport and visa requirements.

Passport and Visa Requirements

1. If you are a U.S. citizen, there are new requirements for travel to Mexico. Please visit the following website for details: http://travel.state.gov. Passports are required for U.S. citizens traveling to Mexico, and there is a backlog in issuing them. If you need to obtain or renew a passport, please apply at least four to six months in advance.
2. If you are a citizen of a country other than the U.S., you need to contact a Mexican consulate in your country to ask about requirements and to take the necessary steps to obtain a visa. The requirements differ from country to country.

   If you are a citizen of Andorra, Argentina, Australia, Austria, Belgium, Canada, Chile, Costa Rica, the Czech Republic, Denmark, Finland, France, Germany, Great Britain, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Liechtenstein, Luxembourg, Monaco, Netherlands, New Zealand, Norway, Poland, Portugal, Puerto Rico, San Marino, Singapore, Slovenia, South Korea, Spain, Sweden, Switzerland, Uruguay, or Venezuela, you don't need a visa to enter Mexico, although you must present a valid passport and fill out an immigration form for tourism and business travel, which can be obtained from travel agencies and airlines or at the point where you enter Mexico.

   The government agency in charge of immigration control and policy in Mexico is the National Immigration Institute (INM is its Spanish acronym). The INM is part of the Ministry of the Interior (called "Segob"). We recommend that you visit their website for further information: www.inm.gob.mx.
3. If you are residing in the United States but hold a J-1 or H-1B visa, the following information provided by the National Postdoc Association will help you organize your documents for travel to the ASPB meeting. Individuals with a J-1 visa must make sure that their DS-2019 is current. They may travel with an expired visa stamp if all other documents are in order.

   The following table answers three frequently asked questions on travel to Mexico for holders of J-1 and H-1B visas:

Question	J-1 Visa Holders	H-1B Visa Holders
I plan to travel to Mexico. My passport has an expired visa stamp, but my other USCIS (U.S. Citizenship and Immigration Services) documents have been revalidated and will be current when I travel. Can I reenter the United States without getting a new visa stamp in my passport?	If you travel to Mexico for fewer than 30 days, it is not necessary to reenter with a valid J-1 visa if the following four conditions are met: 1. You reenter with a valid I-94 card 2. Your passport is valid for at least six months from the date of reentry 3. You possess your original DS-2019 that has been properly endorsed for travel and reentry within the past 10 months 4. You do not apply for the visa at a U.S. consulate. **Note:** If you are flying to Mexico, make sure that the airline does not take your I-94 upon your departure. Provide the airline with a photocopy of your I-94.	If you travel to Mexico for fewer than 30 days, it is not necessary to reenter with a valid H-1B visa if the following four conditions are met: 1. You reenter with a valid I-94 card 2. Your passport is valid for at least six months from the date of reentry 3. You possess your Notice of Approval 4. You do not apply for the visa at a U.S. consulate. For appropriate travel documents and instructions, contact your employer's or institution's international office. **Note:** If you are flying to Mexico, make sure that the airline does not take your I-94 upon your departure. Provide the airline with a photocopy of your I-94.
How long can I stay in Mexico with an expired visa stamp but revalidated USCIS documents?	Up to 30 days	Up to 30 days
What other documentation should I take to Mexico so that there will be no problems when I reenter the United States?	You are strongly advised to carry recent evidence of financial support for the total duration of your stay in the United States.	You are strongly advised to carry a letter from your employer or institution confirming your employment, job title, and salary, as well as your original H-1B Notice of Approval.

Note: Many international flights transfer from a U.S. city to Mérida. If you are a citizen of a country that requires a visa to enter the United States, it is recommended that you fly directly to Mexico to avoid the need for a U.S. and perhaps a Mexican visa.

GETTING TO MÉRIDA

By Plane to Mérida

Aero México

Flies nonstop to and from Miami and Mexico City.
01-800/021-4000 in Mexico
999/927-9277 from abroad
www.aeromexico.com

Mexicana

Has nonstop service to and from Mexico City.
01-800/502-2000 in Mexico
999/924-6633 from abroad
www.mexicana.com.mx

Continental

Has nonstop service to and from Houston.
999/946-1888 or -1900
www.continental.com

Click

A Mexican budget airline, provides nonstop service to and from Mexico City and Veracruz.
01-800/122-5425 in Mexico

Aviacsa

Provides nonstop service to and from Villahermosa and Mexico City.
01-800/006-2000 in Mexico

Continental and Mexicana

Service to Mérida from European, Asian, and South American cities. For details, check with your local travel services.

From the Mérida Airport to the Hotels

Mérida's airport is 13 km (8 miles) from the city center on the southwestern outskirts of town, near the entrance to Highway 180. The airport has desks for renting a car and getting tourist information. Taxi tickets to town are sold outside the airport doors under the covered walkway. For the conference, ASPB will provide a link on the conference website for you to arrange shuttle service to and from the airport.

By Plane to Cancún

Another option is to take an international flight into Cancún, which is served by many U.S. and international airlines. From Cancún you can drive, fly, or catch a bus to Mérida.

By Car from Cancún

Highway 180 is the old *carretera federal* (federal highway) between Mérida and Cancún. The trip takes six hours, and the road is in good shape; you will pass through many Mayan villages. A four-lane divided *cuota* or *autopista* (toll road) parallels Highway 180 and begins at the town of Kantunil, 56 km (35 miles) east of Mérida. By avoiding the tiny villages and their not-so-tiny speed bumps, the *autopista* cuts two hours from the journey between Mérida and Cancún; one-way tolls cost $30. Coming from the direction of Cancún, Highway 180 enters Mérida by feeding into Calle 65, which passes one block south of the main square.

By Bus from Cancún

Once you have cleared customs and immigration and are ready to pick up your baggage, there is a ticket office for bus service to Mérida. Although buses run frequently, it takes about four hours to complete the journey. The bus company is ADO, and buses are first-class and often show movies during your trip. ADO provides a shuttle to the central bus station from the airport as part of your bus package.

By Air from Cancún

There is a new regional airline serving Mérida from Cancún; its website is at http://www.alma.com.mx/default.php. This airline offers low-cost service from Cancún and other cities in Mexico to Mérida. The website is in Spanish, and prices are quoted in Mexican pesos, so translate the cost into your local currency. For example, at this writing, tickets were $500 Mexican pesos each way, or US$50. Navigating the site is easy, even if you don't know Spanish; the format is much like that of any airline or travel portal.

We hope this initial information will be helpful in getting you on your way to Mérida. If you have any questions, please e-mail info@aspb.org. Also, keep posted through updates to our website and upcoming articles in the *ASPB News*.

For more information on Mérida and the Yucatan, check out **www.mayayucatan.com.**

ASPB Annual Meeting Child Care Reimbursement Program Is Reinvigorated and Expanded

The Women in Plant Biology Committee (WIPB) is delighted to announce that ASPB's child care reimbursement program not only will be in place for Plant Biology 2008, but also will be expanded. Jo Handelsman, the speaker at the 2007 WIPB luncheon in Chicago—and a member of National Academy of Sciences panel that wrote the recent report *Beyond Bias and Barriers: Fulfilling the Potential of Women in Academic Science and Engineering* (http://www.aspb.org/committees/women/reading.cfm)—recommended that professional societies support child care at meetings to encourage women's participation. Over the past decade, ASPB has been able to provide child care support funded by a generous donation from John Radin who, sadly, recently passed away (http://www.aspb.org/newsletter/marapr07/23radin.cfm). Although Radin's donation has now been exhausted, the child care reimbursement program will be funded—to up to $4,000 per annual meeting—from income earned on a sizable bequest to ASPB from the estate of Eli Romanoff.

Child care reimbursement will be available for children ages 12 and younger on a sliding scale, with up to $400 per family available for ASPB member graduate students, up to $300 per family for ASPB member postdocs, and up to $200 per family for ASPB member faculty.

Here is how the reinvigorated and expanded child care reimbursement program will work: The Plant Biology 2008 meeting website will provide contact information for prospective child care providers at the meeting site. (Watch for e-mails announcing the opening of registration for Plant Biology 2008 in early December.) Families will then make their own arrangements for child care and provide an estimate of their anticipated costs to the WIPB committee via an online form. After the annual meeting, child care costs will be reimbursed up to the total amount available. WIPB strongly encourages all meeting participants to present a poster or give a talk so that they may get the most out of their participation in the meeting; however, presenting is not a requirement for child care reimbursement.

ASPB is tremendously grateful to Romanoff for remembering the Society in his will. And WIPB appreciates the ASPB Executive Committee's decision to use these funds to continue and expand the child care program initially funded by Radin. Like Radin, Romanoff was no stranger to ASPB or plant biology. He received the ASPB Adolph E. Gude, Jr. Award for outstanding service to the science of plant physiology in 1995. He was a member of the National Science Foundation (NSF) advisory panel for regulatory biology in 1968 while employed at the Worcester Foundation for Experimental Biology. Romanoff remained at NSF and became the program officer for regulatory biology, where he was instrumental in ensuring research funding for plant science research.

Judy Brusslan
Chair, Women in Plant Biology Committee

People

ASPB Past President Buchanan Receives Humboldt Research Award

Bob B. Buchanan, professor at the University of California at Berkeley, has been elected the recipient of a Humboldt Research Award. He was nominated for this award by German scientists Nigel Mark Stitt of the Max Planck Institute for Molecular Plant Physiology, Golm, and Jürgen Soll, University of Munich.

This award is conferred in recognition of lifetime achievements in research. In addition, awardees are invited to carry out research projects of their own choice in cooperation with colleagues in similar specialties in Germany.

ASPB's 2005 AAAS Mass Media Fellow Sarah Nell Davidson is sending a series of "postcards" back to the ASPB News *as she spends the current academic year abroad doing research for her PhD thesis.*

Greetings from San Cristóbal de las Casas, Chiapas

Traditional Medicinal Plants "Rediscovered" in the Land of the Maya

According to the Museum of Mayan Medicine, there are 300,000 known plant species worldwide. Thirty thousand of those can be found in Mexico, and 15,000 find a niche in Mexico's southernmost state of Chiapas.

The cool, misty highlands of Chiapas are home to Mexico's largest rainforest, stunning Mayan ruins, and myriad indigenous groups descended from Mayan peoples. The quaint colonial town of San Cristóbal de las Casas is perched high above the neighboring capital city of Tuxtla Gutiérrez in the midst of a temperate pine forest in the Jovel Valley. Its importance as a major trading nexus for the indigenous groups living in the surrounding highlands not only has spurred a large tourism boom in recent decades, but also prompted Zapatista leaders to launch their movement here in the mid-1990s. It is here that the Organization of Indigenous Physicians of the State of Chiapas (OMIECH) is based, which brings together healers and herbalists to resurrect and promote the traditional medicine practiced by modern Tzotzil and Tzeltal Mayans. These medicinal treatments largely use local flora.

Visitors to OMIECH's museum can witness *I'lols* (healers) treating Mayan patients in the "Living Chapel," where medicinal treatments are mixed with religious ceremonial practices. Many plants that are central tools for the Mayan *Ac'vomol,* or herbalist, can be viewed in an adjoining room, where visitors learn about such plant-based remedies as a paste made from *Tigridia pavonia* roots that can cure rashes, abscesses, and pimples so long as the patient abstains from eating pork or fat. The exhibit highlights the indigenous names of the plants on display as well as the scientific names, botanical characteristics, ecological niches, and use and administration of various plant parts.

Antonio Pérez Méndes, a founder of OMIECH and expert herbalist, processes petema root after a collection trip in the nearby highlands.

Behind the museum, the organization maintains an herb garden that allows visitors to inspect many of the medicinal plants. The garden is also the site of a traditional wood-fired steam bath, where visitors and natives alike can steam herbs and relax in its smoky vapors.

