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New ASPB Officers and Committee Members as of October 1



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ASPB News



THE NEWSLETTER OF THE AMERICAN SOCIETY OF PLANT BIOLOGISTS

President's Letter

Time to Speak Up

JULIAN SCHROEDER
University of California, San Diego

It is an honor to be elected your new president and to work in support of our common goals. It has been a productive year as president-elect, and it is a pleasure to share timely thoughts with you here.

No question: This is an exciting time to be a plant scientist. There are numerous unanswered but important fundamental research questions and diverse new and powerful research tools at our disposal. Furthermore, plant research is having, and will play, an ever-growing role in addressing sustainable solutions for our planet. Goals that were once considered lofty are now being pursued with a vengeance, even if some will take time to deliver. Examples include developing C_4 photosynthesis in C_3 plants, enhancing biotic and abiotic stress tolerance, nitrogen fixation—you name it. But make no mistake: addressing these seemingly applied questions will require in-depth understanding of the underlying fundamental principles and mechanisms of plant life.



Julian Schroeder

For the plant biology community to provide its most effective contributions to ensure a sustainable future, basic research into underlying plant mechanisms and networks should not be short-changed, unless we want to reach these goals more slowly. The “war on cancer” is a prime example, where initially rapid solutions were sought—

and over four decades later, the community has come to realize that any substantial gains that have been made are derived directly from basic scientific insights. I would argue that on a global scale plant biology research cannot afford to lose much time, given the growing world population; the continuing increase in incomes in many countries requiring increased resources; and the expected climate change-linked stresses on food, fiber, and bioenergy production. Advances in the plant sciences will not only be key to addressing these challenges, but

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On Your Mark, Get Set . . . Get Nominating!

It Will Soon Be Time to Recognize Our Fellow Plant Scientists

The 2015 Call for ASPB award nominations will be sent to all members on January 5, and nominations will be due by Monday, February 16. ASPB encourages you to participate in the 2015 awards program by nominating deserving individuals. Please watch for the Call for Nominations in your e-mail inbox and on our website. In the meantime, please visit ASPB's awards pages (http://my.aspb.org/?page=AF_Awards) so that you can see who among your colleagues has received these awards in the past and determine who might be most deserving in the future. All that is required to make a nomination for ASPB's awards is a one- to two-page letter of nomination and a detailed CV of the nominee. However, nomination committees may opt to go back to the nominator to ask for additional information if they deem it necessary. Nominations should be submitted electronically as a single PDF (<https://awards.aspb.org>). The names of the

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

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

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President-elect	Rick Dixon
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Treasurer	Karen Koster
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Chair, Women in Plant Biology Committee	Marisa Otegui
Chair, Minority Affairs Committee	Adán Colón-Carmona
Chair, Education Committee	Kathleen Archer
Chair, International Committee	Tuan-hua David Ho
Chair, Membership Committee	David Horvath
Chair, Science Policy Committee	Patrick Schnable
Elected members	Elizabeth (Lisa) Ainsworth Joe Kieber MariaElena B. Zavala
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Midwestern	Ed Cahoon
Northeastern	Om Parkash Dhankher
Southern	Rebecca Dickstein
Mid-Atlantic	Hemayet Ullah
Western	Camille Steber

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

Copy deadline is the 5th day of the preceding even-numbered month (for example, December 5 for January/February publication).

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PRESIDENT'S LETTER *continued from page 1*

they also will be the drivers of future economic growth.

One of the questions affecting plant biologists while also vexing funding agency managers and political representatives in many countries is, “What is the best mix of fundamental research and applied research for creating a better future and a stronger economy?” Not a simple question, to be sure. Given the importance of innovative discovery research, certain funding agencies in some countries have the mission to support basic research and have been the drivers of the modern-day global economy using this approach (for example, the NSF in the United States, JSPS in Japan, DFG in Germany, and others). At the same time, other agencies that are in dire need of transformative discoveries are being pushed to direct a larger percentage of their funds into applied research. Fundamental and applied research go hand-in-hand and are not easily separable. Nevertheless, while there is a clear need for applied research, past experience shows that fundamental basic research has led to the development of entirely new sectors of the economy and to completely new “disruptive” technologies providing previously improbable and powerful solutions. One recent example is the cascade of discoveries of genome editing technologies, including TALENs (discovered during basic plant pathogen research) and the CRISPR/cas system (discovered during basic microbiological research). These technologies emanating from basic research promise to revolutionize every aspect of the plant, life, and health sciences, with many scien-

tists and newly started companies already going full bore. The powerful solutions to our present and future problems will come in large part from discovery research, which will include, among others, gene discovery, targeted mechanistic research, omics revolution-based systems biology, and quantitative genetics illumination of trait improvements.

Investment in research, whether discovery or applied, is also critical for maintaining a strong training platform for young scientists who will be the future leaders and innovators. A recent opinion piece in *The Scientist* by ASPB past president Alan Jones has summarized the need for increased training of the next generation of plant and agronomic scientists (<http://tinyurl.com/m6chbrr>).

What Can ASPB Do For You?

What can ASPB's plant scientists, educators, industry members—all of our members—do to help elected officials make good decisions for the innovation enterprise? And importantly, what can ASPB do to help you—our membership—connect with policy makers (in addition to the many other ongoing efforts that ASPB is already making)? At the international level, ASPB has been working with and providing strong support for the Global Plant Council (GPC; <http://globalplantcouncil.org/home>). The GPC is a coalition of plant and crop science societies from around the globe that aims to coordinate and bring greater visibility to plant scientists' efforts to address pressing global issues, including hunger, energy, and climate change. One of the GPC's core missions is effective global advocacy for plant science research. ASPB is a member of the

GPC and is working closely with the GPC in supporting this goal on behalf of ASPB members around the world. The GPC's blog (<http://blog.globalplantcouncil.org>) is an increasingly rich source of information, and its Twitter feed (<https://twitter.com/GlobalPlantGPC>) is active and well-populated. In the following, I would like to propose a first step at how we can assist our U.S. membership to make our voices heard.

With a new Congress set to convene in the United States in January 2015, now is an excellent time for the ASPB community to stay informed and get involved to influence key congressional decisions such as funding for federal research agencies (NSF, DOE, USDA-NIFA, and NIH). Congress receives input from ASPB. For example, every member of Congress received a copy of *Unleashing a Decade of Innovation in Plant Science: A Vision for 2015–2025* after it was published by ASPB last summer, and our Science Policy Committee has been following up in various ways since. However, policy makers also want to hear from scientists in their respective districts, from trainees on their own paths to becoming the educators, researchers, and entrepreneurs of tomorrow and from ASPB members at any stage of their careers. Your individual, personal perspective and your personal story, background, and motivation will make a difference.

While there is much we can do, as a first step in ASPB serving your interests, I ask that those ASPB members interested in becoming more engaged and proactive (at any stage of your career and training) please contact ASPB and provide your email

address to Tyrone Spady, ASPB's director of legislative and public affairs (tspady@aspb.org). Tyrone will then be able to alert you of new developments and provide you with helpful information on possible actions. ASPB will inform you of federal budget decisions and other relevant congressional activities and ask for your rapid response to help influence Congress's thinking before decisions are made. In the past, ASPB has communicated new developments to a smaller group of the ASPB membership, and I am enthusiastic about enabling engagement of our broader membership now. You may decide to write an op-ed piece for your local newspaper, meet with your congressperson, or come up with other creative ideas.

To aid your connection with congressional representatives, ASPB has created the Communicating with Congress page (<http://tinyurl.com/ASPB-Congress>). Following are some of the resources posted on that page:

- Meeting request and advocacy letter templates
- General talking points and communications tips
- Links to match your zip code to your congressperson

Communicating and meeting with elected officials and their staff are important activities to educate our representatives about the sheer excitement you bring to your research, as well as the economic impact of plant biology discoveries. Those communications also will increase the influence of plant biologists and amplify the voices of our community. Members of Congress are regularly in their home districts

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ASPB Officers Assume Posts for 2014–2015

Listed below are governance committee members for the current year. The year in which each committee member's term ends is indicated in parenthesis.

Board of Trustees

Rob McClung (2017), *chair*
Karen Koster (2015), *treasurer*
Sally Assmann (2015)
Jonathan Monroe (2016)

Constitution and Bylaws

Brian Larkins, (2015), *chair*
Debby Delmer (2016)
Mary Lou Guerinot (2017)

Education Committee

Kathleen Archer (2015), *chair*
Burkhard Schulz (2016)
Sarah Wyatt (2016)
Subhash Minocha (2017)
Stacey Simon (2017)
Erin Friedman (2018)
Ken Helm (2018)
Scott Woody (2018)

EXECUTIVE COMMITTEE

Officers

Julian Schroeder (2016), *president*
Alan Jones (2015), *immediate past president*
Richard Dixon (2017), *president-elect*
Karen Koch (2016), *secretary*
Karen Koster (2015), *treasurer*

Elected Members

MariaElena Zavala (2015)
Lisa Ainsworth (2016)
Joe Kieber (2017)

Committee Chairs

Rob McClung (2017), *Board of Trustees*
David Horvath (2015), *Membership Committee*
Adán Colón-Carmona (2017), *Committee on Minority Affairs*
Neil E. Olszewski (2017), *Publications Committee*
Marisa Otegui (2017), *Women in Plant Biology Committee*
Kathleen Archer (2015), *Education Committee*
Tuan-hua David Ho (2016), *International Committee*
Patrick Schnable (2016), *Science Policy Committee*

Executive Committee

Sectional Representatives

Om Parkash Dhankher (2015), *Northeastern*
Camille M. Steber (2016), *Western*
Hemayet Ullah (2016), *Mid-Atlantic*
Ed Cahoon (2017), *Midwestern*
Becca Dickstein (2017), *Southern*

International Committee

Tuan-hua David Ho (2016), *chair*
Ousmane Boukar (2015)
Theresa Fulton (2015)
Jaswinder Singh (2015)
Jeff Bennetzen (2016)
Yunde Zhao (2017)

Membership Committee

David Horvath (2015), *chair*
Leeann Thornton (2015)
Sandra Paulina Smieszek (2015), *graduate student member*
Jill Deikman (2017)
Prateek Tripathi (2018), *postdoc member*

Committee on Minority Affairs

Adán Colón-Carmona (2017), *chair*
Michael Gonzales (2015)
John Harada (2015)
Beronda L. Montgomery (2015)
Gustavo Macintosh (2016)
Valerie Sponsel (2016)
Tyrell Carr (2017)

Nominating Committee

Rick Dixon (2017), *president-elect; chair*
Julian Schroeder (2016), *president*
Alan Jones (2015), *immediate past president*

Program Committee

Karen Koch (2016), *secretary; chair*
Rick Dixon (2015), *president-elect*
Alice Harmon (2018), *secretary-elect*
Andrew Bent (2015)
Bonnie Bartel (2016)
Phil Taylor (2017)
Maria Harrison (2018)

Publications Committee

Neil E. Olszewski (2017), *chair*
Steve Rodermel (2015)
Georg Jander (2016)
Pamela J. Hines (2017)
Katie Dehesh (2019)

Science Policy Committee

Patrick S. Schnable (2016), *chair*
Alan Jones, (2015), *immediate past president*
Sally A. Mackenzie (2015)
David Stern (2015)
Hallie Thompson (2015), *early career rep*
Dean DellaPena (2016)
Daniel Peterson (2017)
Nathan Springer (2017)
José Dinneny (2018)
Harry Klee (2018)

Women in Plant Biology Committee

Marisa Otegui (2017), *chair*
Diane C. Bassham (2015)
Michael M. Neff (2015)
Elli Wurtzel (2016)
Kathy Osteryoung (2017)
Laura Wayne (2017)



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2014–2015 Awards Committees

Listed below are awards committee members for the current year. The year in which each committee member's term ends is indicated in parenthesis.

