

ASPB News



THE NEWSLETTER OF THE AMERICAN SOCIETY OF PLANT BIOLOGISTS

Volume 37, Number 2
March/April 2010

Plant Biology 2010—Getting Ready to Go!

Inside This Issue

ASPB Members Named
Fellows of AAAS

On-site Child Care at
Plant Biology 2010

ASPB Education
Foundation—Grant
Awards Program: Call
for Proposals

Plant Biology 2010, a joint annual meeting with the Canadian Society of Plant Physiologists—La Société Canadienne de Physiologie Végétale, will be held in one of the most unique and interesting cities in North America: Montréal, Canada.

Montréal has something for everyone, which makes deciding on what to do while visiting quite a challenge. Neighborhoods abound, just waiting to be explored. The streets surrounding the headquarters hotel—the Hyatt Regency—are full of shops, cafés, and clubs. Just below the hotel, you'll find access to the more than 18 miles of Montréal's underground city and metro system.

Old Montréal/Old Port, just around the corner from the Embassy Suites Hotel, gives you the flavor of traditional Montréal with wonderful restaurants, shops, and art galleries lining cobblestone streets. Stroll by the water while enjoying the breeze

and some crêpes. Horse-drawn carriages and the Cathedral of Notre Dame are just a short walk from the convention center (Palais des Congrès). The architecture and artwork within the Basilique tell the story of the founding of Montréal. If you have time, visit the incredible foliage within the Biosphere, the modern Olympic stadium, or historic Mount Royal, or grab a one-of-a-kind Montréal soft bagel and some chocolate from the many local chocolatiers.

And there's so much more! Visit http://www.aspb.org/meetings/pb-2010/Montreal_is.pdf and get to know Montréal—a European experience in North America.

The city is great, and the scientific sessions, workshops, exhibits, and networking opportunities are even better. For more details on the program, please visit our meeting site—<http://www.aspb.org/pb2010>.

continued on page 9

Québec
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Montréal Plant Biology 2010

Bringing together the global community of plant biologists

July 31–August 4

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

ASPB Executive Committee & Staff

CONTENTS

- 1 Plant Biology 2010—Getting Ready To Go!
- 4 President's Letter
- 5 People—AAAS 2009 Elected Fellows: Current Members of ASPB
- 10 Call for Proposals: ASPB Education Foundation—Grant Awards Program
- 11 Membership Corner
- 13 ASPB Education Forum
- 21 Obituary

Deadline for July/August 2010
ASPB News: June 5, 2010

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ASPB News

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Copy deadline is the 5th day of the preceding even-numbered month (for example, December 5 for January/February publication). Submit copy by e-mail whenever possible; submit all other copy by mail, **not by fax**.

Contact: Nancy A. Winchester, Editor, *ASPB News*, 15501 Monona Drive, Rockville, MD 20855-2768 USA; nancyw@aspb.org; 301-296-0904.

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Voting Is Important, and It Is Easy and Simple

ASPB presidents have, at this time of year, routinely written to members urging them to vote. When I was getting ready to draft this letter for the same purpose, the ASPB staff was kind enough to share with me samples of past letters. They were all well written, and the message was loud and clear.

There is nothing I can write that would improve on the literary merit or clarity of

those letters. So instead, I want to make this letter something of a pep talk encouraging all ASPB members to do the easy, simple, and obvious thing: *VOTE!*

ASPB was formed in 1924 as an offshoot of the Botanical Society of America. It was a grass roots effort by a few dozen scientists who were actively involved in some aspect of plant physiology. Almost a century later, ASPB has become a much larger, more diverse, and highly active society with almost 5,000 members from every corner of the world. Yet the original principles of self-governance are still pretty much intact. To ensure that ASPB remains an organization ably serving its membership and actively promoting plant science, participation of our members in nominating and electing our leadership team is absolutely crucial. Not only has the Society tried to raise awareness of the importance of this democratic process, we have also devoted significant effort to make participation in this process easy and simple.