Antonio Pérez Méndez is a founder of the organization and an expert Mayan herbalist. When I first visited the museum, he was out on a collection trip. Most herbs are collected in the early morning, when, Pérez said, the plants still retain their essence and energy. I caught up with Pérez the following day and found him in the on-site herbarium processing the petema root and guarumbo leaves he

A Mayan woman prepares a traditional steam bath located in the Museum's medicinal herb garden.

collected the previous day. Petema root is used to treat menstrual cramps, and guarumbo leaves are important in the treatment of kidney diseases and tuberculosis. Pérez currently has about 80 species stored in the herbarium. Traditionally, the herbs are dried in the shade, because exposure to the sun bleaches the natural color and compromises the plants' medicinal properties. Pérez dries them in a systematic way in the many cases of drawers that line the herbarium walls.

Pérez knows the properties of about 200 different plants. His father was also an expert herbalist in his birthplace, about 35 kilometers from San Cristóbal. "When I was born, there was no modern medicine and no pharmacy," Pérez explained in Spanish, his second language. "The pills and pharmacies came later, but in the beginning no one used them, as people preferred to stick to their customs and beliefs.

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"Eventually, the doctors began to come and preach that pills and modern medicine were better, so the use and strength of the plants began to decline as people put more confidence in medicine from the pharmacy." At about the same time, Pérez moved to another village in an area where there were no doctors or access to modern medicine, and he began to return to the power of plants. "I began to rediscover the plants that my father collected and their uses," Pérez says. "We began in this way."

According to Pérez, local people are returning to traditional medicine. "Even though pills from the pharmacy often are extracted from plants, they are produced in unidentifiable forms in laboratories, and people feel less comfortable taking them," says Pérez. "What's more, people eventually found out that modern medicine is expensive and often ineffective, so they are returning to using the plants." The most common ailment that brings people to the center is diabetes, he says, followed by gall stones, complications from high cholesterol, and cancer.

Pérez and his colleagues are not opposed to working with academic botanists who share their interest in medicinal plants and approach their study with good intentions. In recent years, however, the organization has learned the hard way to be wary of biopiracy and pharmaceutical companies that don't share a mutual interest in respecting the local ecology and giving back to the local communities.

In its infancy, OMIECH benefited from financial support by a German organization. However, for the past four years, they have operated on minimal support from Mexican agencies and have had to curtail their operations. With additional support, the group would like to begin training more herbalists and traditional doctors. According to Pérez, an increasing number of people from local communities are interested in this training. In addition, OMIECH would like to continue to investigate the properties of local plants. "All of this requires support in the form of money," Pérez noted regretfully.

Sarah Nell Davidson
snd2@cornell.edu

L'Oréal USA Fellowships For Women in Science

On August 20, L'Oréal USA announced the opening of the application period for its esteemed 2008 L'Oréal USA Fellowships For Women in Science. Building off the prestigious international For Women in Science Prize, which L'Oréal operates in conjunction with the United Nations Educational, Scientific, and Cultural Organization (UNESCO), this national program aims to recognize, reward, and support five women postdoctoral researchers in the United States. L'Oréal USA awards each recipient $40,000 toward their postdoctoral research, and the five fellowship recipients will also be invited to attend a week of professional development, media training, and networking events in New York City. The deadline for receipt of applications for the 2008 fellowships is October 31, 2007.

For more information about the L'Oréal USA Fellowships For Women in Science and links to application materials and information about previous winners, please visit http://www.lorealusa.com/forwomeninscience and click on the "US Fellowship Awards" link. This page also include links to similar postdoctoral fellowship programs that operate (separately) in Europe, the Asia/Pacific Region, Africa, Latin America and the Caribbean, and the Arab states, as well as to the For Women in Science Prize. To view the press release for the 2008 U.S. postdoctoral fellowship program, please click here: http://www.aspb.org/publicaffairs/research/2008FWIS.pdf.

Future ASPB Meetings

Pan American Congress
Plant and BioEnergy Symposium 2008
Mérida, Mexico
June 22–25, 2008
Registration opening January 2008

Plant Biology 2008
Mérida, Mexico
June 26–July 1
Joint Annual Meeting of the American Society of Plant Biologists and the Sociedad Mexicana de Bioquímica Rama: Bioquímica y Biología Molecular de Plantas

Plant Biology 2009
Honolulu, Hawaii
July 18–22

Plant Biology 2010
Montreal, Canada
July 30–August 5
Joint Annual Meeting of the American Society of Plant Biologists and the Canadian Society of Plant Physiologists—*Société Canadienne de Physiologie Végétale*

For more information, go to www.aspb.org/meetings/.

Mentoring Undergraduate Research

by Caryl A. Chlan
Associate Professor, University of Louisiana at Lafayette; cchlan@louisiana.edu

When I decided to major in microbiology as an undergraduate, I was still uncertain about the type of career I wanted to pursue. Like many other undergraduates in the life sciences, I seriously considered medical school. However, after having the opportunity to participate in laboratory research, I knew that I wanted to be a scientist. After graduation, I went to work as a technician in a commercial lab, but running the same assays every day wasn't what I wanted, so the following year I returned to school to pursue a master's in microbiology. After I completed the master's, I worked for several years as a technician in a university research laboratory. It was there that I discovered how much I enjoyed the freedom and challenges of pure research. I went back to school again for a doctorate in biochemistry, and after a couple of postdocs I was hired as an assistant professor at the University of Louisiana at Lafayette. Looking back, I realize how important that first undergraduate research experience was for me.

My first class teaching assignment as a new assistant professor was an undergraduate nonmajors class of more than 350 students. Although dealing with this number of students was at first overwhelming, it ultimately helped me appreciate their diverse backgrounds. There were many whose parents did not attend college, some whose parents did not finish high school, and even some whose parents had never learned to read or write. For most of these students, just attending a university was a bold step, and so the idea of becoming involved in independent research was an unlikely prospect. However, after I told the class a little about my own research in plant molecular biology, two students approached me and asked if they could see what I did in my laboratory. Shortly thereafter, they were working on their own projects, and although they were not science majors, they came back every semester to work on these projects until they graduated. Their enthusiasm, dedication, and sense of wonder were a constant reminder to me and my graduate students of why we were attracted to science.

Since then, I have had many undergraduates who were not science majors in my lab, and it is always a rewarding experience. Although none of these students changed majors, they learned to understand and appreciate the actual practice of science, as distinct from the distillation of its findings into a textbook. Of course, I hope that their time in the lab will help them think more critically about the world around them and understand the value of science to society. But I have to admit that I am most gratified to see them leave with a new appreciation for plants.

My experiences with undergraduate life science majors have been no less rewarding. Some of these students work in the lab for a semester or two and then move on to medical research or a professional school. Although they have chosen a different career path than mine, I feel that the time invested in their student projects has been well spent. The principles they learn from studying how plants resist fungal pathogens or why seed storage proteins have diversified are important in medicine as well as in plant science. Furthermore, by first encountering these principles outside of the context of medicine, they develop an appreciation for the value of basic research. Of course, many of the most rewarding students are those who develop a true love for plant biology and go on to pursue an advanced degree. It is so exciting to watch these young scientists develop and mature!

The most talented, and lucky, manage to produce publishable results, but even those who don't can learn the satisfaction that comes from hard and careful work—and all of them have enriched my research program.

In short, undergraduate students with diverse backgrounds and career goals all can benefit from research experience. Even if these students don't follow a career in science, they often find the experience enlightening and rewarding, and it is clearly to everyone's benefit if they come away with a deeper appreciation of how science works. Mentoring diverse students has its own special rewards; it has given me a broader perspective on how people perceive science and what someone else might find interesting about what scientists do. Seeing a student take ownership of a research problem and become doggedly determined to solve it can also be a wonderful reminder of how I got hooked myself.

View past columns of Women in Plant Biology at http://www.aspb.org/newsletter/wipb.cfm.

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: Debbie Swarthout
Title: Assistant Professor
Place of Work or School: Hope College
Research Area: I am a plant physiologist working on photosynthesis, photorespiration and water-use efficiency in agronomic and native grasses.

Member Since: 2002

1. **Why has being a member of ASPB been important?**
   It has helped me connect with other plant biologists through reading the newsletter regularly and attending the annual meetings.

2. **Was someone instrumental in getting you to join ASPB?**
   No. I was looking for a small society to join that would allow me to begin networking with people in my area of research.

3. **What would you tell colleagues to encourage them to join?**
   ASPB is a friendly society with broad interests in plant biology. The small size is especially attractive, because you can attend meetings without knowing anyone and you will not get the feeling of complete loneliness during the meetings. People are very willing to talk to you as you meander through the rooms. I had a good experience like this when I attended an ASPB meeting for the first time in 2004. Also, I really like the organization of the online newsletter. It makes it easy to stay informed about the happenings in plant biology.

4. **Have you enhanced your career using ASPB job postings or through networking at an ASPB function?**
   No. I joined ASPB only after beginning my current position at Hope College.

5. **Have you had any success at finding candidates as a result of a job posting at the meeting or on our online Job Bank?**
   No, I have not advertised any positions through this network.

6. **Do you read print journals? If so, where do you usually read them?**
   I read them in our library at Hope College. I usually visit our library about once a month to read journals in my area of research.

7. **What do you think is the next "big thing" in plant biology?**
   I think that the next big thing in biology is using plants as a common resource for preventing diseases such as cancer, diabetes, and Alzheimer's. I think that the hype about using plants as alternative fuels will lead to major biochemical breakthroughs about plants that will trigger a new emphasis on correcting one's diet to prevent latent diseases that emerge later in life.

8. **What person, living or deceased, do you most admire?**
   I admire Nelson Mandela the most. He is an incredible example of a leader who exhibited patience and humility while turning a very intense political climate into one that could actually sustain itself through true democracy.

9. **What are you reading these days?**
   I have just completed reading *The Notebook* by Nicholas Sparks and have begun reading *The No. 1 Ladies' Detective Agency* by Alexander McCall Smith.

10. **What are your hobbies?**
    I love golf, walking, swimming, cycling through the woods, photographing plants, reading, traveling, and attempting to paint with watercolors.

11. **What is your most treasured possession?**
    I treasure hearing the light snores of my two and six-year-old daughters, as well as those of my husband, in the early hours of the morning, when I get up to read and write..

12. **What do you still have left to learn?**
    It fuels my soul that I can be a lifelong learner. First, I need to stop second–guessing myself. I need to learn to be more assertive about what I enjoy researching in the field of plant biology. Second, I need to learn how to catalogue the most pertinent primary literature in my field in a meaningful way on my laptop and desktops. Third, I need to express myself through writing short descriptions of interesting findings in my research lab on a more regular basis.

The Bioethics Imperative XXXI

Does Gender Matter?

"Mokita": The truth we all know and **agree** not to talk about. *Papua New Guinea*

This two-part column addresses issues of gender discrimination in the workplace.

Scenario 1: A woman in the last years of her graduate studies goes to her field site to collect data. She returns to her car and, seeing that a truck is parked next to her in an otherwise empty lot, decides to walk to the nearby military academy instead. She returns to her car with a military escort, and the truck roars out of the parking lot. When she relays these events to her adviser, he worries that he has put her in jeopardy and wonders if he should adopt a double standard, sending his male students into the field but not his female students.

Upon hearing this true story, my first thought was that a sexual predator was being described. However, on reflection and in conversation with others, I realized that I had no idea why the truck was there, who was in it, or the intent of the occupant(s). It could have been a benign circumstance that the truck left at that time—maybe the occupants suddenly realized that they were late for an appointment. The person in the truck could have been a woman, a robber, or someone taking a nap from a long drive. Maybe a woman in the truck parked there to protect herself from being exposed and alone in the empty parking lot and was scared off by the military men.

Why was my first instinct to assume a sexual motivation? Many women are more sensitive than men when there is something fishy going on. Why? Because we are raised to be aware of our surroundings and to process that information to make decisions about our immediate safety. Right or wrong, my upbringing taught me to be more leery of men than of other women: "They are bigger, stronger, and sexually motivated" was the message I was given. Hence, in this scenario, I assumed a sexual motivation. Would my reaction have been any different if the car had been a Volkswagen Beetle rather than a truck? You bet.