ASPB Innovation Prize for Agricultural Technology

Chris Somerville
(four award cycles), *chair*
Jeff Dangl (two award cycles)
Jane Langdale (three award cycles)
Toni Kutchan (three award cycles)
Elliot Meyerowitz (two award cycles)

Charles Albert Shull Award

Steve Briggs (2017), *chair*
Libo Shan (2015), *past winner*
Ralph Panstruga (2016)
John Shanklin (2017)

Charles Reid Barnes Life Membership Award

Bob Buchanan (2017), *chair*
James Siedow (2015), *past winner*
Jack Preiss (2016)
Barbara Mazur (2017)

Corresponding Membership Awards Committee

Hiroo Fukuda (2017), *chair*
Gerald Edwards (2015)
Karen Koch (2015)
Gynheung An (2016)
Luis Herrera-Estrella (2016)
Leon Kochian (2016)

Dennis R. Hoagland Award

Mary Lou Guerinot (2021), *past winner, chair*
C. Robin Buell (2015)
Kendal D. Hirschi (2015)
Elizabeth E. Hood (2015)
Katie Dehesh (2021)

The Early Career Award

Michael Hahn (2017), *chair*
Jing-Ke Weng (2015), *past winner*
Bob Sharrock (2016)
Keiko Torii (2017)

Eric E. Conn Young Investigator Award

Bijay Singh (2015), *chair*
Rob Last (2015)
Christophe Maurel (2019)
Danny Schnell (2019)

Excellence in Education Award

Amy M. Clore (2015), *chair*
Brent Buckner (2015), *past winner*
Kenneth Korth (2016)
Paul Overvoorde (2016)

Fellow of ASPB Award

Jaakko Kangasjärvi (2017), *chair*
Alice Cheung (2015)
Dan Bush (2016)
Janet Braam (2017)

Martin Gibbs Medal

Wolf Frommer (2019), *chair*
Jen Sheen (2015), *past winner*
Gerald Berkowitz (2017)
Alice Cheung (2017)

Stephen Hales Prize

Maarten Koornneef (2016), *chair*
Mike Thomashow (2015),
past winner
Chentao Lin (2016)
Alex Webb (2017)

Summer Undergraduate Research Fellowship

Burkhard Schulz (2017), *co-chair*
Michael Campbell (2017), *co-chair*
Joseph Jez (2018)
Devi Venkateswara (2018)
Amy S. Verhoeven (2018)

GET NOMINATING *continued from page 1*

2015 award recipients will be announced in mid-April via e-mail broadcast to ASPB members, and the awards themselves will be presented during Plant Biology 2015 in Minneapolis, Minnesota.

Awards to Be Given in 2015

ASPB Innovation Prize for Agricultural Technology

This prize was inaugurated in 2015 to recognize the outstanding work of industry scientists in companies of all sizes who translate discovery research into real-world outcomes that benefit agriculture. The award additionally acts as a vehicle to increase the awareness

of the highest-quality science performed by industry scientists, whether or not they are members of the Society upon nomination, and showcases the opportunities and rewards of this career path. The Innovation Prize, which is made biennially, is a monetary award that also provides a one-year membership in the Society.

Charles Albert Shull Award

This award was initiated in 1971 by the Society to honor Dr. Charles A. Shull, whose personal interest and support were largely responsible for the founding and early growth of the Society. It is a monetary award made annually for outstanding investigations in the field of plant biology by a member who is generally under 45 years of age on January 1 of the year

of presentation or is fewer than 10 years from the granting of the doctoral degree. Breaks in careers will be considered when addressing the age limit of this award. The recipient is invited to address the Society at the annual meeting the following year.

Charles Reid Barnes Life Membership Award

This award was established in 1925 at the first annual meeting of the Society through the generosity of Dr. Charles A. Shull. It honors Dr. Charles Reid Barnes, the first professor of plant physiology at the University of Chicago. It is an annual award for meritorious work in plant biology; it provides a life membership in the Society to an individual who is at least 60 years old. Membership is a requirement

for the award, and, if appropriate, every fifth award should be made to an outstanding plant biologist from outside the United States.

Corresponding Membership

This honor, initially given in 1932, provides life membership and Society publications to distinguished plant biologists from outside the United States in recognition of their contributions to ASPB and to plant biology. 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.

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GET NOMINATING *continued from page 5*

Election of a corresponding member is to be considered each year and held if warranted, provided the election would not increase the number of corresponding members beyond 2% of the dues-paying membership. Membership is a requirement for this award.

Dennis R. Hoagland Award

This monetary award, established by the Society in 1985 with funds provided by the Monsanto Agricultural Products Company, honors Dr. Dennis R. Hoagland, recipient of the first Hales award, for his outstanding contributions and leadership in plant mineral nutrition. The award, to be made not more frequently than triennially to an individual, whether or not a member of the Society, is for outstanding plant research in support of agriculture.

Early Career Award

The Society's executive committee instituted the Early Career Award 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, inde-

pendent contributions by an individual, whether or not a member of the Society, who is generally not more than seven years post-PhD on January 1 of the year of the presentation. Breaks in careers will be considered when addressing the time limit of this award.

Eric E. Conn Young Investigator Award

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

Excellence in Education Award

This award, initiated in 1988, recognizes outstanding teaching,

mentoring, and/or educational outreach in plant biology by an individual, whether or not a member of the Society. It is a monetary award to be made annually in recognition of excellence in teaching, leadership in curriculum development, or authorship of effective teaching materials in the science of plant biology.

Fellow of ASPB Award

Established in 2007, the Fellow of ASPB Award may be granted to current members in recognition of direct service to the Society and distinguished and long-term contributions to plant biology. Areas of contribution may include education, mentoring, outreach, research, and professional and public service. Examples of relevant Society service include, but are not restricted to, service on or on behalf of ASPB committees, service on editorial boards of ASPB journals, and active involvement in ASPB meetings. Current members of ASPB who have contributed to and been members of the Society for at least 10 years cumulative prior to their nomination are eligible for nomination. Recipients of the Fellow of ASPB honor, which may be granted to no more than

0.2% of the current membership each year, receive a certificate of distinction and a lapel pin.

Martin Gibbs Medal

This monetary award, initiated in 1993, honors Martin Gibbs for his outstanding service to the Society as editor-in-chief of *Plant Physiology* from 1963 to 1992. This award is to be given biennially to an individual, whether or not a member of the Society, who has pioneered advances that have served to establish new directions of investigation in the plant sciences. The recipient is invited to organize a symposium at the annual meeting the following year.

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 an ASPB member 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. ■

PRESIDENT'S LETTER *continued from page 3*

during weekends, recess periods, and just prior to congressional elections. These represent great opportunities to engage them directly and possibly to establish longer-term communication channels, and I highly encourage you to pursue these opportunities. If you are unable to meet directly

with your congressperson, meeting with their staff is very much worthwhile, as the staff is highly influential in shaping policy.

As a former member of ASPB's Science Policy Committee, I can tell you that outreach and meeting with policy makers are critical to ensure that our scientific enterprise stays strong. If you are interested in getting involved, want assistance

in organizing a meeting with your congressperson, or have ideas about how we can improve our advocacy efforts, please send your contact information to Tyrone (tspady@aspb.org). This is a great opportunity, and I am happy to be working on this initiative.

As a final comment, the past year of activities as president-elect for ASPB has made it abundantly

clear to me how hard working ASPB's staff is, and how motivated the staff is to support the diverse missions of our members. I hope with this first letter that we can help you engage and have your voice heard. I am looking forward to serving ASPB during this year. ■

Plant Biology 2015

JULY 26–30 MINNEAPOLIS, MINNESOTA
PLANTBIOLOGY.ASPB.ORG

YOUR PLANT BIOLOGY MEETING *continued from page 7*

rigorous and arduous process. As the committee is made up of scientists, we're interested in the data on this, so in Minneapolis we will be adding a career-stage checkbox to the abstract submission form. This will enable us to provide data afterwards on exactly how many graduate students, postdocs, new assistant professors, and senior scientists were chosen for speaking slots.

Some people requested fewer overlapping sessions, but the arrangement of the past few years (five simultaneous sessions during periods of concurrent talks) seems, on the whole, to be popular. We aim for many

diverse talks, but not too many. Let us know what you think! Some people requested less topic overlap among simultaneous talks in different concurrent sessions. We find that some overlap is inevitable, but attendees should know that the Program Committee works hard every year to minimize it. We are looking forward to being at the Convention Center in Minneapolis, where the minisymposia rooms will be bigger (no more huddling outside the door of a packed room trying to see the slides!) and closer together for easier movement from one to another for those of you (like me) who find themselves bouncing around different sessions.

And coffee! We will have plenty of it next year! We have already started working on this for Minneapolis. Coffee for more than 1,000 people? No problem! In fact, we're hoping to have coffee ready for you when you arrive for major symposia first thing in the morning to get you ready for a great day of talks, posters, and fun.

Everyone seemed to enjoy the final party this year. I can't give it away just yet, but I think we may just have a few tricks up our sleeve to ensure next year's closing party is even better.

I hope that by reading this, you're now even more convinced that making the trip to beautiful Minnesota next July to spend

some quality time with your community will be good for you—and your career. Abstract submission begins soon, so now is the time to be thinking about throwing your hat in the ring to be part of the action. If you have questions or comments, feel free to contact Phil Taylor (phil.taylor@monsanto.com) or any other member of the Program Committee (http://my.aspb.org/?G_Leadership#program).