The adviser in this case must understand that no matter how much he may want it to be, this situation is not in his control. His student is an adult who understands the risks of being female whether she is doing fieldwork, walking to her car at night in a big city, going to an urban bar, or doing an extreme sport. Is he responsible for all these events in her life? Of course not. He can make her aware of the risks her fieldwork poses and express his concern, but he should not curtail her career just because he feels that she is at greater risk than a male student in the same situation. Would the reaction of the adviser have been any different if the adviser were female?

It surprised me that although the ombudsman's office at the University of Washington sees 300–500 gender-based informal cases per year, it has dealt with more than 800 cases of sexual harassment from 1982 to 2004, a rate of only 38 per year. With the caveat that many cases go unreported, sexual harassment in this institution is only roughly 10% of the gender-related caseload, far less than I expected. (We will deal with sexual harassment in the next column.)

What are these gender-based informal cases? For faculty they mostly involve promotion and tenure, teaching assignments, sabbaticals, grants, committee work, and pay-related issues. Staff cases, on the other hand, usually concern job responsibilities; general performance; how well a staff member keeps confidentiality; and how he or she is perceived in terms of trustworthiness, likability, and competence. Student cases deal with grants, teaching and research assistantships, and opportunities that lead to internships—that is, "service/learning" experiences.

Scenario 2: A very attractive, fully qualified female faculty member is excluded from a committee in her department. When she complains to the chair, she is told that she cannot be on the committee. As a result, her status in the department declines. She retools for a new career in a different field.

A sad but true story (see also reference 1 below), this is a classic example of assertiveness being perceived as pushy or bitchy. If one has any doubts that assertiveness in females is perceived as aggressive behavior in the United States, just take a look at Hillary Clinton's reviews in the newspapers. Despite her intelligence and demonstrated competence, she is almost always labeled as *aggressive* (negative) rather than *assertive* (positive). Politics aside, assertive behavior in women is not rewarded in the same way it is for men. The perception is that female assertiveness disrupts relations, people, and process—in other words, that it is aggressive—whereas male assertiveness fosters them. In our scenario, all it took was one person to derail this woman's career (and no, it does not have to be the chair).

The cultural roots of this attitude are profound. Where the female style is perceived as nurturing, educative, and collaborative, the male style is punitive and preventive. Just think of the stereotypical phrases you have heard: "This is why your father will punish you" (female is educative) and "Just wait until your father gets home!" (male is punitive).

Next time: "Does Gender Matter?" continued

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Acknowledgments: I thank one anonymous faculty member and one anonymous staff member for their input and discussion surrounding this topic. I thank Vidhi Tyagi for editing a draft of this column.

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Eligibility
Applicants are expected to have a doctorate or to have published work of doctoral character and quality. Pre-doctoral graduate students are not eligible, 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 15; notification in May.

DOE Selects Three Bioenergy Research Centers for $375 Million in Federal Funding

U.S. Department of Energy (DOE) Secretary **Samuel W. Bodman** announced June 26 that DOE will invest up to $375 million in three new Bioenergy Research Centers that will be located in Oak Ridge, Tenn.; Madison, Wisc.; and near Berkeley, Calif. The centers are intended to accelerate basic research in the development of cellulosic ethanol and other biofuels, advancing President Bush's Twenty in Ten Initiative, which seeks to reduce U.S. gasoline consumption by 20 percent within 10 years through increased efficiency and diversification of clean energy sources. The department plans to fund the centers for the first five years of operation (fiscal years 2008–2013).

"These centers will provide the transformational science needed for bioenergy breakthroughs to advance President Bush's goal of making cellulosic ethanol cost-competitive with gasoline by 2012 and assist in reducing America's gasoline consumption by 20 percent in 10 years," Secretary Bodman said. "The collaborations of academic, corporate, and national laboratory researchers represented by these centers are truly impressive, and I am very encouraged by the potential they hold for advancing America's energy security."

To bring the latest tools of the biotechnology revolution to bear to advance clean energy production, the centers will be supported by multidisciplinary teams of top scientists. A major focus will be on understanding how to reengineer biological processes to develop new, more efficient methods for converting the cellulose in plant material into ethanol or other biofuels that serve as a substitute for gasoline. This research is critical because future biofuels production will require the use of feedstocks more diverse than corn, including cellulosic material like agricultural residues, grasses, poplar trees, inedible plants, and non-edible portions of crops.

The centers will bring together diverse teams of researchers from 18 of the nation's leading universities, seven DOE national laboratories, at least one nonprofit organization, and a range of private companies. All three centers are located in geographically distinct areas and will use different plants both for laboratory research and for improving feedstock crops.

U.S. Department of Energy Secretary Samuel W. Bodman.
WHITE HOUSE PHOTO BY PAUL MORSE

The mission of the Bioenergy Research Centers will lie at the frontier between basic and applied science and will maintain a focus on bioenergy applications. These centers aim to identify real steps toward practical solutions regarding the challenge of producing renewable, carbon-neutral energy. At the same time, the centers will be grounded in basic research, pursuing alternative avenues and a range of high-risk, high-return approaches to finding solutions. To some degree, one key to the centers' success will be their ability to develop the more basic dimensions of their research to a point that can easily transition to applied research.

The department's Bioenergy Research Centers will include

- The DOE BioEnergy Science Center led by the DOE's Oak Ridge National Laboratory in Oak Ridge. The center director will be **Martin Keller,** and collaborators include the Georgia Institute of Technology in Atlanta; DOE's National Renewable Energy Laboratory in Golden, Colo.; the University of Georgia in Athens; and the University of Tennessee in Knoxville.
- The DOE Great Lakes Bioenergy Research Center will be led by the University of Wisconsin–Madison, in close collaboration with Michigan State University in East Lansing. The center director will be **Timothy Donohue,** and other collaborators include DOE's Pacific Northwest National Laboratory in Richland, Wash.; Lucigen Corporation in Middleton, Wisc.; the University of Florida in Gainesville; DOE's Oak Ridge National Laboratory; Illinois State University in Normal; and Iowa State University in Ames.
- The DOE Joint BioEnergy Institute will be led by DOE's Lawrence Berkeley National Laboratory. The institute director will be **Jay Keasling,** and collaborators include Sandia National Laboratories; DOE's Lawrence Livermore National Laboratory; the University of California at Berkeley; the University of California, Davis; and Stanford University in Stanford, Calif.

Subject to the finalization of contract terms and congressional appropriations, the centers are expected to begin work in 2008, consistent with President Bush's FY2008 budget request, and would be fully operational by 2009. DOE's Office of Science issued a competitive funding opportunity announcement in August 2006 to solicit applications. The three centers were chosen following a merit-based, competitive review process that included external scientific peer review of the applications.

The establishment of the Bioenergy Research Centers culminates a six-year effort by DOE's Office of Science to lay the foundation for breakthroughs in systems biology for the cost-effective production of renewable

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Mollohan Champions Boost for Biology Research in Appropriations Report

House Report 110-240, accompanying House Bill 3093 providing fiscal year 2008 appropriations for the National Science Foundation (NSF), calls for funding increases for biological, social, behavioral, economic, and geological sciences comparable to those for other science disciplines. This effort addresses the widely diverging increases sought in the FY2008 budget request to Congress.

Some percentages of increase in the NSF budget request for other science disciplines were more than twice as high as those sought for biological, social, behavioral, and economic sciences.

This House Report language calling for comparable increases for biological, social, behavioral, and economic sciences reflects both ASPB's request in congressional testimony by Committee on Public Affairs Chair **Gary Stacey** and efforts with the Appropriations Committee coordinated by the Public Affairs offices of ASPB and the American Society for Biochemistry and Molecular Biology (ASBMB). These efforts were also supported by the Consortium of Social Science Associations and other affected science societies. ASPB, ASBMB, and other colleagues sought language in the Appropriations Committee report calling for increases for biology and the social, behavioral, and economic sciences comparable to the higher increases requested by NSF in the FY2008 budget for other science disciplines.

Appropriations Subcommittee on Commerce, Justice, Science, and Related Agencies Chairman **Alan Mollohan** (D-WV) championed comparable increases for biology; the social, behavioral, and economic sciences; and geosciences. The House Appropriations Committee favorably reported the measure July 19. The House passed the measure July 26.

The language accepted by the Appropriations Committee is similar to the authorization report language for NSF, written by the

Alan Mollohan

House Science and Technology Committee, that ASPB requested earlier. The Science and Technology Committee has budget-authorizing jurisdiction over NSF. ASPB Committee on Public Affairs member **Roger Innes** played a key role in seeking the House Report language supporting biology in the NSF budget authorization. Science and Technology Committee Chair **Bart Gordon** (D-TN) and Congressmen **Baron Hill** (D-IN) and **Brian Bilbray** (R-CA) championed support for biology and the social sciences in the authorizing report for NSF.

Following is the House Appropriations report language calling for comparable increases for the sciences:

"The Committee strongly supports increases for the math and physical sciences, computer sciences, and engineering directorates in fiscal year 2008 for research and related activities (R&RA). However, the Committee also believes the Foundation should maintain comparable growth in fiscal year 2008 for the biological sciences, geosciences, and social, behavioral, and economic sciences directorates. As the Innovation Agenda moves forward, it is important to note that maintaining U.S. competitiveness will depend on advances in, and the interactions among, all fields of science. The Committee expects NSF to ensure that the biological sciences, geosciences, and social, behavioral, and economic sciences directorates receive increases in fiscal year 2008 that are comparable to the other directorates."

The House Appropriations Committee and full House actions on House Bill 3093 and accompanying House Report 110-240 included the following:

- Committee recommendation includes $6,509,000,000 for NSF, $80,000,000 above the request and $591,835,000 above FY2007. This level of funding will support the doubling of the NSF budget in 10 years as part of a long-term, sustained commitment to investment in basic research and development, which provides the foundation for innovation and future technologies. This represents a recommended increase of 10%.
- The committee recommendation includes $5,139,690,000 for the Research and Related Activities account, $8,000,000 above the request and $473,740,000 above FY2007. This is an increase of more than 10%.
- The committee has provided an additional $8,000,000 above the budget request for a total of $115,000,000 for the Experimental Program to Stimulate Competitive Research.
- The committee recommendation includes $822,600,000 for Education and Human Resources, $72,000,000 above the FY2008 request and $25,907,000 above FY2007.
- The committee recommendation includes $244,740,000 for the Major Research Equipment and Facilities Construction account, the same as the request and $53,859,000 above FY2007.

Collins Peers into Future of 21st-Century Plant Biology

In his presentation July 7—"Plant Biology into the 21st Century: Where to from Here?"—**Dr. James Collins** discussed future directions he sees for research in plant biology.

Collins is National Science Foundation assistant director for the Directorate for Biological Sciences (BIO). He shared his insights as part of the Perspectives of Science Leaders program at the ASPB annual meeting in Chicago.

Collins noted that BIO inspires research and education at the frontiers of the life sciences to enable the discoveries for understanding life. BIO is taking a leadership role in integrating research and education, in broadening participation, in conducting international partnerships, and in aligning with other agency research agendas. Collins explained BIO's scientific themes: Theory and Concepts in Biology; Systems Biology; and Biology and Society—and some of the ways these themes can relate to plant biology.

He noted that systems approaches will help drive discovery of new processes and patterns in plant biology. Among the systems approaches in which plant biologists will be engaged are collaborating with scientists in other disciplines; utilizing modern tools for information and data management—for example, making advances in capacity and collaborative use of cyberinfrastructure; and developing innovations in education and training.

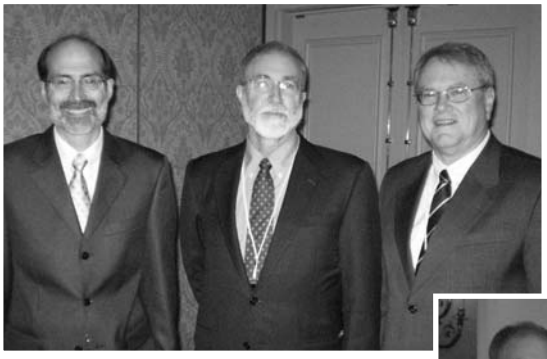
The National Plant Genome Initiative (NPGI) is increasing understanding of the structure, organization, and function of plant genomes and plant processes, Collins said. NPGI is developing data management and analysis capabilities and ensuring access to the broader community. At the same time, NPGI is maximizing training opportunities and accelerating knowledge transfer to agriculture, forestry, energy, environment, and health.

Biologists will need to become more familiar with mathematics, computational approaches, and modeling and collaborate with scientists in these fields, noted Collins, adding that "We need to prepare the next generation of scientists by providing a dynamic new intellectual environment for interactive pedagogy and research" he said.

He noted that plant systems are models for studying general biological processes, including genes and small RNA regulation, cells and cell signaling by sugar molecules, ecology and adaptation to global change, evolution, and novel energy transduction systems.

Collins noted his keen interest in stimulating innovation within biology, fostering transformative research, and making possible the biology of tomorrow.

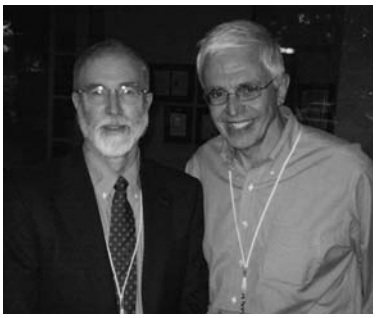
A large number of attendees filled available seats and standing room areas to hear Collins's presentation. Collins met with several of the attendees at the conclusion of the Perspectives of Science Leaders program and also at the ASPB Fellows reception that followed.



(From left) ASPB President Rick Amasino introduced Jim Collins for the Perspectives of Science Leaders Program coordinated by Gary Stacey and the Committee on Public Affairs.

(From left) Jim Collins, his predecessor Mary Clutter, colleague Machi Dilworth, and National Science Board member Doug Randall enjoy the ASPB annual meeting in Chicago. Mary, Machi, and Doug are all part of the inaugural class of Fellows of ASPB recognized at the annual meeting.

(From left) ASPB President-Elect Rob McClung, Jim Collins, and Jim Siedow, who was selected to the inaugural class of Fellows of ASPB, took part in the Fellows reception after Collins's presentation.



Jim Collins (left) recently visited with Ralph Quatrano, founding chair of the Committee on Public Affairs, past editor-in-chief of *The Plant Cell,* and member of the Fellows of ASPB inaugural class.

Carpita, Benning, Andre Present Congressional Poster Exhibits on NSF-Sponsored Plant Research

A record 493 attendees, including 11 members of Congress, many congressional staff, and executive branch officials participated in the 13th annual Congressional Exhibition and Reception of the Coalition for National Science Funding (CNSF) cosponsored by ASPB on June 26 in the Rayburn House Office Building.

ASPB Secretary **Nick Carpita,** of Purdue University, presented a poster on his plant genome research, sponsored by the National Science Foundation (NSF), on the "Structure and Biosynthesis of Plant Cell Walls" at the ASPB exhibit booth.

Carpita explained to visitors that plants devote about 10% of their genomes to the biogenesis of their cell walls. He said the NSF plant genome research project was designed to use cell biological, biochemical, and biophysical methods to identify, classify, and determine the functions of all the genes involved in cell wall construction—a first step toward a systems approach to gaining control of cell wall structure and dynamics. "Our establishment of the 'cell wall gene network' in maize and Arabidopsis provides an essential foundation for the design of optimized biomass feedstocks for biofuels," Carpita explained.

Collaborating with Carpita on the research were **Maureen McCann** (Purdue University), **Karen Koch** (University of Florida), **Don McCarty** (University of Florida), **Sarah Patterson** (University of Wisconsin), **Wolf-Dieter Reiter** (University of Connecticut), and **Wilfred Vermerris** (University of Florida).

Carpita and ASPB Public Affairs staff also conducted visits earlier in the day with Carpita's Congressman **Steve Buyer** (R-IN) and his staff and with Senator **Richard Lugar's** (R-IN) staff. Congressman Buyer thanked Carpita for his timely advice on plant research related to production of cellulosic ethanol. Carpita's recommendations subsequently found their way into energy legislation on which Congressman Buyer was working.

(From left) NSF Deputy Director Kathie Olsen, NSF Director Arden Bement (a professor at Purdue from 1992 to 2001), and NSF Assistant Director for the Directorate for Biological Sciences Jim Collins visit with Purdue Professor Nick Carpita on his research contributing to the understanding of plant cell walls.

Professor Christoph Benning (left) of Michigan State University discusses his research on the world's most essential energy conversion process—photosynthesis—with Congressman Bob Etheridge (D-NC) (center) and Professor Nick Carpita.

Jane Silverthorne of the Office of Science and Technology Policy and Nick Carpita enjoy the festivities at the ASPB booth and CNSF Congressional Exhibition and Reception.

ASPB members **Christoph Benning** and **Carl Andre** of Michigan State University presented a poster on "Plants as Biochemical Factories and Assembly of the Photosynthetic Machinery" at the MSU booth.

"Although scientists have long known that plants use photosynthesis to convert sunlight into chemical energy, there is less understanding of the actual process of how this happens," Benning explained. "Through research funded by NSF, we are now learning about how the export and import of lipids into chloroplasts contribute to the energy conversion process. We are also learning to manipulate this process to increase the amount of chemical energy stored by the plant in the form of oil."

"These basic research findings are significant in advancing the engineering of oil-producing plants so that we can maximize their use as bioenergy crops. Essentially, we want to ensure that each bioenergy crop field planted will generate the maximum amount of chemical energy. This work feeds directly into our applied research aimed at converting plant materials into biodiesel and other fuels funded by the Michigan Agricultural Experiment Station," Benning added.

A total of 35 poster exhibits were presented at the CNSF Congressional Exhibition and Reception. The exhibits highlighted research sponsored by NSF in a number of different science disciplines. Science societies and universities sponsored the individual exhibits. ASPB has participated in each of the 13 annual exhibitions and advocated that CNSF experiment with its first Congressional Exhibition in 1995. ASPB Public Affairs staff helped organize for CNSF the first exhibition and a number of subsequent exhibitions. The event has continued to grow in attendance and popularity. It's the major exhibition/reception of the year on Capitol Hill highlighting NSF-sponsored research. This education outreach event succeeded again this year in explaining the benefits of research to a key audience in a festive, interactive reception setting.

ASPB Secretary Nick Carpita discussed his NSF-supported plant genome research on biosynthesis of plant cell walls with Congresswoman Heather Wilson (R-NM). Wilson joined with Congressman Buyer in their successful effort to assure competitive selection based on highest merit for bioenergy research awards.

Congressman Steve Buyer (R-IN) (center) met with Professor Nick Carpita (right) of Purdue University and Brian Hyps, ASPB Public Affairs director, in the congressman's office June 26. Congressman Buyer and his staff discussed with Nick and Brian the congressman's successful effort in committee to assure competitive selection based on highest merit of a newly proposed bioenergy research award.

Bioenergy Research Centers
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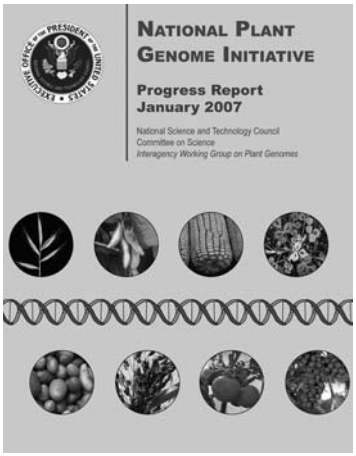
energy. In July 2006, DOE's Office of Science issued a joint biofuels research agenda with the department's Office of Energy Efficiency and Renewable Energy titled *Breaking the Biological Barriers to Cellulosic Ethanol.* The report provides a detailed roadmap for cellulosic ethanol research, identifying key roadblocks and areas where scientific breakthroughs are needed, and is available at http://genomicsgtl.energy.gov/biofuels/b2bworkshops.html.

The Bioenergy Research Centers announcement follows other key funding announcements this year to advance **President Bush's** Twenty in Ten Initiative and to make cellulosic ethanol cost competitive with gasoline by 2012. On February 28, 2007, DOE announced up to $385 million for six biorefinery projects that, when fully operational, are expected to produce more than 130 million gallons of cellulosic ethanol per year. On May 1, 2007, DOE announced a funding opportunity for $200 million over five years (FY07–FY11) to support the development of small-scale biorefineries that produce liquid transportation fuels such as ethanol. For additional information on DOE's biofuels initiatives, access http://www1.eere.energy.gov/biomass.

Additional information on the Department's three Bioenergy Research Centers and the Department's Genomics Research Programs is available at http://www.science.doe.gov/News_Information/News_Room/2007/Bioenergy_Research_Centers/index.htm. The research program is funded by the DOE Office of Science.

ASPB and a number of its members have worked with DOE officials since early in 2005 in support of a plant-based energy research initiative that would lead to cost-effective production of vast new quantities of cellulosic ethanol and other biofuels. President Bush announced his commitment for a major bioenergy research initiative in his 2006 and 2007 State of the Union addresses.

National Plant Genome Initiative Progress Report Cites Major Discoveries



Many important science breakthroughs resulting from the National Plant Genome Initiative (NPGI) were featured in the 2007 *Progress Report* issued by the White House National Science and Technology Council Committee on Science Interagency Working Group on Plant Genomes (IWG). The IWG is chaired by **James Collins** of NSF and **Judith St. John** of USDA.

The following discoveries were cited in the report:

- Regulatory RNAs are expressed even in the tightly wound parts of chromatin. These RNAs serve to silence the genes from which they come by guiding silencing machinery to them. This mechanism is likely to play a role in regulating gene expression in polyploids, where instead of two copies, there may be as many as six copies of each gene, researchers at Cold Spring Harbor Laboratory found.
- A milestone paper resulting from research by University of Florida researchers and their industrial collaborators described approximately 35 genes influencing tomato volatile production. This work was based on analysis of data from the growth of 75 plant lines over multiple seasons in multiple locations. These genes can now serve as markers to further study the complex metabolic pathways of flavor and nutrient compounds and to improve the quality of tomato fruits.
- Plants also store iron in the vacuole. Research on Arabidopsis at Dartmouth College has shown that cells in seeds accumulate iron in their vacuoles using a transporter protein molecule. Iron is an important component of the human diet, and applying knowledge to modify crop plants could allow development of iron-rich seeds, including cereals and beans.
- Washington State University researchers identified a gene required for RPG1-dependent resistance to stem rust in barley. The results of this research will facilitate understanding of why the RPG1 gene has been so durable and of ways to engineer durable resistance in other disease-resistance genes in barley, wheat, and other crops.
- Researchers at the University of California, Davis, and the University of Haifa have helped identify a gene from wild wheat germplasm called Gpc-B1. Collaborators at the USDA Agricultural Research Service, Albany, Calif., altered the Gpc-B1 levels in wheat, confirming that this gene can significantly increase grain protein content. Genetic mapping has placed the Gpc-B1 gene on Chromosome 6 of the wheat genome. The DNA sequence from this region has been used to develop a molecular marker that can identify the presence or absence of the Gpc-B1 gene in different wheat lines. This marker is now being used in breeding programs across the United States to improve protein content in wheat.
- Research at the University of Nevada, Reno, is testing the role of 20 candidate genes in rubber biosynthesis using a transgenic approach in Russian dandelion. This work could allow development of novel rubber-producing crop plants, as well as the ability to produce large amounts of hypoallergenic latex.
- Studies at Cold Spring Harbor Laboratory found that one of a complex network of genes regulating the development of ears and tassels in corn, Ra3, works by modifying a simple sugar called trehalose. The gene networks in corn have been shown to be similar to those in other cereals and grasses, enabling this discovery to be applied across a wide range of plants.