We're looking forward to reading your abstracts! See you at #PlantBiology15 in Minneapolis! ■



(left to right) Anja Geitman, Julian Schroder, Carl Douglas, Julia Bailey-Serres, and Karen Koch figure out how to put 30 different minisymposia into an already packed agenda to avoid any unnecessary overlap.

2015 Program Committee members

Karen Koch, *secretary; chair* (KEKoch@ufl.edu)

Richard Dixon, *president-elect* (Richard.Dixon@unt.edu)

Alice Harmon, *secretary-elect* (harmon@ufl.edu)

Andrew Bent (afbent@wisc.edu)

Bonnie Bartel (bartel@rice.edu)

Phil Taylor (phil.taylor@monsanto.com)

Maria Harrison (mjh78@cornell.edu)



Poster Neighborhoods: Abstract Submission Categories

Applied Plant Biology

Plants and Human/Societal Health
Biotechnology, Molecular Breeding
Genome Editing

Genetics and Genomics

Genetics
Epigenetics
Comparative Genomics, Domestication
Molecular Evolution
Gene Regulation and Molecular Biology
Systems, Synthetic, and Bioinformatics
Computational Biology

Biochemistry

Biochemistry and Metabolism
Specialized Metabolites
BioEnergy

Signal Transduction

Hormone Biology

Cell Biology: General

Plastids and Organelle Biology

Development: General

Transcriptional Networks
Root Biology
Fruit Biology
Seed Biology
Pollen Biology and Mating Systems
Space Biology

Biotic Interactions

Plant–Insect
Plant–Microbe

Environmental Stress

General Abiotic
Light
Temperature
Water
Salt and Minerals

Whole Plant Biology

Whole Plant and Ecophysiology
Climate Change
Tree Biology

Education and Outreach



Call for Abstracts

Submission Open Now

<http://plantbiology.aspb.org/abstracts>

ASPB invites the submission of abstracts that report new scientific research developments in the areas of plant biology. Abstracts are welcome from scientists and students in all sectors, including academia, industry, government, and education.

All abstracts submitted for consideration for a minisymposium talk are reviewed by the Program Committee (<http://tinyurl.com/pb15committee>), who will select a scientific program of 28–30 minisymposia. Complete abstracts will be online ONLY.

Abstract submission is separate from the Annual Meeting registration. Please register for the Annual Meeting at the conclusion of your abstract submission. (Registration opens January 15, 2015, but you may submit an abstract before that date.)

Submission Deadlines

To be considered for inclusion in a minisymposium, submit abstract by **February 16, 2015**.

For inclusion in the printed registration materials, submit by **June 1, 2015**.

Abstracts must be submitted via the web at <http://plantbiology.aspb.org/abstracts>.



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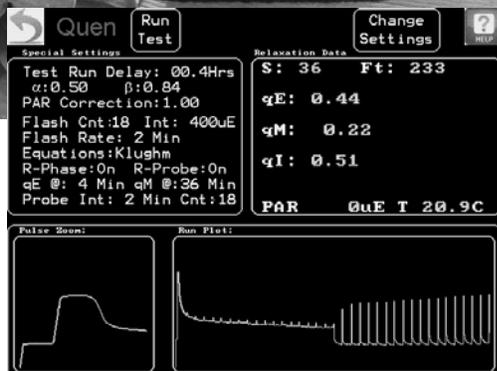
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Kramer lake model Hendrickson lake model
 Puddle model Quenching relaxation

The following article first appeared on the Biodiversity Heritage Libraries blog (<http://tinyurl.com/lx99cqd>).

Exploring the Rich History of Plant Science

GRACE COSTANTINO
Biodiversity Heritage Libraries

In 1682, the first known microscopic depiction of pollen appeared in Nehemiah Grew's *Anatomy of Plants* (<http://tinyurl.com/koobugt>). Grew, now known as the "Father of Plant Anatomy," revolutionized botanical science with his studies of plant structure. Exploiting the power of the microscope, he outlined key morphological differences in plant stems and roots and proposed the hypothesis that stamens are a plant's male reproductive organs.

Science has progressed significantly since the 17th century. Microscopes are no longer novel but commonplace, and scientists occupy their minds with theories about dark matter and quarks. Yet despite the centuries that have elapsed, today's advances are founded squarely on the discoveries of these bygone eras. Likewise, modern theories often cause us to re-examine assumptions from the past.

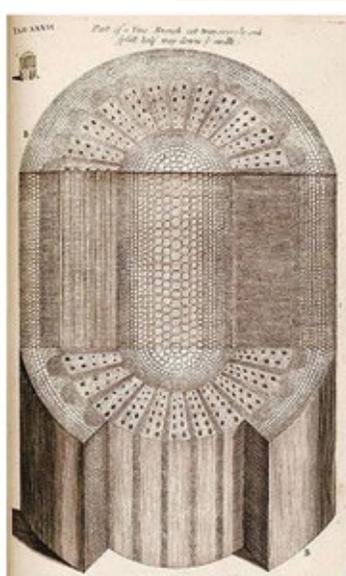
Dr. Mary Williams is particularly drawn to this interplay between historic and modern scientific study, specifically in the field of botany. Dr. Williams has been studying and educating people about plants since she began her PhD in plant molecular biology 30 years ago. Serving as a professor at Harvey Mudd College from 1995 to 2009, Dr. Williams is now a features editor for ASPB, writing a series of educational articles about plant biology called

Teaching Tools in Plant Biology (<http://tinyurl.com/85j3mq7>). The series connects advanced undergraduate students to current research in plant sciences through textbook-style review articles, diagrams, and images.

A comprehensive biological education is not just about current research, however. "Educating students about science involves more than teaching them our current models," explains Dr. Williams. "We also have to help them learn to synthesize information and develop their own models. One way to do this is by asking them to examine how our ideas and understanding have changed with time. As an example, students can read *Vegetable Staticks* (<http://tinyurl.com/nlpo2rx>), published in 1727 by Stephen Hales, who is considered one of the pioneers of plant physiology. This book is an account of his studies of water transport in plants. In spite of having only simple tools, he made key discoveries and developed models that are still useful."



Mary Williams demonstrating the size of giant hogweed (*Heracleum mantegazzianum*).



(left) Drawings of a grapevine stem showing the transport vessels, from Nehemiah Grew's *The Anatomy of Plants* (1682).

Biodiversity Heritage Library (BHL) has become an important resource for satisfying Dr. Williams' need for historic botanical literature. Some serendipitous Google searching in 2012 brought

her to several digitized classics in the BHL collection, which has since transformed into monthly searches for materials. BHL's Twitter account, @BioDivLibrary, *continued on page 12*

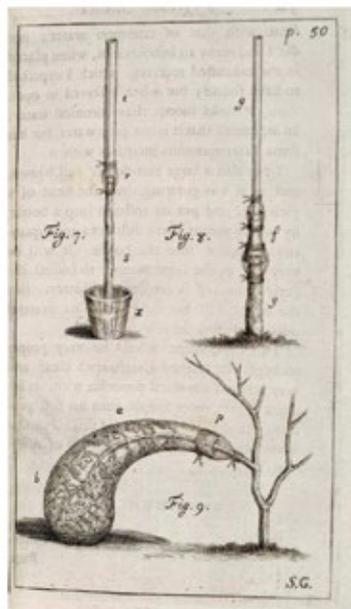
HISTORY OF PLANT SCIENCE
continued from page 11

has also proven helpful for uncovering hidden gems in the collection. Dr. Williams includes links to relevant material and images in her teaching articles.

“BHL makes great scientific works available for students to explore,” lauds Williams. “It can be both fascinating and challenging to see how early scientists conducted experiments and described their results. I particularly like to direct students to *The Power of Movement in Plants* (<http://tinyurl.com/l7cb7xx>), written by Charles Darwin and his son Francis. Reading it reveals how these exceptional scientists first observe a phenomenon and then set out to understand it. Their investigations of phototropic movement of *Phalaris canariensis* are brilliant studies that set the stage for the discovery of the plant hormone auxin.”

Providing access to historic literature isn't the only thing that makes BHL an important resource for Dr. Williams. The diversity and openness of the collection are equally important. “I wrote an article about medicinal plants and was able to draw on BHL for access to dozens of books from across the world and across the ages. Also, the fact that many of the resources are in the public domain makes them easier to share.”

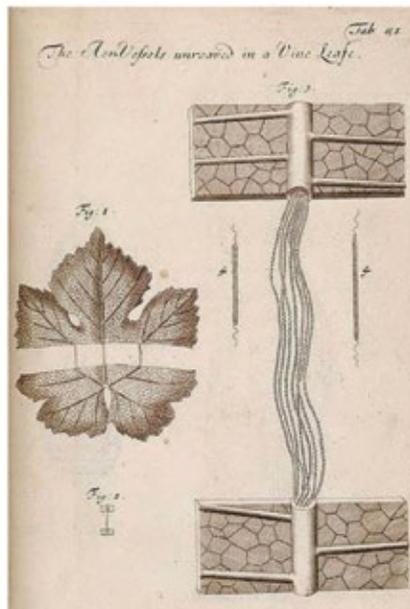
The ability to see the primary sources as they were originally published is another of Williams'



Investigations into the forces and nature of xylem sap, from Vegetable Staticks, published in 1727 by Stephen Hales.

favorite BHL qualities. “Although it would be possible to learn from a transcribed document, somehow seeing the original publications with the old type and especially the old drawings has so much more impact and makes me feel connected to the writers across the centuries.”

Her one complaint? “It would be nice if it were easier to search within a book (although I do enjoy scrolling and browsing).” Improved search is a component of the Mining Biodiversity, Digging Into Data project (<http://tinyurl.com/q2hqy5d>) that BHL is currently engaged in. Deliverables



Drawings of a grapevine stem and leaf showing the transport vessels, from Nehemiah Grew's The Anatomy of Plants (1682).

will include enhanced search functionality incorporating text mining, semantic metadata, and result visualizations.

So, which books would a botanical educator choose as her favorite within a collection of more than 150,000 volumes? “It would have to be the two important plant anatomy books from the 17th century, Marcello Malpighi's *Anatome Plantarum* (1675; <http://tinyurl.com/k9mm2rk>) and Nehemiah Grew's *The Anatomy of Plants* (1682; <http://tinyurl.com/koobugt>),” asserts Williams. “The detail and observational quality of the draw-

ings is fantastic. Because of their simplicity in some ways these centuries-old line drawings are clearer and easier to comprehend than an image taken today using a powerful microscope. When I look at these books I am struck by the power of the giants whose shoulders we stand on.”