The report outlined plant genome–enabled research efforts in plant-based product development, including the following:

- A joint program in plant feedstock genomics was sponsored by the Department of Energy (DOE) Office of Biological and Environmental Research (BER) and the USDA Cooperative State Research, Education, and Extension Service National Research Initiative. The goal of the joint fundamental research program is to facilitate the use of plant tissues, specifically lignocellulosic materials, for bioenergy, including biofuels. Awards made by the joint program are leveraging information and research tools developed by NPGI projects.
- DOE–BER is supporting three Bioenergy Research Centers to accelerate basic research on the development of cellulosic ethanol and other biofuels.
- Two recent NSF awards complement DOE and USDA efforts in biomass genomics. Researchers at the University of California, Davis, in collaboration with the U.S. Forest Service, will develop genomic markers for members of the *Pinaceae* (conifers). Several thousand single nucleotide polymorphisms will be developed for each of eight different conifer trees to enable forest tree researchers to conduct breeding and gene resource programs at a depth and precision previously not possible. This work will have a broad impact on the develop-

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Annual Report Cites Arabidopsis-Fueled Discoveries Heading to Marketplace

The Multinational Coordinated Arabidopsis thaliana *Functional Genomics Project Annual Report* for 2007 noted that practical applications are arising from basic research findings on the model plant Arabidopsis.

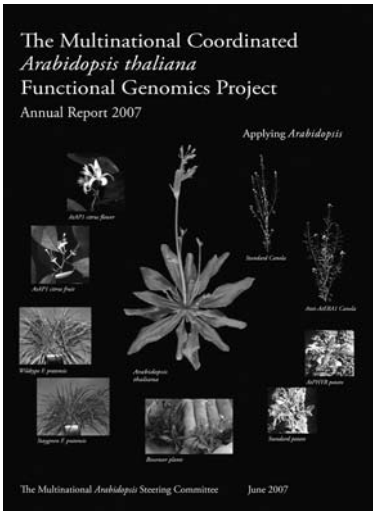
The report noted that many patents worldwide acknowledge research on Arabidopsis, but a widely held myth is that few discoveries are ever turned into useful products. "In reality, the time from discovery to application takes years, and the pipeline is full of Arabidopsis-fueled discoveries heading for the marketplace," the report said.

Highlights in Arabidopsis research cited in the report for the past year include the following:

- Leading findings in epigenetics and signaling
- A global view of methylation patterns in Arabidopsis using high-resolution whole-genome tiling microarrays
- Transgenerational memory of stress in plants
- The crystal structure of the TIR1 auxin receptor
- Gene-imprinting mechanisms in the plant embryo
- Cellulose synthesis guided by microtubules
- A high-throughput screen to improve fatty acid content.

The annual report can be seen at http://arabidopsis.info/progreports.html.

Ian Small of the University of Western Australia is chair of the Multinational Arabidopsis Steering Committee. **Xing Wang Deng** of Yale University is co-chair, and **Joanna Friesner** is coordinator.



House Authorizes $250 Million for Competitive Bioenergy Research

A new competitive grants program, the Agricultural Bioenergy and Biobased Products Research Initiative, is included in the House-passed Farm Bill (HR 2419). It would provide $50 million per year from fiscal year 2008 to fiscal year 2012.

This research program is intended to enhance the production, sustainability, and conversion of biomass to renewable fuels and related products. Research and development objectives would focus on improving biomass production and sustainability and improving biomass conversion in biorefineries by

- Leveraging the broad scientific capabilities of the department in plant genetics and breeding; crop production; soil and water science; use of agricultural waste; carbohydrate, lipid, protein, and lignin chemistry and biochemistry; enzyme development; fermentation; microbiology; cellulosic gasification; and ethanol by-product utilization
- Supporting bioenergy and biobased product research that will enhance the production, sustainability, and conversion of biomass to renewable fuels and related products
- Supporting bioenergy and biobased product research and the dissemination of that research that will assist in achieving the goals of the program.

The Secretary of Agriculture shall carry out the Initiative through a bioenergy and biobased product laboratory network that may consist of colleges and universities; federal agencies; national laboratories; research institutions and organizations; private organizations or corporations; state agricultural experiment stations; and individuals. Grant proposals will be selected based on merit through a system of peer review.

The Agricultural Bioenergy and Biobased Products Research Initiative was proposed by the Department of Agriculture. ASPB worked with department officials last year and this year in support of a bioenergy research initiative. The department had sought mandatory account funds for the bioenergy research program, because it is sometimes more difficult to find discretionary account funds in making subsequent appropriations for an authorized program. The Senate Agriculture, Nutrition and Forestry Committee is developing its version of the Farm Bill.

House Farm Bill Authorizes $715 Million over Five Years for New Specialty Crop Research Competitive Grants Program

With strong support from specialty crop producers, ASPB, and other science societies, the House Committee on Agriculture and the full House of Representatives have approved $715 million for competitively awarded research grants on specialty crops in the Farm Bill authorization.

The research funds would be awarded over five years from fiscal years 2008 through 2012 under the bill. Individual grants under this section are not to exceed five years.

Notably, the House approved $215 million in mandatory funds from the Commodity Credit Corporation over five years to fund the new research program. An additional $100 million a year in discretionary funds was authorized under the House-approved Farm Bill (HR 2419 and accompanying House Report 110-256).

The USDA had sought mandatory account funds for this research program, which it proposed to Congress earlier this year. It is sometimes more difficult to find appropriations for all discretionary funds authorized in an authorization bill, including the Farm Bill. However, the vast majority of all research supported by the federal government through all federal departments and agencies makes use of discretionary funds. Approval of mandatory funds increases the probability that there would be resources for the specialty crops research program, regardless of whether $100 million is subsequently appropriated each year in discretionary account money during the annual appropriations process.

In general, for grants awarded under this program, the Secretary of Agriculture will seek and accept proposals for grants; determine the relevance and merit of proposals through a system of peer review; and award grants on the basis of merit, quality, and relevance. Funds cannot be used for construction.

Under the Specialty Crop Research Initiative of the House-passed Farm Bill, the USDA seeks to address the critical needs of the specialty crop industry by developing and disseminating science-based tools to address the needs of specific crops and their regions, including

1. Research in
   a. Plant breeding, genetics, and genomics to improve crop characteristics, such as product appearance, environmental responses and tolerances, nutrient management, pest and diseases management, and enhanced phytonutrient content
   b. Safety
   c. Quality
   d. Yield
   e. Taste
   f. Shelf life.

The program also supports

2. Efforts to identify and address threats from invasive species
3. Efforts to improve agricultural production by developing more technologically efficient and effective applications of water, nutrients, and pesticides
4. New innovations and technology, such as enhancing mechanization and reducing reliance on labor
5. Production efficiency, productivity, profitability, and marketing.

Eligible entities to receive research awards include colleges and universities, federal agencies, national laboratories, research institutions and organizations, private organizations or corporations, state agricultural experiment stations, and individuals.

The Senate Agriculture, Nutrition, and Forestry Committee is developing its own version of the Farm Bill. Generally, a bill must be passed by both the House and Senate and signed by the president to be enacted into law. Some observers project that the Farm Bill now in effect will need to be extended before enactment of the proposed new Farm Bill now proceeding through Congress.

National Plant Genome Initiative
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ment of new wood-based materials. A project led by researchers at the University of Delaware will focus on sequencing all of the small RNAs in a range of plant species, including poplar, switchgrass, and pine. Because these RNAs are known to regulate key developmental pathways, this basic research will likely lead to identification of the gene networks governing biomass formation and accumulation in the plant.

Teacher training, training of a new generation of plant scientists, international collaboration, and the successful completion of the Poplar Genome Sequence in an effort led by the DOE Joint Genome Institute are significant components of the NPGI. The report noted that the NPGI leverages scientific expertise and resources from multiple federal agencies to expand fundamental knowledge about the genetic makeup of plants and to facilitate applications of plant biology to improve the environment, meet the world's growing food and energy needs, advance clean industrial processes, and contribute to overall economic growth.

The 2007 *Progress Report* can be found at http://www.nsf.gov/publications/pub_summ.jsp?ods_key=npgiprog2007.

President Bush Presents Congressional Gold Medal to Norman Borlaug

Norman Borlaug, Nobel Laureate for Peace and recipient of the ASPB Leadership in Science Public Service Award at the 2002 annual meeting in Denver, received the Congressional Gold Medal from **President Bush** on July 17. House and Senate Leaders took part with the president in the presentation.

Borlaug gave an inspiring presentation in the Perspectives of Science Leaders Program at the ASPB annual meeting in Denver. Recognized as the father of the Green Revolution, Borlaug has helped save nearly a billion lives by bringing modern innovations in plant science to developing nations.

For a story on the Congressional Gold Medal presentation, see http://news.yahoo.com/s/ap/20070717/ap_on_sc/borlaug_medal;_ylt=Apk3u0Pfy82euSDGbpcIo8DMWM0F. The site also makes available a touching account of the award presentation and Borlaug provided in an *ABC News* clip. Borlaug's presentation at the ASPB annual meeting in Denver can be viewed at http://www.aspb.org/publicaffairs/agricultural/borlaug.cfm.

Secrets of Plant Genomes: Revealed!

A video recently produced by the National Science Foundation (NSF) shares secrets of plant genomes with middle school, high school, and undergraduate non-biology major and introductory classes.

The 25-minute production—*Secrets of Plant Genomes: Revealed!*—unravels the science of plant genome research in a manner that students and others can more easily decipher. NSF produced the video to excite students about plants, plant research, and science in general and to emphasize the relevance of plants in our lives. Scientists are encouraged to use the DVD in conducting education outreach to schools.

Video Placement Worldwide will distribute DVDs to approximately 3,000 middle and high schools. The video will also be available on the web (streaming and downloadable). Twin Cities Public Television prepared the video for NSF. The video was completed in July 2007 with the release date in August 2007.

Following the introduction, the narrator takes viewers on a journey of the corn genome while explaining the multitude of food and non-food products from corn. Interesting historical accounts of ancestral links between teosinste and modern-day corn are explained.

Then it is on to the cotton genome, without which, we wouldn't have cool cotton blue genes—that is—blue jeans. Viewers are informed how knowledge of the cotton genome will lead to improved cotton-made clothes and other cotton fabrics.

"Potatoes vs. Late Blight: Plants at War and Peace" is the final segment of the movie. It recounts the devastating famines in Ireland resulting from destruction of potato crops infested with late blight in the 1800s. The famines tragically killed more than 1 million people in Ireland. The movie explains how knowledge today of the potato genome and plant transformation technologies have led to development of a potato that is resistant to late blight. Knowledge of food crop genomes could help avert future famines in other parts of the world.

"We are developing a companion website as an educational resource with information about plant genomics, bioinformatics, and plant breeding," commented Machi Dilworth, director of the NSF Biological Infrastructure Division. "It will be accessible for any teenager or adult curious about plant science, but also functions as a tool for educators by including discussion questions for use in middle and high school classrooms. It also provides correlations to science standards."

"We tried to make the video entertaining and the material accessible, done in a fast-paced style that appeals to today's students," said **Lauren Kitchen,** NSF science assistant.

The companion website is at http://www.plantgenomesecrets.org/. For further information, please contact Lauren at NSF at lkitchen@nsf.gov.

Fedoroff Selected Science and Technology Adviser to Secretary of State; National Medal of Science Recipient

The day after it was announced that President Bush would be presenting ASPB member **Nina Fedoroff** with a 2006 National Medal of Science, Secretary of State **Condoleezza Rice** announced on July 18 that she had named Fedoroff to be her Science and Technology Adviser.

Following is a letter of congratulations sent to Fedoroff by ASPB President **Rick Amasino,** ASPB President-Elect **Rob McClung,** Past President **Michael Thomashow,** Board of Trustees Chair **Danny Schnell,** and Executive Director **Crispin Taylor:**

Congratulations on two great honors announced July 17 and 18: your selection as a 2006 National Medal of Science Laureate and your naming as Science and Technology Adviser to the Secretary of State. We all fully appreciate how deserving you are of these honors, and we're delighted that someone of your caliber will have an opportunity to distinguish yourself at the Department of State just as you have throughout your illustrious career.

We are particularly delighted because we know that, in addition to your groundbreaking research, you have a long and successful record in public education and outreach. This includes among many other things your critically acclaimed book *Mendel in the Kitchen: A Scientist's View of Genetically Modified Foods,* which examines the scientific and societal issues surrounding the introduction of genetically engineered crops, and your service on the National Science Board.

As Science and Technology Adviser to the Secretary of State, we are grateful that you have accepted the responsibility of enhancing the science and technology literacy and capacity at the State Department, increasing the number of scientists and engineers working in Washington and at U.S. missions abroad, and strengthening and building bridges to the scientific and engineering communities. This is particularly important as the State Department seeks cooperation from foreign nations regarding use of science-based standards concerning acceptance of genetically engineered crops.

As noted in the American Society of Plant Biologists (ASPB) statement on Plant Genetic Engineering (available at http://www.aspb.org/publicaffairs/aspbgestatement.cfm), "the use of genetic engineering to modify plants represents a significant advance in plant science, building on centuries of human involvement in the genetic modification of crop species."

We appreciate your strong contribution to ASPB's public education outreach efforts on plant genetic engineering. We recall that you braved the unruly street antics of anti–World Trade Organization demonstrators in Seattle as you participated with fellow ASPB members **Doug Randall** and **Brian Larkins** and with Senator **Kit Bond** (R-MO) as presenters at an ASPB-sponsored press conference concerning plant biotechnology and genetically engineered plants.

Please let us know if there is anything that we and ASPB can do to assist you in your efforts within the Department of State.

Wall Street Journal Reports on Heightened Plant Bioenergy Research Support

The day of ASPB member **Steve Long's** mini-symposium on bioenergy crops at the ASPB annual meeting in Chicago (July 10), the *Wall Street Journal* published an article on increased private and public investment in bioenergy-related plant research. "Alternate-Fuel Hunt Gives Plant Biologist a Lift" was the headline for the article featured on B1, the first page of the Marketplace section.

The article noted that Long is enjoying increased interest and support for his research studying grass, "in particular a sugarcane-like grass called *Miscanthus X giganteus.* But until this year, the University of Illinois biologist had difficulty getting research grants and could count on one hand the invitations he received annually to make presentations at academic conferences."

The article noted that in February, Long was one of two plant biologists invited to the White House to brief **President Bush** on how plants like *Miscanthus* might begin replacing foreign oil. In that same month, BP announced a $500 million grant to the University of California at Berkeley; the University of Illinois at Urbana–Champaign; and the Lawrence Berkeley National Laboratory to develop fuels made from plant materials. Long has been named acting deputy director of the project, called the Energy Biosciences Institute.

"Now Mr. Long says he gets more academic-conference invitations than he could possibly accept—more than 50 a year, some from as far away as Australia and Japan. He's also inundated with calls and emails from prospective students interested in studying plants," the article noted.

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Wall Street Journal
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"Spurred by high oil prices and concern over greenhouse gases, the push for alternative fuels like plant-based cellulosic ethanol is putting plant biologists at the forefront of energy exploration. . . . Plant biologists are crucial to identifying and engineering a high-yield, drought-resistant plant and an efficient, cost-effective method of breaking down plant cellulose into biofuels," the article added.

The article further reported that Conoco Phillips established a $22.5 million biofuels research program at Iowa State University in April. Chevron has provided $60 million to such schools as the University of California, Davis, and Texas A&M for biofuels research in the past few years.

Biotechnology companies like Mendel Biotechnology Inc. in Hayward, Calif., and Ceres Inc. in Thousand Oaks, Calif., also are depending on plant biologists to commercialize plant breeds, seeds, and enzymes for breaking down plant cellulose, and they are hiring, the article said. In February, the Department of Energy committed $385 million over four years to build six cellulosic ethanol refineries. In June, DOE announced awards of $375 million over five years for three new Bioenergy Research Centers to develop biofuels.

The article said that at universities, student enrollment in plant biology is rising, and the programs are expanding, particularly at schools with new energy industry grants.

ASPB began its campaign in support of bioenergy research in early 2005. President Bush explained to the nation in his State of the Union addresses in 2006 and 2007 the significant opportunities offered through plant bioenergy research. Congress has demonstrated bipartisan support.

These research initiatives are expected to lead to vast increases in domestic production of biofuels and reduced reliance on foreign oil.

Reference

Wollan, Malia (July 10, 2007), "Alternate-Fuel Hunt Gives Plant Biologist a Lift," *Wall Street Journal,* p. B1, http://online.wsj.com/ public/article/SB118403019523461642-GQvjGx_5Vx3jLFHFvs8pOqB8AwE_20080709.html?mod=rss_free

Attention Plant Biologists and Agricultural Scientists in Developing Countries!

If you live in one of the developing countries listed here, your institution may be eligible for FREE online access to *Plant Physiology, The Plant Cell,* and many other scientific journals!

ASPB participates in three initiatives to bring the scientific research literature to scientists working in many developing nations: AGORA (food and agricultural science), HINARI (biomedical and health literature), and OARE (environmental science).

Public institutions in eligible developing countries can sign up for access by registering online (www.aginternetwork.org/en/about.php; www.who.int/hinari/en; www.oaresciences.org). So, go to the person in charge of journal subscriptions at your institution (probably the chief librarian) to see if you are already registered. If not, then please explain that this is very important for your research and that the service is free.

Don't delay—act now!

If you have questions, contact
AGORA/HINARI/OARE or
ASPB's director of publications, Nancy Winchester,
at nancyw@aspb.org.

AGORA HINARI OARE

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Zimbabwe

Jane Ellis Assumes Chair of Education Committee October 1

Jane Ellis is the new chair of ASPB's Education Committee, succeeding Mary Williams of Harvey Mudd College. Jane's new role within ASPB will be added to the impressive list of professional and volunteer activities she has undertaken as a plant scientist and educator.


Jane Ellis

Jane received her undergraduate degree from Erskine College and her master's degree in biology from Appalachian State University. She received her Ph.D. in plant physiology in 1994 from Clemson University; her dissertation explored the *Characterization of In Vitro Cultured Cocklebur: Biotypes Resistant and Susceptible to the Organic Arsenical Herbicides.* During her time at Clemson, she also coordinated the Monsanto Biotechnology Grant.

Jane is currently associate professor of biology at Presbyterian College in Clinton, S.C., specializing in plant physiology, tissue culture, and medicinal botany. She is also adjunct associate professor in the Department of Entomology, Soils, and Plant Sciences at Clemson University.

Actively involved in science education throughout her career, Jane taught high school biology and chemistry for many years before pursuing her Ph.D. During those years, she led many school and science academic team events. Jane received the South Carolina High School Science Teacher of the Year award in 1987. She has also taught science methods (K–12) in the university setting and continues to teach biology methods courses as needed at Presbyterian College. Since 1994, Jane has been a reader for the Advanced Placement biology exam. In 1996, she was named the Frances Livingston Cardwell Distinguished Lecturer at Erskine College.

Jane has been a member of the Board of Councilors of the South Carolina Academy of Science for many years and served as its secretary and vice president before being elected president in 2000. Jane was elected vice chair (2002) and chair (2003) of the National Association of Biology Teachers (NABT) College/University Section. She has served on the board of directors of NABT and continues to fill numerous leadership roles for NABT and other organizations.

Jane has published and presented her research many times since 1988. Earlier topics ranged from developing science writing skills in college biology majors to linking collegiate resources and high school biology teachers. Her most recent projects include presenting workshops on assaying the properties of essential oils and herbal and medicinal plants at various conventions and publishing her ongoing research on essential oils and medicinal plants, including their chemical analysis, toxicity, and estrogen-binding and anticancer properties.

Jane has been an invaluable member of ASPB. She has recruited volunteers to help her run many Education Committee booths at conferences such as NABT, American Association for the Advancement of Science, and the ASPB annual meeting. Recently, she attended the Society for Experimental Biology conference in Glasgow, Scotland, and once again promoted ASPB initiatives to an ever-expanding audience. She has served on the ASPB Education Committee since 2006. Her countless volunteer hours and invaluable coordination with other committee members have prepared her well for her new role as chair.

"It's going to be very difficult to fill Mary William's shoes, as she did such an outstanding job as chair," Jane noted. "I am so glad that she will continue as an adjunct member as the Education Committee moves forward."

Educational Highlights from the Plant Biology & Botany 2007 Joint Congress

The Plant Biology & Botany 2007 Joint Congress provided an opportunity for ASPB and the Botanical Society of America (BSA) members to share ideas about teaching and communicating plant biology. ASPB members had the opportunity to learn more about the BSA's annual Education Forum and to participate in the many other educational events that took place throughout the meeting.

Education Forum

The Education Forum is an annual event that occurs just before the formal BSA congress. The joint meeting provided ASPB members with an opportunity to attend BSA workshops, field trips, and symposia. Sessions on undergraduate education covered new tools for teaching particular topics such as life cycles, plant identification, and morphological phylogenetics; approaches to engaging students through clickers and differentiated learning techniques; and current pedagogical knowledge about educational objectives and active learning.

Two special features of the 2007 forum were the Active Learning Short Course and the BioQUEST Curriculum Consortium Spe-

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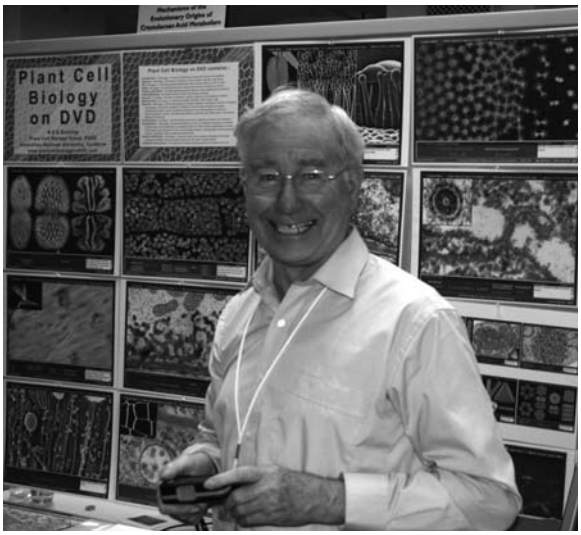

Brian Gunning presents his picture-perfect educational DVD.

Paul Williams and his Fast Plants attract an eager crowd.

John Cushman explains his "CAM kit" teaching tool for use with neotropical orchids.

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cial Symposium. Participants in the Active Learning Short Course, led by Jim Wandersee (coinventor of the phrase *plant blindness)* and Marshall Sundberg, boosted their retention, tenure, or promotion files with a certificate of completion and continuing education credits. For those interested in connecting to K–12 education, there were sessions on the PlantingScience student research mentoring program and the Partnership for Research and Education in Plants, workshops on sharing scientific research and collections information and on bringing space gardens and simple enzyme assays into classrooms, and much more. For more information about the Education Forum events, see http://www.2007.botanyconference.org/engine/search/index.php?func=ataglance&program=forum.

Education Booth

As always, a highlight of the exhibition and poster hall space was the Education Booth. The 2007 Education Booth in Chicago featured several outstanding education projects. The quality of educational efforts by ASPB members was evident in the ASPB Education Booth Competition, which is becoming increasingly competitive and prestigious. The first winning team, led by John Cushman, presented a beautiful display involving the evolutionary origins of crassulacean acid metabolism in tropical orchids. The second winning team, Amy Verhoeven and Jayna Ditty, presented "Active-Learning Tools for Bioenergetics," which involved photosynthesis and respiration modeling using magnetized pieces.

The BSA also sponsored an Education Booth Award this year. Bruce Kirchoff presented Image Quiz, a new method for teaching plant identification using computer-based visual-training programs. Another exhibitor, Brian Gunning, compiled a stunning collection of plant cell images on DVD for educational purposes. Finally, Paul Williams engaged meeting attendees with experiments using his highly acclaimed Wisconsin Fast Plants.

Education and Outreach Minisymposium

Four speakers highlighted innovative teaching methods and approaches. Rick Amasino spoke about "Developing Rapid-Cycling *Brassica rapa* as a Model for Teaching Genetics"; Carolyn Napoli spoke on "Integrating Genomics and Computational Thinking into Biology Education and Outreach"; Brian Gunning spoke on "Images of Plant Cell Biology on DVD: Information for Students and a Resource for Teachers"; and Eve Wurtele showed "Meta!Blast: Development of a Video Game of Cell and Metabolic Biology" (abstracts can be viewed at http://2007.botanyconference.org/engine/search/index.php?func=Select1stAuth&section=194&type=aspbmini&level=).