We couldn't have said it better ourselves.

Thank you, Dr. Williams, for taking the time to tell us how BHL has impacted your work. Do you use BHL regularly? Tell us about it by writing to feedback@biodiversitylibrary.org. ■

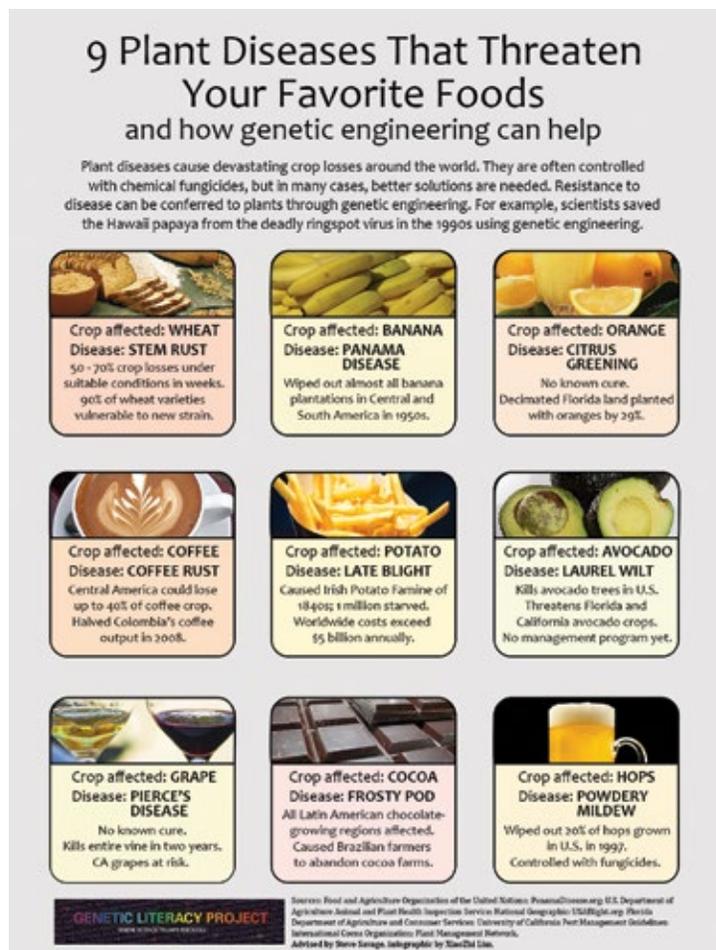
Around the Web

TYRONE SPADY

ASPB Director of Legislative and Public Affairs

Given the enthusiastic response to ASPB immediate past president Alan Jones's column in the July/August issue of the *ASPB News* on the urgent need for more plant scientists (<http://newsletter.aspb.org/2014/julaug14.pdf>), Alan penned a follow-up article that appeared in the October 1 issue of *The Scientist* (<http://shar.es/1m3rXd>). Alan's piece posits that "academia is not producing sufficient PhDs in the plant sciences to solve the crop production challenges facing a rapidly growing population." The article was conceived as a response to the editorial published in *PNAS* by Bruce Alberts, Marc Kirschner, Shirley Tilghman, and Harold Varmus on the structural flaws of the U.S. biomedical research enterprise. Not surprisingly, Alan's initial article has also received a fair amount of attention in the broader nonmedical life sciences community and was distributed by NSF to members of the Directorate for Biological Sciences Advisory Committee as preparation for their discussion of these issues at their September 10 meeting.

On the other side of the world, China's Ministry of Agriculture has refused to allow researchers at Huazhong Agricultural University and the Chinese Academy of Agricultural Sciences's Biotechnology Research Institute to continue to grow transgenic rice and corn. The permits to grow the two varieties of rice and one of corn expired on August 17. Though it is unclear why the



permits were allowed to lapse, some fear that growing public skepticism of transgenic crops may be to blame (<http://tinyurl.com/lx5xz2>).

In an effort to stem the tide of growing public opposition to

transgenic plants across the world, the Genetic Literacy Project (GLP) has released an infographic titled "9 Plant Diseases That Threaten Your Favorite Foods and How Genetic Engineering Can Help." The interactive infographic

highlights diseases such as stem rust in wheat and citrus greening in citrus trees. Though most commercialized transgenic crops are either resistant to insect pests or to herbicides, the GLP points out that plant biotechnology can also produce crops that are disease resistant. Three particular categories of plant disease are thought to be particularly amenable:

1. Systemic diseases spread by insect vectors
2. Diseases of crops for which conventional breeding is far too slow and/or disruptive to key quality attributes
3. Crop diseases that are not amenable to safe and effective chemical control

To access the fully interactive infographic or download a flat version, visit <http://bit.ly/1rdCvUz>.

On September 1, the *New York Times* profiled the work of ASPB member Michael Knoblauch of Washington State University (<http://nyti.ms/1za9TLx>). Michael's work seeks to test the phloem pressure flow hypothesis developed in 1930 by Ernst Münch that nutrients passively flow from areas of high pressure to areas of low pressure. Although elegant in its simplicity, Münch's hypothesis has remained largely untested. Michael, however, has developed an approach using microscopic glass needles and pico-scale volumes of oil to measure the pressure and flow of nutrients as they move through the phloem. ■

The following article first appeared in *Photosynthesis Research*.

Tribute

Andrew Benson Honored on Birthday No. 97

BY BOB BUCHANAN, University of California, Berkeley
and ROLAND DOUCE, Université de Grenoble

This brief tribute to Andrew Benson on his 97th birthday was invited, edited, and accepted by Govindjee, for the History and Biography section of Photosynthesis Research.

We present a brief account of the 97th birthday celebration of Andrew Benson, a scientific legend who is known, among other contributions, for his pioneering work on the path of carbon in photosynthesis (the Calvin–Benson cycle).

Andrew was honored on his 97th birthday, September 24, with a dinner held at the La Jolla Country Club, La Jolla, California. Members of Andy's family were joined by several of his close friends and former collaborators for the occasion. In addition to Andy and his wife Dee, the dinner list included Andy's stepdaughter, Wendy Neri; two former postdocs, Barry Holtz and one of us (Roland Douce); a long-time friend, Carole Mayo; a collaborator, Arthur Nonomura; and the corresponding author (Bob Buchanan). Among other pioneering contributions, Andy is known universally for his work that led to the discovery of the Calvin–Benson cycle in photosynthesis.

Andy received birthday greetings from his wide circle of national and international friends. He also received a number of gifts that included several bottles of



Dee and Andy Benson at the birthday dinner, September 24.



Julian Schroeder enjoying the traditional birthday apple pie at the gathering in the Benson home.



(left to right) Roland Douce, Barry Holtz, Bob Buchanan, and Arthur Nonomura after breakfast in the Benson home the morning after the birthday dinner.

vintage wine and the traditional apple pie that Wendy has baked annually for his birthday for the past two decades. Andy was also honored with the first Andrew A. Benson Award for “Conferring the Greatest Benefit on Mankind.”

Sponsored by Brandt iHammer, the honor consisted of a 15-ruby watch handcrafted in Germany in the mid-19th century and a check for \$25,000.97 (the 97 cents reflecting his 97th birthday). The award highlighted Andy's recent

work on plant lectins and their role in improving crop productivity (Nonomura and Benson, 2014).

During the dinner and the get-togethers that followed at the Benson home later that evening and at breakfast the next morning, family and guests reminisced about Andy's 90th birthday that was celebrated at the *Le Procope* restaurant in Paris (Lichtenthaler et al., 2008). They also recalled the editorial marking his 93rd birthday (Govindjee, 2010). All agreed that Andy's steadfast levelheadedness, his relationship with people, his talent of being appreciated by all, and his sheer joy in science have been key to his success and longevity. He is, indeed, a model for all of us. ■

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Lichtenthaler, H. K., Buchanan, B. B., and Douce, R. (2008). Honoring Andrew Benson in Paris. *Photosynthesis Research* 96: 181–183.

Nonomura, A. M., and Benson, A. A. (2014). The path of carbon in photosynthesis, XXXI. The role of lectins. *Journal of Plant Nutrition* 37: 785–794. For a hard copy reprint of the article, contact anomomura@mail.ucsd.edu.

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.



Mohammad Salehin

Professional Title: Postdoctoral Fellow

Member Since: 2010

Place of Work or School: Mark Estelle Lab, Division of Biological Sciences and the Howard Hughes Medical Institute, University of California, San Diego

Research Area: Auxin Signaling, Plant Development, Growth Regulation, and Genetics

What would you tell colleagues to encourage them to join ASPB?

It is essential to be under the umbrella of a flagship association such as ASPB for networking and future career development.

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

I think the next big thing will be the translation of basic knowledge in plant biology from the lab to the field to improve crop yield and provide food security to the estimated 9 billion people by 2050.

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

Always dream big and never hesitate to question existing knowledge.

Why has being a member of ASPB been important?

The main reason is that it has been a way for me to connect with as many plant people as possible.

What are you reading these days?

Mostly literature on crosstalk between two classic plant hormones. I'm also reading about plant stem cells.

What are your hobbies?

My hobbies are watching cricket and reading Bengali literature.

What do you still have to learn?

Learning is a lifelong process, and I am always trying to learn something new.

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

Most of the time I read online versions. But sometimes I do print them out, mainly when I need to focus very hard.

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

There are so many, and since I cannot single them out, I will list a few:

- Advent of CRISPR-Cas9 based genome editing as a tool in crop improvement to circumvent the pressing issues related with genetically modified foods.
- Demonstration of regulated proteolysis in hormone signaling by Mark Estelle. This became a recurrent theme for several plant hormone signal transductions.

- Use of FRET-based nano-sensor by Wolf Frommer to unravel novel glucose and sucrose transporters. Rice pathogens exploit these transporters using their effectors for their sugar demand. It has tremendous practical implications.
- Development of flood tolerant rice by Julia Bailey-Serres and colleagues. It has far-reaching implications in agriculture-based countries like India and Bangladesh.

What could ASPB do better?

ASPB could provide an opportunity for more young scientists to present their research during the annual meeting. ■

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Some former host sites

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Milwaukee Journal-Sentinel

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Philadelphia Inquirer

Raleigh News & Observer

Sacramento Bee

Scientific American

The Oregonian

WIRED

Slate



ADVANCING SCIENCE, SERVING SOCIETY

ASPB Issues Position Statements on Genetically Engineered Plants and Diversity

Position statements are an important means of communicating ASPB's official view on a range of topics. Further, position statements are an invaluable opportunity for the Society to contribute formally to the public dialogue on a particular issue and are regularly referenced by policy makers and the media. ASPB's position statements can be accessed via <http://bit.ly/1qaPfEw>.