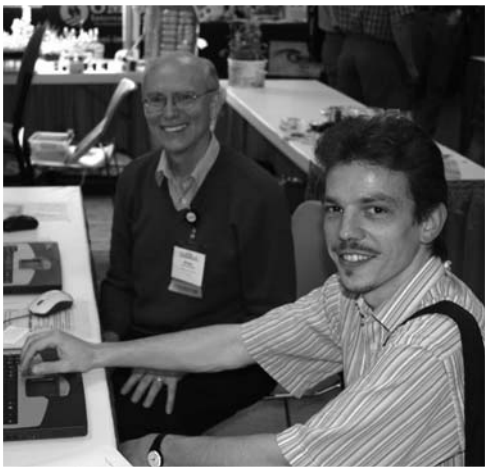
Joint ASPB/BSA Educational Workshop

Workshop leaders and participants from ASPB and BSA came together to discuss how to get involved and make an impact in education and outreach activities. Some of the themes that emerged include the importance

(Above left) Jane Ellis, Abbas F. Al-Jamali, and Paul Williams discuss issues, both rosy and thorny.

(Above, from left) Sarah Blackford, SEB; Katie Engen, ASPB; and Lauren Kitchen, NSF meet & greet at the booth.

Jayna Ditty and Amy Verhoeven display their winning teaching aids for bioenergetics.



Bruce Kirchoff helps a willing test taker master some of the 3,500 plant names in Image Quiz.

of stressing connections with familiar concepts and ideas, using tactile and sensory materials to draw the audience in, and teaching through telling engaging stories. A compilation of suggested resources and links will be posted soon on ASPB's and BSA's education websites.

Education and Outreach Posters

Nearly 30 posters describing innovative ideas for teaching plant biology at the K–12 and undergraduate levels were presented. Several poster authors described novel ways to incorporate interdisciplinary education into the undergraduate curriculum. Susan Blauth of the University of Redlands described the "Development of an Interdisciplinary Research Course in Biology and Chemistry to Study the Phytotoxin Herbarumin." In this course, undergraduates synthesize herbarumin and assay its effects on root growth while learning skills such as grant writing and synthesizing primary literature. Gary Tallman described "An Investigative Laboratory for Integrated Plant and Animal Physiology at the Sophomore Level at Willamette University" (http://www.willamette.edu/cla/biology/biol244/). Check out these and other projects through the conference abstract site (http://2007.botanyconference.org/engine/search/index.php?type=aspbposter).

2009: The Year of Science

In 2009, numerous scientific societies will coordinate a widespread effort to promote scientific literacy, specifically the importance of evolution to our understanding of biology (www.copusproject.org/yearofscience2009). The year 2009 will be the 200th anniversary of Charles Darwin's birth and the 150th anniversary of the publication of *On the Origin of Species.* ASPB will be contributing to these efforts in part by compiling and disseminating suggestions for activities to teachers and ASPB members. Send your ideas and suggestions to the ASPB Education Committee and look for us in 2008 in Mérida!

Mary Williams
Jeffrey Coker
Claire Hemingway
Jane Ellis

SRO for NSF @ PB07!

Plant scientists are passionate about the future of biological science education. This happy fact was quite apparent during the standing-room-only discussion about education hosted by the National Science Foundation (NSF) on July 10 at the ASPB annual meeting in Chicago. The NSF representatives Terry Woodin, program director, NSF Division of Undergraduate Education, and Judy Skog, deputy division director, NSF Biological Infrastructure, were hard-pressed to provide enough handouts (let alone chairs!) for the many attendees eager to discuss the topic "Vision and Change in Biology Undergraduate Education: A View for the 21st Century."

Woodin and Skog introduced NSF's two-prong rationale for changes in biological education. First, they stated, "The discipline of biology is undergoing a revolution. The major focus in understanding life remains unchanged, but breakthrough discoveries have changed the nature of the questions, and new technologies have changed our capacity to answer these questions." Both moderators emphasized that instruction must identify and examine the driving, cohesive factors of today's science. Second, they proposed that effective change will include instruction that reflects and responds to the wide variety of students and education options that are now available.

The moderators explained how the NSF's new Cross-Directorate Working Group will build on the combined input of experts from both the Biological Sciences Directorate and the Education and Human Resources Directorate to move undergraduate education forward. These experts will lead a series of conversations with key scientists and biology educators to identify and prioritize goals. NSF will then prepare a budget to fund well-defined goals.

The session at Plant Biology 2007 was the fourth such conversation of experts. Participants were asked to specifically define curricular goals, course designs, and delivery options, as well as the related faculty preparation and institutional structures that are needed to create effective change.

The session in Chicago was so large that one conversation was impossible. So the crowd broke into several dozen groups of five to seven people each. After much lively discussion, each group shared their top priority for improving plant science education. The following is a list of their suggested goals:

- The scientific method should be taught to everyone, including non-science majors, and should include probability instruction.
- Attitudes toward teaching need to be changed, especially at major research universities. Professors need additional support to become effective teachers and to disseminate their effective techniques.
- K–12 education majors need more science education. Science majors need to be taught to teach.
- Longer terms (although not necessarily more money) are needed for funding—for example, five years rather than three. Projects need at least that long to produce verifiable results.
- Biology should be taught to all undergraduates. It is the platform for all scientific thinking.
- The needs of majors (i.e., expertise) versus nonmajors (i.e., literacy) should be distinguished and thoroughly defined.
- Measurable learning objectives must be defined, and the relevance of the content to students' lives must be specified.
- Science classes should use the same evaluation standards for all students, raising the bar for nonmajors. (For example, there's no such course as "English Literature for Nonmajors.")
- More support is needed for pedagogical development, especially as related to interdisciplinary connections. No discipline stands alone.
- Change is required in teaching approaches. Spouting all the answers is an outdated method. Professors should
  a. model good research techniques and collaborative processes
  b. build learning communities around specific problems
  c. teach students to innovate and evaluate.
- Bring back the excitement of discovery! Educators should create discovery-based courses that address real, significant problems. They should find ways to do innovative, active learning with large classes.
- Science teaching is a process, not a litany of facts. Graduate students should be given teaching and research tools and allowed to go through the process.
- Students must be oriented toward global citizenship.

Other recommendations included the following:

- Statistics should be integrated with coursework.
- Students should be made more aware of career options (as well as other reasons why science is important).
- The challenges of interacting in large classes should be addressed.
- NSF initiatives should be more carefully articulated.
- Metrics must be developed to measure progress in reforming undergraduate biology education.

We hope that these ideas, combined with goals from additional NSF-hosted conversations, will help frame undergraduate science education in the future. The NSF welcomes any additional comments on these issues. Please e-mail Terry Woodin at twoodin@nsf.gov or Judith Skog at jskog@nsf.gov with your ideas.

Jane Ellis
Katie Engen

SURF's Up! The Next Wave of Plant Biologists Gets a Lift from UROs

Does student participation in hands-on undergraduate research opportunities (UROs) really make a difference? According to findings published in the April 2007 edition of *Science* magazine, the answer is yes. The study's authors, Susan H. Russell, Mary P. Hancock, and James McCullough, surveyed about 15,000 respondents from 2003 through 2005. Their results showed that overall, undergraduate research increased student interest in science, technology, engineering, or mathematical (STEM) careers.

The survey revealed that undergraduate researchers tended to be students who had STEM interests that started in elementary school and who had already expected to obtain an advanced degree before they entered college. This initial definition of the successful URO student substantiates the belief that quality educational outreach starting in the early grades is critical.

Graduate students reported that URO participation boosted their awareness of the demands and benefits of graduate school, their understanding of how to conduct experiments effectively, and their confidence in their general research skills. Sixty-eight percent of those surveyed said that their URO at least somewhat increased their expectation of achieving a doctorate and pursuing a STEM career.

The study showed that no one program structure or teaching formula proved to be the best for URO efficacy. However, the earliest exposure possible to hands-on research seemed to generate the most enthusiasm and persistence. Student researchers who completely immersed themselves in the process seemed to gain the most benefits. Attending conferences, mentoring peers, and authoring papers led to even more interest. Almost all students surveyed reported that specific and consistent faculty guidance was very motivating and helpful. Students whose mentors represented a wide array of racial groups and both genders reported a small but notable boost in confidence compared with students with a more homogenous set of mentors. It seems that the variety and depth of support was the key factor. The ethnicity or gender of the students did not influence this positive impact.

ASPB directly supports UROs through its Summer Undergraduate Research Fellowship (SURF) program. The program targets students with a demonstrated commitment to plant biology who have finished their sophomore year. SURFs are available to qualified freshman and juniors, too. The primary goal is to support students in their pursuit of meaningful research in plant biology at their home institutions early in their college years. Recipients also present their findings at ASPB's annual meeting.

ASPB member Amy Clore, assistant professor at New College of Florida's Division of Natural Sciences and a 2007 SURF organizer, was emphatic about the effectiveness of SURF. She said, "What makes the SURF program so powerful is that it provides the student with a significant combination of opportunities. . . . I know that for several of my own students (one of whom was a SURF awardee), the ability to engage in potentially publishable research and then to get feedback from experts in the field prompted them to pursue PhDs in plant biology–related fields. For these particular students, the research experience led them to initially consider a graduate degree in science, but it was the conference attendance that 'sealed the deal' for selecting a plant program. My undergraduates have come back from conferences tremendously energized and ready to apply to such programs."

According to Clore, undergraduates aren't the only beneficiaries of SURF and other UROs. She explained, "SURF awards can also help young faculty members to start down the rewarding road of mentoring undergraduate researchers. Those that take this route often find that undergraduates can be reliable and enthusiastic research colleagues. Some stay with their faculty mentors for up to three or four years."

Clore believed that SURF participation has benefits that reach beyond the field of plant science. She stated that "even if student awardees take a different path, their engagement in 'real-world' scientific research and attendance at a conference filled with ideas and controversies can only increase their abilities to sort through scientific information in the news and to make science-related decisions in the voting booth."

ASPB is excited about the many different levels of mentoring and learning that occur in the SURF program. The Society anticipates that these rich experiences will do much to prepare many budding student researchers to surge ahead in their plant science careers.

Katie Engen

Reference

Russell, S. H., Hancock, M. P., McCullough, J. (2007). The pipeline: Benefits of undergraduate research experiences. *Science* 316: 548–549.

Grant Awards Program Update—"The Plant Detective"

Beth Judy Fills Public Airways and Primary Art with Plant Science

ASPB member and radio producer Beth Judy has been very busy spreading seeds of enthusiasm for plant science since winning a Grant Awards Program (GAP) award from the ASPB Education Foundation in 2006. With the help of GAP funds, Judy has expanded the outreach of her radio show "The Plant Detective" starring Flora Delaterre (voiced by Judy). The 90-second show features the worldwide adventures of Detective Delaterre as she searches for specific medicinal plants and discusses their benefits, risks, and efficacy. Flora's motto is "Medicinal plants are everywhere, and you've got to treat 'em right, 'cause some day, they might be treating you."

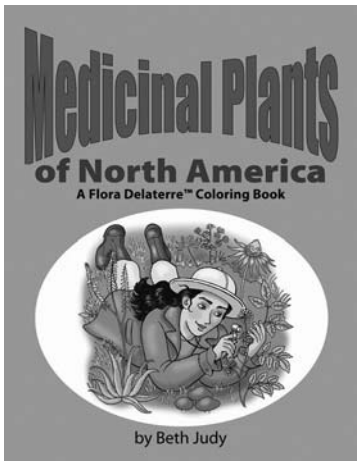
Beth Judy

Judy emphasized that her goal is conservation rather than the promotion of self-care with plants. She believed that people will more readily connect with the importance of plants if they learn how directly plants can affect their health.