Revised Position Statement on Plant Genetic Engineering

TYRONE SPADY

ASPB Director of Legislative and Public Affairs

Advances in agriculture are cumulative and build on the integration of new approaches with established breeding techniques and farming practices. The Food and Agricultural Organization anticipates the need for a 70% increase in agricultural productivity to meet the food, feed, fiber, and fuel needs of an ever-growing world population, without further degrading the environment (Food and Agricultural Organization, 2009).

ASPB supports the continued responsible use of genetic engineering (GE) as an effective tool for advancing food security and reducing the negative environmental impacts of agriculture. ASPB also supports the continued use and further development of appropriate, science-based procedures and regulations to assess the risks and benefits of all new agricultural technologies and products, including those developed using GE.

The use of GE to modify plants represents an important advance in plant science and agriculture that builds on centuries of human involvement in the genetic modification of crop species. GE allows

for the transfer into a plant of well-characterized genes. The precision of this technology, coupled with the knowledge of the specific nature of the manipulated genetic information, makes the risks of unintended consequences of this type of gene transfer comparable to or less than the random mixing of genes that occurs during classical breeding (National Research Council, 2004).

GE crops were first introduced into the U.S. market in 1996 and have been adopted rapidly (Center for Agricultural Science and Technology, 2012). As of 2013, GE varieties were being grown in 28 countries, including 20 developing countries. In the United States, GE cultivars account for more than 90% of the corn, soy, canola, sugar beet, and cotton acreage. A recent comprehensive report by the National Research Council (2010) reviewed scientific studies on the impact of GE crops on farm sustainability and found that GE crops can provide substantial net environmental and economic benefits compared to non-GE crops. Such benefits include reduced soil erosion due to adop-

tion of no-till (conservation) agricultural practices made possible by herbicide-resistant GE crops (Cerdeira and Duke, 2010; Duke et al., 2012) and reductions in the amount and toxicity of insecticides applied to GE crops. For example, insecticide usage on corn decreased 10-fold in the 15 years since introduction of GE insect-resistant corn (Fernandez-Cornejo et al., 2014).

GE herbicide- or insect-resistance traits are subject to the same selection pressures as non-GE traits, potentially giving rise to pest populations able to overcome the trait (Heap, 2014). Just as over-reliance on individual non-GE traits or practices can limit their effectiveness, as demonstrated with overuse of certain pesticides, over-reliance on individual GE traits will similarly lead to loss of efficacy in the field (Center for Agricultural Science and Technology, 2012; National Research Council, 2010; Tabashnik et al., 2013). GE traits should therefore be used judiciously as one of many components of integrated agricultural management systems in order to maximize their efficacy and longevity.

GE crops can provide major health benefits to people throughout the world, especially in developing countries where food insecurity and malnutrition are still prevalent. Examples include enhancing the vitamin and mineral content of staple foods (Fitzpatrick et al., 2012) and developing crops with enhanced water and nitrogen efficiency or tolerance to environmental stresses such as drought, which has a disproportionate impact on the world's poorest farmers (Fedoroff et al., 2010), but that are also of value in industrialized countries. In many cases, conventional breeding cannot achieve these needed improvements because the genetic diversity in such traits does not presently exist in available compatible germplasm. Worldwide, GE plants could also be increasingly useful in nonfood applications. These applications include cleaning up toxic environmental pollutants and creating compounds presently made using nonrenewable resources, such as industrial oils, fuels, and chemicals, or compounds that

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Position Statement on Diversity

TYRONE SPADY

ASPB Director of Legislative and Public Affairs

The study of plants is essential for a comprehensive understanding of biology. Many fundamental discoveries in molecular, cell, organismal, evolutionary, and ecological biology have been made using plants as model systems. Moreover, plant biologists will play vital roles in addressing many of the most pressing problems facing humanity. For example, *Unleashing a Decade of Innovation in Plant Science: A Vision for 2015–2025*, the report developed by representatives of the plant science community through a strategic visioning process, highlights the issues of climate change, food insecurity, and diminishing natural resources and describes how plant science can be brought to bear to help develop solutions (Plant Science Research Summit, 2013).

ASPB strongly believes that meeting the serious challenges faced by humanity will require groups of scientists that exhibit diversity in their age, race, gender expression and identity, nationality, ethnicity, religion, educational background, and physical and mental abilities. In other words, it is essential that plant biology, as well as science more broadly, draw upon the most comprehensive pool of intellectual talent society has to offer. Therefore, ASPB is committed to supporting and cultivating an inclusive scientific enterprise that maximally leverages the full societal spectrum of experiences and insights.

Several studies have documented that diversity in the workforce promotes innovation and achievement (Denson and Chang, 2008; European Commission, 2003; Hong and Page, 2004). Despite the obvious advantages, ASPB recognizes obstacles associated with building diversity into the workforce and membership. For example, studies have documented gender and racial biases in hiring practices and the awarding of grant funding (Bertrand and Mullainathan, 2004; Ginther et al., 2011; Moss-Racusin et al., 2012; Sheltzer and Smith, 2014). These inequities have been attributed to “implicit biases” that affect our actions and decisions in an unconscious manner based on our attitudes and stereotypes. Thus, immediate and sustained efforts are needed to increase the participation of diverse individuals, particularly from groups underrepresented in the sciences. ASPB considers the need to increase diversity among its membership to be an opportunity for investment. We believe that diversity enriches the intellectual, professional, and social experiences of the membership by providing individuals with different experiences, perspectives, and cultural backgrounds the opportunity to learn and work collaboratively to solve problems creatively and make informed decisions. We consider the underrepresentation of African Americans, Hispanic/Latino Americans, and Native Americans

in ASPB and in science in general to be a problem that must be addressed.

ASPB believes that enhancing the climate of inclusiveness will help to increase the diversity of the membership. We recognize that each individual is unique and deserves respect and that everyone must be given equal opportunities and treated equally. The goal of enhancing inclusiveness must be to appreciate similarities between individuals from diverse groups and also to value, respect, support, and utilize the differences. By making inclusiveness paramount within the Society, ASPB will create an environment that welcomes all individuals to actively participate in plant biology.

ASPB has made it a priority to increase diversity and establish a climate of inclusiveness, and many of its current activities reflect these commitments. First, ASPB has established societal committees, the Women in Plant Biology Committee (WIPB) and the Minority Affairs Committee (MAC), whose activities focus on the recruitment, retention, and inclusiveness of women and underrepresented minorities in ASPB. Second, ASPB encourages and enables women and individuals from minority groups to attend its annual meeting through competitive travel grant programs. WIPB provides travel awards to deserving female applicants, and MAC offers recognition travel awards to individuals from underrepresented groups

and instructors at minority-serving institutions. Third, to enhance the inclusiveness at the annual meeting and in the Society, WIPB and MAC both sponsor events with keynote speakers who address issues of diversity and inclusiveness. Fourth, ASPB sponsors the MAC Symposium at its annual meeting, which highlights the scientific accomplishments of underrepresented minorities. Fifth, to enhance the pool of underrepresented minorities who are positioned to be recruited by ASPB, MAC has obtained federal grant support to offer professional development workshops aimed primarily at undergraduate students at minority-serving institutions. The goal of these workshops has been to build the skills and knowledge base needed to apply to and succeed in graduate school.

ASPB has further committed to efforts to enhance inclusiveness and build diversity in order to attain and maintain a diverse community. Diversity will be strongly considered in making assignments to societal committees, encouraging individuals to run for leadership positions, nominating individuals for societal and external awards, selecting speakers for sessions at annual meetings, and hiring personnel.

Being inclusive will enhance ASPB’s ability to create an atmosphere that fosters scientific creativity in plant biology as well as a broader societal under-

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Policy Update

LAUREN BROCCOLI
Lewis-Burke Associates, LLC

Congress Passes Short-Term Continuing Resolution to Fund Government into FY2015

On September 18, the U.S. Senate approved a continuing resolution (CR) to fund the federal government into the new fiscal year (FY), which began October 1. The passage of the short-term CR ensures that the government will continue operating through December 11, 2014. This action cleared the CR for President Obama, who signed the bill into law. To offset the costs of the spending associated with the various provisions added to the bill while staying within the overall spending cap, the CR includes a 0.0554% across-the-board reduction. The administration will have some flexibility in how these reductions are allocated, and the cut is not likely to significantly affect science and research activities. For a full report, visit the ASPB science policy blog at <http://tinyurl.com/nv6poa3>.

National Research Council Releases Report Reviewing AFRI

On September 9, the National Research Council (NRC) released a report titled *Spurring Innovation in Food and Agriculture: A Review of the USDA Agriculture and Food Research Initiative Program*. The purpose of the NRC report was twofold: to assess the effectiveness of the Agriculture and Food Research Initiative (AFRI) with respect to the congressional goals

and mandates for the program and to review the program's progress in developing innovation and competition in the nation's food and agriculture system.

The NRC committee's general consensus is that AFRI serves a unique and vital role, recognizing that agricultural research and development is essential for producing necessary food, fuel, and fibers to meet the growing population. However, the committee concluded that AFRI does not receive adequate resources to meet current and future food and agricultural challenges. Additionally, the committee determined that the structure of AFRI is complicated and recommends better priority setting as well as reconfiguring programs to better align with AFRI's mission.

As part of the report's rollout, the National Academies hosted a public webinar that provided an overview of the report and its findings. During the report's public roll-out, the committee acknowledged that the matching requirement for non-land-grant institutions contained in the 2014 Farm Bill effectively deters new researchers from pursuing AFRI awards and thwarts academia-workforce growth.

The report's recommendations are organized into four main areas: Need for Food and Agriculture Research; Realignment of Program Structure to Match Mission, Mandate, and Budget; Strategy and Collaboration; and Program Management. For a full report,

visit ASPB's science policy blog at <http://tinyurl.com/nv6poa3>.

New Assistant Director of NSF Biological Sciences Directorate Announced; Advisory Committee Meets

NSF announced James L. Olds as the new assistant director of the Directorate for Biological Sciences (BIO). Currently, he serves as a director and chief academic unit officer at the Krasnow Institute for Advanced Study and is a professor of molecular neuroscience at George Mason University. He assumed the role of assistant director in October. Prior to his appointment at Krasnow Institute, he served as CEO of the American Association of Anatomists.

In September, the BIO Directorate met for a two-day Advisory Committee (AC) meeting that included a visit from NSF director France Córdova. Efforts to outline specific action items for the BIO AC for 2014–2015 included developing a strategic plan, increasing participation, and clarifying metrics for evaluating broader impacts. For the full press release, visit <http://tinyurl.com/ovdxcbv>.

National Research Council Studies Genetically Engineered Crops

On September 15–16, the NRC Committee on Genetically Engineered (GE) Crops held its first public meeting at the National Academy of Sciences (NAS) in Washington, D.C.

The committee's statement of task involves a broad review of available information to examine the history of GE crops domestically and internationally; assess any negative effects and technologies associated with GE crops; evaluate the benefits and technologies associated with GE crops; review scientific foundation of current assessments and related technologies; and explore new technologies and developments in the field.

During the first public meeting, expert speakers from academia, industry, and nonprofits presented on a variety of topics related to GE crops over the course of two days. The committee hosted a series of webinars in October, and public meetings, are scheduled for December 10–11 and early March 2015.

The committee's findings will identify any information gaps and may recommend research to "fill gaps in safety assessments, increase regulatory clarity, and improve innovation in and access to GE technology."

The agenda, along with an archived webcast for each presentation, is available at <http://tinyurl.com/mm2zf47>.

Feed the Future Authorization Legislation Introduced in House and Senate

On September 18, legislation was introduced in both the House (H.R. 5656) and Senate (S.2909) "to authorize the Feed the Future Initiative to reduce global pov-

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PLANT GENETIC ENGINEERING
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require sophisticated biochemical processes, for example, vaccines and pharmaceuticals.

Concerns raised about the use of GE and its products in agriculture include food and environmental safety issues, as well as socioeconomic and ethical matters (Lemaux 2008, 2009). To the extent that scientific data can be gathered to address these concerns, ASPB supports and encourages such investigations. When GE crops were first introduced, regulatory agencies, namely the USDA, the Food and Drug Administration, and the Environmental Protection Agency, exercising an excess of precaution, demanded extensive safety testing of new GE food products. In contrast, conventional and organic crops created by classical breeding undergo no safety testing. Since the commercial introduction of GE crops in 1996, there has not been a single documented instance of harm to human health. Furthermore, thousands of scientific studies from the academic, government, and private sectors have been performed on various aspects of GE crops. These data have been comprehensively assessed in multiple National Research Council reports: *Genetically Modified Pest-Protected Plants* (2000), *Environmental Effects of Transgenic Plants* (2002), *Safety of Genetically Engineered Foods: Approaches to Assessing Unintended Health Effects* (2004), and *Impact of Genetically Engineered Crops on Farm Sustainability in the United States* (2010).

Because the current regulatory framework was put in place in

the 1990s, ASPB recommends that the federal regulatory agencies responsible for oversight of GE crops review and potentially revise the current regulatory framework to reflect these data and National Research Council reports. Specifically, regulatory scrutiny should focus on the potential for new risks, irrespective of the method of introduction of the trait, taking into account existing familiarity with the crop species and the trait being introduced.

ASPB endorses continued responsible development and science-based oversight of GE and other food production technologies and practices. Additionally, ASPB encourages federal funding to support generation of the science-based information needed for the government, the private sector, NGOs, consumers, educators, and other stakeholders to make informed choices about the products resulting from GE technologies. ASPB believes that GE products will continue to bring many significant health and environmental benefits to the world and its people. ■

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DIVERSITY
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standing of science. ASPB will actively support diversity within its membership to help build generations of valued, skilled professionals who are cognizant of how diversity can promote creativity. ■

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POLICY UPDATE
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erty and hunger in developing countries on a sustainable basis.” The Initiative was first proposed by President Obama in 2009. It focuses on improving agriculture in the developing world, particularly for small rural farmers. Feed the Future is led by the U.S. Agency for International Development (USAID) and includes efforts from the State Department, USDA, the Peace Corps, and other partners.

The legislation is not likely to move this year; however, it is expected that both bills will be

reintroduced next year. Additional information on the Feed the Future Initiative is available at <http://www.feedthefuture.gov/>.

New Report Highlights Role of Research in Fostering Innovation; Recommendations Reflected in Senate COMPETES Bill

On September 16, AAAS issued a report titled *Restoring the Foundation*, which urges lawmakers to increase the federal investment in research to ensure U.S. preeminence in science and innovation. The report provides rec-

ommendations for the long-term stability of the nation’s science and engineering system to ensure maximum benefit from federal investments in research.

To help drive economic growth, the report specifically calls for federal spending on basic research to be 0.3% of gross national product by 2032. Senator John Rockefeller (D-WV) has included many of the report’s recommendations in his version of the America COMPETES Act, which reauthorizes NSF and other science agencies. However, the Senate is unlikely to consider the

bill before Senator Rockefeller retires at the end of this year. The *Restoring the Foundation* report is available at <http://tinyurl.com/lddsp9d>. ■

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University of Missouri
Columbia, MO
May 27-29, 2015

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of gaps in our knowledge that will need to be addressed by multi-disciplinary, collaborative research.

Additional Information and Registration
www.ipg.missouri.edu/symposium

Hosted by the Interdisciplinary Plant Group at the University of Missouri with support from the Food for the 21st Century Program and in cooperation with the MU Conference Office.



ASPB and PlantingScience: A Perennial Partnership

Announcing the 2014–2015 Master Plant Science Team

By KATIE ENGEN
ASPB Education Coordinator

PlantingScience (PS) is an online platform where middle and high school students reflect with scientists on plant-based research projects conducted in their classrooms. (See the modules at <http://www.PlantingScience.org>.) ASPB became an official PS partner in 2006 and began sponsoring members of the Master Plant Science Team (MPST) when it was established in 2008. The MPST is a special cohort of graduate and postdoc students who mentor PS students. ASPB has grown its sponsorship commitment from five to up to 12 MPST awards each academic year.

MPST members are selected upon successfully completing a competitive process to demonstrate their ability to collaboratively engage and guide the students through the PS research modules and the online platform. These collaborations rely on clear, engaging, time-sensitive, and nondirective communication with the students and, to a lesser degree, their classroom teachers. Along with helping highly motivated students conduct meaningful research, the MPST members also enrich ASPB by contributing to an active cohort of Society members reaching out to their individual campus and community networks.



Eli Borrego



Rhodesia Celoy

What the MPST Means to Some of Its Members

Rhodesia Celoy

Great and successful mentors inspired me to be who I am. And so I have to continue the tradition of mentoring to inspire others.

Ravendra P. Chauhan

It is a privilege to serve as a member of the MPST. The MPST program provides a unique platform for interaction among brilliant brains in plant biology. Bringing scientist mentors and school students together for on-line interactions will benefit the plant biology community in the long term. Designing successful execution of the experiments and analytical evaluation of the findings will hone the young minds and simultaneously propel them to explore the possibilities in the discipline. I believe that this is



Ravendra P. Chauhan

one of the most important of all the requirements for making the future of plant biology brighter. Additionally, the program has a diverse background of scientists in the MPST cohort, which is another salient feature of the community facilitating the interactions among the scientist mentors to broaden their horizons. I look forward to serving in my capacity as a scientist mentor.

Congratulations to these 2014–2015 MPST members sponsored by ASPB

- Eli Borrego**, Texas A&M University
- Rhodesia Celoy**, University of Georgia
- Ravendra Chauhan**, Oklahoma State University
- Christina Garcia**, Baylor College of Medicine/USDA-ARS
Children's Nutrition Research Center
- Mike Geiger**, University of Wisconsin–Madison, Horticulture
Department
- Jonathan Gilkerson**, The Salk Institute for Biological Studies
- George Littlejohn**, University of Exeter
- Jesse Mayer**, University of Nevada Reno
- Bastian Minkenberg**, Pennsylvania State University
- Prateek Tripathi**, University of Southern California



Christina Garcia



Michael B. Geiger



George Littlejohn



Jesse Mayer



Bastian Minkenberg



Prateek Tripathi

Michael B. Geiger

I'm very excited to engage in the learning and science process with students. I am grateful for all of my experiences as a mentee in plant sciences and value the opportunity to cultivate fruitful experiences for other students. I think I will be learning as much as the students as I practice and develop my mentoring capabilities.

George Littlejohn

I'm very pleased to be supported by ASPB for my involvement with MPST, which is an excellent resource for teachers and students. I'm delighted to take part and usually write my posts with the help of my daughter—so there's education of young people happening at my end, too!

Jesse Mayer

I'm really excited that there are programs like PlantingScience available for K–12 educators to use. Plant science is typically a very small part of the overall science curriculum, but programs like this one will help to get students passionate about plants at an early age. It's something I wish I had when I was in high school!

Bastian Minkenberg

Alan Jones pointed out the need for PhDs in agriculture and plant biology research in his July/August president's letter (<http://newsletter.aspb.org/2014/julaug14.pdf>). I am happy for the chance to pique high school students' curiosity in plant biology by volunteering for my

MPST Member Benefits

- Free ASPB membership for 1+ year
- 50% off the registration fee for the subsequent Plant Biology annual meeting
- Unique professional development and networking experiences
- Collaborations that will inspire you—the student researchers—and your teachers
- A chance to shape the future of your profession and prepare students to use 21st century inquiry-oriented skills and science content

second year as an MPST member. I sincerely hope some of my mentored students will become plant biologists in the future.

Prateek Tripathi

PlantingScience is a great learning platform not only for the K–12 students, but also for me as a mentor, helping me to understand and answer biological curiosity without using jargon. It's amazing to see the potential among these kids to be good scientists. ■

ASPB Summer Undergraduate Research Fellowship (SURF)

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

ASPB's Summer Undergraduate Research Fellowship (SURF) funds promising undergraduate students so they can conduct research in plant biology during the early part of their college careers. SURF recipients must present their research at ASPB's annual Plant Biology meeting in the year following the fellowship award.

Eligibility

Application is open to all full-time undergraduate students in a degree-granting program. Students completing their second year are preferred, but well-prepared first- and third-year students who provide evidence of a strong interest in plant biology may apply as well. Undergraduates needing more or less than the standard four years to earn a degree may still be eligible. International students or students following nontraditional academic calendars are welcome. In order to provide support to the maximum number of students, SURF awards are limited to those without other sources of stipend or salary for the proposed research. Supplemental funds for room and board are acceptable.

Faculty Mentors

Students must secure a mentor before submitting an application. The proposed research project must be pursued in the mentor's laboratory. Mentors must be a member of ASPB, have an ongoing research program of high scientific merit, and demonstrate a commitment to undergraduate education and research. Mentors are expected to attend Plant Biology 2016 in Austin, Texas, with their SURF student.