So far, "The Plant Detective" has aired from Galena, Alaska, to Chestnut Hill, Mass., and in many communities in between via National Public Radio (NPR) and local airways. Judy and her colleagues are in the middle of a three-year plan to add 100 stations and more than 3 million listeners. Thanks to Judy's attendance at the National Federation of Community Broadcasters conference in New Orleans in April, the Plant Detective team is closer to reaching these goals. The radio show will be marketed to reach an even larger audience via the industry contacts Judy made during the conference.

Conference participants in New Orleans provided great feedback for Judy. She reported, "The response to the show from people at the conference was quite positive. There was a wide spectrum of community broadcasters—urban and rural, all different races and types. Indigenous people who were there 'got' the show immediately, because plant medicine is still widely known and used by tribal members: The concept of plants containing medicine is a no-brainer there. In fact, if you look at where the show is playing, many Indian reservations have taken it."

"In September," Judy added, "we take the show on the road again, this time to the Public Radio Program Directors' Conference in Minneapolis. We would like to have the show on 100 public and community stations by the end of the year." Judy will continue to offer "The Plant Detective" CDs and accompanying print materials at national broadcasting conferences and to market the program directly to NPR affiliates. The program will also be available on the Internet.



But wait, there's more! Flora Delaterre has hopped out of her adult-focused radio adventures onto the pages of a coloring book. *Medicinal Plants of North America* (available from http://floradelaterre.com/?id=40) is geared toward kids ages 7 and up, as well as "colorists of any age." Judy described the project as follows:

Each picture in the book is part of a two-page spread that includes information about the plant's past uses as herbal cures and present pharmaceutical uses. There are also "fun facts" about each plant—for example:

- Cricket bats are made out of willow; there's even a species called cricket-bat willow that's cultivated on special plantations.
- Native North Americans used lobelia, not just to soothe muscle spasms, but to concoct love medicine (both to induce love and to ward it off!).
- Pleurisy root, which is extinct in the wild in some northeastern states, is also called "butterfly weed" because it's eaten by Monarch butterflies.
- Individual echinacea plants can live up to 30 years.
- According to legend, Robin Hood's bow was made of yew wood (today, yew is the source of taxol, used in treating breast and ovarian cancer).

Judy is excited about the potential impact of this coloring book. She observed, "Kids will be the ones in charge of the planet in the future, and they need to know about the resource of medicinal plants. I'm interested in getting kids to see plants—so often, people don't even see them—and, of course, to value them. I think the connection medicinal plants have with humans really draws kids' attention. It's stuff they remember."

Judy has made great progress in reaching many people with many inspiring insights into plant science over the past year. To learn more about Judy's projects, check out www.floradelaterre.com.

2007 GAP Winners Offer Outstanding Ongoing Outreach Opportunities

ASPB's Education Foundation is pleased to announce the winners of its annual Grant Awards Program (GAP) awards to support education and outreach activities that advance knowledge and appreciation of the basic concepts and contributions of plant biology. The Education Foundation was established in 1995 to provide information and education to increase the public's knowledge about the role of plants in all areas of life. This year's winners will create exciting, hands-on learning experiences for students in a wide variety of educational settings.

Peggy Lemaux prepares to get everyone's plant science juices flowing.

Peggy Lemaux

Safe and environmentally friendly foods are a top priority for consumers and critical to the world's future. Peggy Lemaux of the University of California at Berkeley, Department of Plant Microbial Biology, and her team are working hard to help the public learn how safe foods are produced. Lemaux's group will use their 2007 GAP award to update and promote their materials at plant science and science education forums and at family-oriented outreach locations like county fairs. This year's award provides additional funds to enable this ongoing project to build on its success and meet the increasing demand for its educational resources.

To expand the Foods: Past and Present display, the team will create a related hands-on activity, the GENE-ie Juice Bar, which will demonstrate how DNA and genes are part of daily living. Drawn in by the appetizing format of a juice bar, users will explore the DNA protocol, easily accessed in a variety of fresh, juice-able produce. GAP funds will go toward juice bar tools and a new handout to augment the related baseball-type cards titled "What Is DNA?" and "How Much DNA Do You Eat?" GAP funds will also help defray the cost of sending these materials to new and repeat users everywhere.

To enhance the educational effectiveness of the Tic, Tac, Grow game, the team will add an activity in which children make necklaces of microfuge tubes filled with different-colored seeds. These necklaces will inspire interest in seed varieties and serve as take-home reminders of the game's lessons. The team plans to make 1,000 necklaces with children as they discuss important ideas about plants.

Lemaux's resources are doubly useful, because they make it easy for other plant biologists to connect with the general public. Scientists and educators, including many ASPB members, have been using Lemaux's materials at conferences and events to great effect since she first received GAP funding in 2004 to develop them. Since 2005, these materials have been sent to nearly 100 organizations and have reached an audience of more than 1,000 interested attendees. In 2005 and 2006, the displays traveled as far as Hawaii and Africa. They will visit 24 venues by the end of 2007.

Lemaux's project continues to build bridges with other outreach efforts. For example, the team's administrative assistant/graphic designer, Barbara Alonso, will create additional outreach materials for RiceCAP and BarleyCAP. An undergraduate student at one of the University of California institutions will also participate in outreach activities using these materials, thus expanding this teaching modality to the next generation of plant scientists.

Erin Dolan and David Lally

High school students and their teachers want to do "real" science. "Real" scientists often want assistance in their labs to determine gene functions in model plants. Virginia Tech's Partnership for Research and Education in Plants (PREP) was created to join these two complementary desires. Its focus became determining gene functions in *Arabidopsis thaliana* plant models. Scientists donate seeds and explain their scientific story. Students design and conduct experiments to

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Erin Dolan and David Lally prep for teacher/scientist partnerships.
PHOTO BY CAROL ROBERTSON

Teacher and scientist partners—future users of the Dolan & Lally web modules.
PHOTO BY CAROL ROBERTSON

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investigate mutant and wild-type plants' reactions to environmental stresses. Over time, PREP sprouted a website that generated a lot of interest from teachers and scientists.

Erin Dolan, assistant professor of biochemistry and outreach director of Virginia Tech's Fralin Biotechnology Center, along with PREP coordinator David Lally, plan to use their GAP award to meet this growing interest. Dolan explained, "The GAP award will allow PREP to reach an entirely new audience of high school students, their teachers, and plant scientists. Because PREP's focus to date has been on establishing research collaborations among students, teachers, and scientists with a focus on investigating gene function in Arabidopsis, we haven't been able to involve students or teachers beyond our geographic region or the vast number of scientists who have related expertise but don't study this model plant."

Dolan and Lally will develop and disseminate a series of four interactive, video-integrated, Web-based flash animation modules. According to Dolan, these modules will "highlight concepts in plant science in a dynamic, approachable way that is available to anyone with Web access." The modules' content will coordinate directly with ASPB initiatives and will teach plant biology, genetics, and scientific inquiry. Subject matter also will align directly with high school biology curricula, including critical issues such as functional genomics, differential regulation of gene expression, genome evolution and adaptation, plant–environment interactions, and plant–pathogen interactions. Each module will include video discussions with a research scientist, images and animations that elucidate the science, and related lessons developed by science educators.

The first module's release is scheduled for December 2007. This initial release will reach 2,000 students across the country. Modules 2 through 4 will go live between May and December 2008. This project will track the number of hits to the website, as well as unique visitors. Project evaluation will compare mastery of plant science and genetics concepts among students who do and do not use the modules. All results will be shared at ASPB events and other meetings and will be submitted for publication in peer-reviewed journals.

This appealing technology will attract the interest of many students, educators, and researchers. Beyond the wider geographic access to this content, Dolan and Lilly expect the modules to encourage plant scientists to serve as role models for teachers and students and to encourage more experts on cutting-edge science to share their work.

Jeffrey Coker, Jane Ellis, and Mary Williams

ASPB promotes the 12 principles of plant biology as a springboard for plant biology education at the K–12 levels. These principles serve as guidelines for curriculum developers and teachers to ensure that students gain a thorough understanding of plant biology.

Jeffrey Coker, Jane Ellis, and Mary Williams will use their 2007 GAP award to identify, troubleshoot, assess, and disseminate hands-on, inquiry-based activities that exemplify each of the 12 principles. This project is the fruit of the applicants' considerable combined experience in plant science education and is their response to numerous requests from teachers and organizations for well-constructed ("fool-proof") hands-on, active learning opportunities with plants.

Coker stated, "We envision our project as a resource for ASPB. The hands-on activities will be available for use in a variety of settings, including ASPB education booths, teacher workshops, outreach activities, and middle school and high school classrooms."

The project has five phases. First, the team will review their repository of activities to identify those that align best with each principle, engage students, and work well in classrooms (i.e., are safe, inexpensive, and simple). Second, they will adapt each activity to suit the middle school stu-


Jeffrey Coker


Jane Ellis


Mary Williams

dent's capability levels and interests. Lessons will be designed carefully to meet the parameters of time and lab facilities available in most middle schools.

Third, they will develop teacher and student guides. Each team member will be the lead developer on four activities and will revise the guides as they are field tested. ASPB member and middle school teacher Nathley Ceaser will also review the materials.

Then the assessment cycle for optimizing each activity will hit full stride. During the summers of 2008 and 2009, Coker will teach and evaluate the program during the one-month Elon Academy for talented students (grades 8–12) from underprivileged backgrounds. He will train teacher assistants to teach at the academy, thus perpetuating the cycle of experienced science educators. Ellis will follow a similar plan with sixth graders during the CHAMPS (Communities Helping, Assisting, Motivating, Promising Students) summer program at Presbyterian College.

Finally, the team will disseminate the project to several thousand new people around the country every year. They will present their activities at teacher workshops within various school systems. The will prepare PDF files of the activities to be archived on the ASPB website for easy access. The team also will develop traveling booth activities for teachers to conduct at National Association of Biology Teachers, National Science Teachers Association (NSTA), and public science events like the Family Science Days of the American Association for the Advancement of Science. When the 12 activities are fully developed, the trio will present to the Council of State Science Supervisors at the NSTA conference with the goal of disseminating the project through this influential network for science education outreach.

Elliot Meyerowitz

Elliot Meyerowitz, professor of biology at the California Institute of Technology, has coordinated with the Botanical Educators group at the Huntington Library in Pasadena to create a teacher training program. The program will use plants as model systems to address state biology standards in the Pasadena Unified School District (PUSD).


Elliot Meyerowitz

Meyerowitz's 2007 GAP award will allow him to coordinate this districtwide professional development program for all PUSD high school biology teachers. Teachers will attend six professional development workshops throughout the school year. They will use the state-of-the-art laboratory spaces in the Huntington Library's new Botanical Center. And, of course, they will be able to take advantage of the Huntington Library's 11 acres covered with 14 gardens with distinct botanical themes. Workshops will be timed to coordinate with district schedules so that teachers will have the new methods and materials ready to go when they need them in their classrooms.

Based on the Huntington Library's summer course "Grounding in Botany," the workshops are designed to help teachers explore the diverse learning opportunities inherent in plant studies. The workshops will show precisely how to align plant model knowledge and related lab skills with the school district's guidelines and textbooks. Workshop topics will include scientific literacy, cellular biology, genetics, evolution, physiology, and ecology. Teachers will increase their content knowledge, lab skills, and comfort levels with plants as model systems. These teacher improvements are expected to improve student performance on the state biology exam. In addition to the workshops, there also will be a meeting at the start of the academic year to discuss the pacing of the materials.

The teachers will be able to reach more than 1,800 students in an underserved community in the first year. The GAP award will make it possible for each teacher to take the necessary plant science materials back to the classroom. The availability of proper materials and the quality of teacher training are critical, because this biology course may be the only natural science class many of these students ever take.

Meyerowitz and his partners also plan to develop this series of workshops into a program that can be used in any school district. Continued dissemination of the program will spread the word that plants are effective model systems.

ASPB Headquarters

Telephone Extensions and E-Mail Directory

For your convenience, keep this listing of extension numbers and e-mail addresses handy when you contact ASPB headquarters so that you can reach the person best able to assist you.

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