Need a Mentor? Students may work with a mentor at their own institution or at another institution. Additional guidance is available by contacting ASPB (see below).

Application

A complete application will include a research project statement and personal statement from the student, a research and mentoring statement from the mentor, a letter of recommendation from another faculty member (not the mentor or in the mentor's lab), and official undergraduate transcripts.

Selection Criteria

Competitive student applicants should have high academic achievement, strong motivation and skills for conducting research, and career objectives showing interest in or relevancy to plant biology. Reviewers also will consider the contribution of the project to the mentor's research program, institutional commitment to the proposed research, and the mentor's commitment to undergraduate research.

Successful applicants receive a \$4,000 summer stipend, a one-year membership in ASPB, and \$700 (paid to the mentor or institution) for materials and supplies. Each fellowship also provides student travel support to Plant Biology 2016, the ASPB annual meeting, to be held July 9–13, 2016, in Austin, Texas. These travel funds are sent only to the 2015 SURF recipients who (1) register for the meeting, (2) submit proof of using social media or other outlets to communicate with the public or peers about the SURF project, and (3) author and submit an abstract about their SURF project to present as a poster at the meeting.

A Successful SURF Applicant's Sample Timeline

Contact potential mentors: NOW

Discuss research topics: NOW

Request a reference letter: by January 2015 (from college/university faculty member who is not the mentor)

Submit SURF application: by the deadline, February 11, 2015 (11:59 p.m. ET)

Look for e-mailed decisions: by mid-April 2015

Conduct research: over 10 consecutive weeks when classes are not in session

Present research: July 9–13 at Plant Biology 2016 in Austin, Texas.

Applications will be accepted December 1, 2014, through February 11, 2015 (11:59 p.m. ET).

Need additional help?

Contact Katie Engen, ASPB Education Coordinator (katie@aspb.org).

New Higher Education Journal: *CourseSource* Launches December 1!

Features Core Concepts in Plant Biology from ASPB and BSA

BY KATIE ENGEN

ASPB Education Coordinator

CourseSource (<http://coursesource.org>) is an open-access journal of peer-reviewed resources for teaching higher education biological science courses. A key feature of *CourseSource* is the alignment of articles with learning goals and objectives developed by scientific professional societies.

When announcing the journal's launch, Editor-in-Chief Robin Wright noted, "We are very happy that the American Society of Plant Biologists was an early partner in this Howard Hughes Medical Institute-supported enterprise, which was a direct result of recommendations from the NSF/AAAS Vision & Change initiatives (www.visionandchange.org). As a result, the learning objectives for a core plant biology course approved by ASPB's Education Committee (and BSAs) are featured on the *CourseSource* website."

CourseSource offers 12 course categories, each with its own landing page and related resources. The plant biology course landing page (<http://coursesource.org/courses/plant-biology>) features the Learning Framework for Plant Biology. This framework is based on core concepts and objectives developed by ASPB and BSA in response to both memberships' initiatives to advance Vision & Change. Users will find course structure, goals,

measurable objectives, and content germane to the course or topic they teach.

The plant biology page also includes opportunities for ASPB to share announcements related to our Society with *CourseSource* readers. Article review and page features are overseen by the *CourseSource* editor(s) specifically selected for plant biology.

Susan Wick (University of Minnesota) is the first editor on the *CourseSource* plant biology page. Sue has been an ASPB member since 1989. When asked about the new journal, she stated, "It is exciting to have resources that are consistent with Vision & Change goals for undergraduate education, have been tested in classrooms and peer reviewed for clarity, and whose effectiveness is based on evidence. Users of *CourseSource* will be able to



Sue Wick

search for materials dealing with various aspects of plant biology (and other areas within the broad field of biology)." Sue, in tandem with ASPB leadership, strongly encourages Society members and other authors to contribute to the journal by submitting their own instructional resources.

To the editors' knowledge, *CourseSource* is the only online journal that exclusively publishes biology teaching materials that

- incorporate student-centered, evidence-based pedagogy;
- focus on professional society-developed learning goals and objectives;
- are organized and formatted so that transfer and use in other classrooms is easily done; and
- do not require data supporting the efficacy of the materials themselves.

Authors will retain copyright to their materials through a Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>) and will pay no page charges. ■



“*CourseSource* offers a high-quality format for documenting scholarly teaching efforts, accomplishments, and innovations.

—Sue Wick, University of Minnesota

Planting Seeds: Teacher Development for Engaging 21st Century Learning and Inspiring Careers

Another ASPB BLOOME Grant Success Story

BY SHANNON L. GALBRAITH-KENT
Thomas More College

A collaboration has begun between Thomas More College (a private Catholic liberal arts college) and Boone County Schools (one of Kentucky's fastest growing school systems with approximately 20,000 students), which are both located in northern Kentucky. The Planting Seeds program brought together five Thomas More faculty members from various disciplines (such as biology, chemistry, and education) to facilitate a series of Saturday workshops for a selected group of 14 high school teachers who use plant biology in their curriculum.

The main premise of Planting Seeds has been to engage the teachers in new ideas and activities in plant biology that they can then incorporate and apply in their own classrooms to potentially have an impact on thousands of high school students. The approach is based on using the "5E" inquiry-based model and also incorporating the New Generation Science Standards (NGSS), which teachers are starting to implement in public schools.

During each workshop, college faculty facilitated inquiry-based projects (on desirable topics identified by teacher pre-surveys) with the high school teachers working as active collaborators. The topics varied from photosynthesis and

invasive species, to plant decomposition dynamics, to plant chemistry, pollinator syndromes, and constructing phylogenetic trees. The main goals of each workshop included (1) keeping it inquiry based through the 5Es but providing ways for teachers to adapt it to specific classroom needs, (2) making it engaging and fun for the teachers, (3) providing ample teacher resource materials for future use, and (4) presenting plant content to enhance high school curriculum within the NGSS landscape.

Throughout the year, our professional learning community (PLC) continued on a forum-based website (e.g., Schoology), which allowed for discussion and interaction between workshop dates and a sharing of ideas and resources. During the last workshop, teachers gave presentations on inquiry-based plant activities that also addressed some of the NGSS within a plant biology context. The teachers did a remarkable job and presented on diverse topics, including school plant surveys, hydroponics, what plants should be grown on the moon, and how seed identification



High school teachers having fun testing each other on identifying plant-derived scents with Bill Wetzel (Thomas More College, Chemistry), seen lower right.

can be used in a forensics inquiry-based project.

The post-workshop data stated that not only did teacher confidence in plant biology content increase dramatically, but also the teachers felt more comfortable leading an inquiry-based project in their classrooms. In addition, as the external evaluator noted in our summary analysis, our program was able to "crack the classroom door" for 100% of its participants, as all teachers found Planting Seeds information useful for actually transferring into classroom practice (this was much higher when compared to other professional development). A few

of the teacher comments at the end of the workshop included the following:

"I really enjoyed the process of this grant. I have many ideas on how to incorporate [plant activities] into the classroom."

"I started this journey not being a 'plant person.' Today, I understand the importance of teaching plants and how they can be easily integrated into my classes. I am also determined to venture further into the inquiry continuum and use the 5Es to teach."

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DC Teachers' Night at the U.S. Botanic Garden

A Perennial Winner for ASPB Outreach and Attendees

BY KATIE ENGEN

ASPB Education Coordinator

On October 2, ASPB enjoyed another night of fruitful outreach at the United States Botanic Garden (USBG) in Washington, D.C., as an exhibitor at the annual D.C. Teachers' Night hosted by USBG and the District of Columbia Environmental Education Consortium (<http://www.dcnaturally.org>).

The ASPB volunteers welcomed K–12+ teachers as they explored resources ranging from the new dye-sensitized solar cells energy education module from NSF and the University of Tennessee, Knoxville (<http://tinyurl.com/DyeCells>) for upper-level students to the ever-popular *My Life as a Plant* activity and coloring book for emergent readers and young scientists (<http://www.aspb.org/coloringbook>). Teachers also could take along other materials, including a mini garden cup necklace of *Arabidopsis* seedlings to start plant explorations with their students.

The booth was managed by Tyrone Spady (ASPB). He was joined by veteran ASPB outreach stars Janet Slovin (USDA) and Daniel Czerny (University of Maryland). Many thanks also to Hemayet Ullah (Howard University) for supplying the *Arabidopsis* seedlings.

Here is a glimpse of what makes this event so fun and productive:

It was great to see how many teachers want to incorporate plants into their classes. We had teachers from every grade asking for materials to use in their classes, and we had something for everyone. The activity books went like hotcakes!

—Janet Slovin

The classroom solar cell using berry pigments was a hit with the teachers whose students could understand the material. A few teachers asked me if ASPB does classroom visits—a sign that meeting this demand would be a great goal for any ASPB member.

—Daniel Czerny

These types of events are the perfect opportunities for face-to-face engagement with the public around plant-related topics about which they have an abundance of interest but a perceived dearth of reliable information. During the event, I was able to have a great conversation with two attendees about their concerns over GMOs. Though cautious, by

the end of our discussion, both acknowledged some of the good, such as combating vitamin A deficiency using Golden Rice, which is coming from the use of modern recombinant DNA tools, and the challenges of feeding, fueling, and clothing a growing population. ■

—Tyrone Spady



PLANTING SEEDS

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"This was such a great experience. Thank you for all the hard work, coordination, and openness to be 'brave' and try new things! I thought it was a true partnership."

"This was one of the more useful PD [professional development] experiences I have had."

What has made this program successful (i.e., plants are being discussed more often in high school classrooms and in interesting and innovative ways) is due to a combination of many factors. First, at the very beginning of the program, we worked hard to "meet teachers where they are" with respect to content, listen to their challenges and teaching constraints, and determine how we could best assist them with incorporating plant biology into their classroom. Second, having supportive administrators in the



Shannon Galbraith-Kent (left; Thomas More College, Biological Sciences) and Anna Marie Tracy (Boone County Schools).

school system to allow for logistical support and context was very helpful. And, third, we have had a program built upon curious, intelligent, and collaborative-minded participants (teachers) and facilitators (faculty). We are currently looking at the next steps for this community of learners.

Planting Seeds: Teacher Development for Engaging 21st Century Learning and Inspiring Careers was developed and

made possible through an ASPB Education Foundation Grant (<http://bloome.aspb.org>) awarded to Shannon Galbraith-Kent (Thomas More College) and Anna Marie Tracy (Boone County Schools) in 2013. Special thanks to our participating Thomas More College faculty (Kim Haverkos, Dustin Swanson, Zachary Taylor,

and Bill Wetzel) and the high school teachers (H. Bates, L. Beck, D. Black, S. Lainhart, M. Medious, A. Mosley, P. Mueller, D. Ogden, R. Page, J. Schaeffer, M. Schuster, T. Shelton, N. Sparks, M. Stolz, and N. Averett) and curriculum adviser (Sandy Holtzapfel) from Boone County Schools; it is a joy working with all of you. ■



A high school teacher (Melissa Stolz) is excited to share the results of her pollinifer syndrome activity, facilitated by Dustin Swanson, seen standing (Thomas More College, Biological Sciences).

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Outreach Is a Hybrid: What Transpires When Scientists Reach Out?

Broader Impacts and Community Service—Two Compatible Outreach Options

BY KATIE ENGEN, ASPB Education Coordinator,
with input from SARAH WYATT, Ohio University



Outreach matters. Good outreach advances science. Some scientists conduct outreach through broader impact goals. Others get involved at the community service level. What's the difference? Where do you fit in?

Broader Impacts

Technically, the term *broader impacts* (BI) stems from NSF. So official BI activities must support the mission of NSF: “To promote the progress of science; to advance the national health, prosperity, and welfare; and to secure the national defense” (NSF Act of 1950). This means PIs must create BI activities that connect nonspecialists to the specific science content of a PI’s grant or research program. Of course, the NSF Broader Impacts Review Criterion (<http://www.nsf.gov/pubs/2007/nsf07046/nsf07046.jsp>) is more in-depth than that. So it’s worth considering how BI components are explored by various entities, including

- University of Massachusetts Amherst web pages (<http://tinyurl.com/nnsd4la>) and “cheat sheet” (<http://tinyurl.com/njsljzq>)
- Broader Impacts Summit (<http://www.broaderimpacts.net>)
- Broader Impacts and Outreach Network for Institutional Collaboration (BIONIC; <http://tinyurl.com/oy9bes3>)

While the actual term is NSF-centric, BI often is used a bit ecumenically to mean any educational activities inspired by or grounded in a large research program. This often leads to confusion about what is BI versus community service. Here’s a quick litmus test. The action or resource in question should qualify as officially BI if it

- ties directly to enhancing the grant’s primary goals, protocols, outcomes, or potential for renewal;
- involves creating learning tools, labs, flipped classroom resources, or evaluation options that are based on core elements of the funded research; or
- features a PI or grant team member communicating as an expert on a particular set of data and offering a closely linked applied learning opportunity.

Community Service

Community service is about sharing science expertise with K–12 students, science festival attendees, cross-campus (nonspecialist) colleagues, or other members of the science-interested public. Quite often, community service involves promoting an appreciation for the process or nature of science; it

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Engaging Students and the Public

Do They Get What You're Saying?

BY KATIE ENGEN

ASPB Education Coordinator

You really care about your subject. You enthusiastically explain your results and insights with publication-worthy panache. So why don't people outside of your research niche seem to get jazzed about or connect to what you're trying to convey? Maybe your presentation is upside down.

Which End Is Up?

Effective public engagement and teaching do not happen by verbalizing your abstract or broader impact objectives. A jargon-jammed delivery will fall flat. Instead, you should (Figure 1):

1. Alert listeners to the spoiler or “bottom line.”
2. Answer *So what?*
3. Add details.

Spoiler Alert

Yes, start with the spoiler. Devise a catchy phrase that encapsulates the concept, process, discovery, or application you want your audience members to keep with them for a long time. Think jingle, familiar phrase, headline, or alliterative wordplay. Even if your spoiler isn't pitch perfect, be sure it's short and jargon-free:

THIS: *Barbara McClintock's discovery of “jumping genes” was one step for a researcher, one giant leap for mankind's understanding of how genes produce endless varieties of living things.*



Figure 1. Tip-top engagement starts with the bottom line.

CREDIT: AAAS Center for Public Engagement with Science and Technology.

NOT THIS: *In this talk I will explain how Barbara McClintock discovered transposable elements in the genome by experimenting with maize. First, I will review McClintock's study of the variegated color pattern of maize kernels (a.k.a. Indian corn). The maize's phenotypic system involves three alleles rather than the more regular two. Insert “yadda, yadda, yadda” here, because at this point that's what is getting processed.*

So What?

Tell your audience why the bottom line matters—to them. Why should they stay tuned? Share information that improves or explains their daily lives. For example:

- Like red wine but not white? Jumping genes influence grape color and your favorite pairings.
- Prefer Indian corn to plain yellow corn for your fall décor? Consider McClintock and her jumping genes part of your design team.

- Would you find purple tomatoes palatable? What if they deter cancer? Genes can be made to “jump” to grow these potential lifesavers.

Make Sure “IT” Is in the Details

Now you can add details. But do not sling zillions of facts and research references. Offer details at the proper level of complexity to prime your audience's interest while building bridges to new understanding. Details need some type of “IT factor,” where IT can stand for **Interest Traction, Interconnected Topics, or Independent Thinking.**

Break down big concepts into scaffolded memes. Walk some audiences through each step; be ready to skip along with others. Build your detail scaffolds like this:

- Genes are made of DNA. Genes carry traits from parents to offspring. All living things—including YOU—reproduce thanks to genes.
- The proper term for jumping genes is *transposons*.

Transposons move or “visit” other locations in the organism's genetic material.

- *Genome* is the term for an organism's genetic material.
- Genes jump naturally, or they can be modified to jump to particular places within the genome.
- When a gene jumps, it leaves behind parts of itself. These little parts make little changes. Little changes can cause a big change in how something looks or behaves. This means there is a change in the organism's DNA. Such a big change is called a genetic mutation.
- Offspring do not look or function precisely like parents partly because “jumping genes” and other types of genetic mutation cause important changes. As the changes add up over time, organisms can take on new forms.

Now the stage is set. Your audience should be ready for more interactive discussion or active learning geared to the setting and your audience's needs and preferences.

The Tipping Point on Tone

Your aim is to be engaging and accurate. Engaging fourth-graders is different from engaging legislators, which is different from engaging reporters. And while accuracy always has parameters, it can be conveyed with vastly different vocabularies. These factors



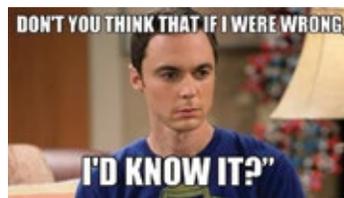
Figure 2. Fine-tune your tone for each audience.

combine to create tone. As shown in Figure 2, there is a continuum of tone. Aim for the middle for general audiences. Slide either way to meet your particular audience's age range and interests. And always remember that each audience member is an expert on his or her own experiences, perspectives, and expectations. Respect what each person brings to the conversation.

Ready to Engage?

For more on this topic, see

- AAAS Center for Public Engagement with Science & Technology (<http://www.aaas.org/communicatingscience>)
- *What do scientists think about the public and does it matter to their online engagement?* (<http://tinyurl.com/lzqab5v>)
- *Salvaging Science Literacy* (<http://tinyurl.com/ps067ek>)



Don't be a Pontificating Sheldon (Big Bang Theory).

- *What's a Genome?*—Details with “IT factor” for teens and up (<http://tinyurl.com/mhtzq82>)

- *Jumping Genes and the Color of Grapes*—sample engagement for youngsters (<http://tinyurl.com/pq60cfe>)
- Purple tomatoes—Quick blurb with intermediate complexity (<http://tinyurl.com/q88lgsf>)
- Student Science Communication Project (<http://tinyurl.com/oyhhbtn>)

To communicate with this audience as a guest blogger, contact katie@aspb.org. ■

OUTREACH IS A HYBRID *continued from page 29*

does not necessarily seek to convey hyper-specific content. The goal is to meet the needs and interests of a given audience so its members find new inroads and connections to the world of science.

The scientist serving the community is not primarily attempting to forge a direct tie-in or benefit to his or her grant-making or grant renewal options. The service-oriented scientist is creating or disseminating resources to advance the field or promote scientific thinking. Happily, since community service has rather fluid boundaries, audience members could become lay experts or career-oriented recruits for the service-oriented scientist's particular area of expertise. Community service also is fertile

ground for new collaborations, especially in discipline-based education research or public engagement studies.

Actually, community service dovetails with many aspects of public engagement about science. Effective practices are highly sought after right now and the literature and online resources reflect this active trend. Healthy examples include

- AAAS Center for Public Engagement with Science & Technology (<http://www.aaas.org/communicatingscience>)
- PULSE Community (<http://tinyurl.com/nwdtzng>)
- Informal Science (<http://informalscience.org>)
- Besley, J. C., Dudo, A., and Storksdieck, M. (forthcoming). Scientists' views about communication training. *Journal of*

Research in Science Teaching.

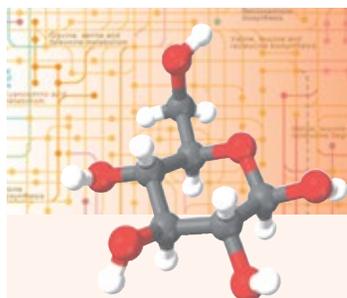
- Dudo, A. (forthcoming). Scientists as public communicators: An overview of the empirical literature. *Sociology Compass.*
- Gonsalves, L., and Sevian, H. (2008). Analysing how scientists explain their research: A rubric for measuring the effectiveness of scientific explanations. *International Journal of Science Education.* <http://tinyurl.com/kgdvxsx>

Reach Out Now

- Volunteer for 2015 ASPB outreach events in San Jose, California (February); Chicago, Illinois (March); Washington, D.C. (September); and Providence, Rhode Island (November). Contact katie@aspb.org if you

work near these locations.

- Have you authored successful BI statements and reports? Submit examples to katie@aspb.org. This will help ASPB populate an archive of quality sample statements and exemplary outcomes.
- Share resources you've developed on the Life Science Teaching Resource Community (<http://www.lifescitrc.org>). Submit under the ASPB partner banner.
- Nominate a U.S.-based high school teacher or public librarian with whom you collaborate for free online access to ASPB's journals. Go to <http://journalaccess.aspb.org>.
- Invite a local high school student into your lab for a month/semester/summer of hands-on experience and mentoring. ■



Call for Papers *Plant Physiology* Focus Issue on Metabolism

Deadline for Submission: June 8, 2015

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

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

Authors interested in contributing should indicate this in the cover letter when submitting papers online at <http://submit.plantphysiol.org>. Please select "Metabolism (October 2015)" from the Focus Issue list in the online submission system. Articles published in *Plant Physiology* on this topic within 2 years before and after the Focus Issue publication date will be collected in an online Focus Collection on Metabolism.

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



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