The one-two punch of this process is nomination and voting. The topic of my January/February President's Letter was "Broadening and Enhancing Participation in the Nominating Process"; I strongly encouraged members to nominate candidates for president-elect, Executive Committee members, and various awards. At the same time,



Tuan-hua David Ho

chairs of award committees have worked extra hard to actively solicit nominations from members, and the Society has also streamlined the nomination process, making it much easier for members to nominate.

Consequently, I am delighted to report that we have received more than twice the number of nominations than in past years. With the increased participation, the

award committees have a larger nomination pool to identify a diverse group of winners who would likely better represent the excellence in our membership.

Besides these awards, the leadership team of ASPB needs to be elected by members via voting. Two candidates each for president-elect and one position on the Executive Committee will be on the ballot this year. One of these two candidates for president received the most nominations from ASPB members at large, and the other was chosen by the Nominating Committee, consisting of the immediate past president, president, and president-elect, usually from the list of other nominees.

The ASPB office has prepared a brochure summarizing academic and service accomplishments for each of these candidates. It is available online at the Society website (www.aspb.org/voting) and is mailed to any member requesting a paper ballot. In addition, candidates for the Corresponding Membership award will be on the ballot. This honor, initially given in 1932, provides life membership and Society publications to distinguished plant biologists from outside the United States. This is an important outreach effort of our Society to network with plant scientists in other regions of the world. Endorsement of these awards by ASPB membership welcomes

these distinguished scientists to be a part of our community.

Now is the time for the second act of this one-two punch democratic process, that is, the actual voting. How has our voting record been in the past? Frankly, it does not look very good. According to the record kept in the ASPB office, in the past decade and a half (since 1996), less than half of our members participated in voting, with the voter turnout ranging from 13% to 45%. These numbers did not compare well even with the U.S. major federal elections held in the same period, which ranged from 36% to 57%. In the United States, a common observation has been that as a result of low voter turnout, the president is almost always elected by less than half of the citizens. However, the ASPB record has been even worse because our presidents have always been elected by less than half, and often less than one-third, of our members eligible for voting.

Another revealing observation is that the winning margin of the ASPB president-elect in the past five years ranged from 2% to 42%, which means that fewer than 100 ballots could be the difference separating the two candidates. This is indeed a type of election where we could easily say "Every vote counts" and "Your vote can make a difference." Suffice it to say, we do need to have a much higher level of participation from our membership in the voting process in order to make it more meaningful. Although the voter turnout has not been satisfactory, we have begun to see a potential upward trend in the past three or four years. This is most likely due to the increasing use of electronic voting at the ASPB website, which is simple and fast, taking no more than a few minutes to accomplish.

People join ASPB for various reasons. I understand that there are a good number of people who sign up with ASPB to enjoy a substantial discount for attending the annual

continued on page 8



AAAS 2009 Elected Fellows: Current Members of ASPB

The 2009 Fellows of AAAS were announced on December 17, 2009, and the awards were presented on February 20, 2010, during the Fellows Forum at the AAAS Annual Meeting in San Diego, Calif. The Fellows were elected this past November in recognition of their overall contributions to science and technology. Each Fellow receives a certificate and a blue and gold rosette as a symbol of his or her distinguished accomplishments. Of the 531 Fellows elected for 2009, 24 current members of ASPB were among those selected by the AAAS Sections on Agriculture, Food, and Renewable Resources; Education; and Biological Sciences. Congratulations to all the honorees!

Section on Agriculture, Food, and Renewable Resources



Joseph Chappell

University of Kentucky

For contributions ranging from the basic understanding of terpene metabolism in plants to the broader applications of this knowledge to technological advances for the benefit of mankind



Harry J. Klee

University of Florida

For seminal contributions to understanding factors that control tomato flavor



Robert Bruce Goldberg

University of California, Los Angeles

For fundamental and seminal contributions to our understanding of seed development, a commitment to and success in undergraduate education, and numerous contributions to biotechnology



Henry T. Nguyen

University of Missouri

For contributions to plant genetics and genomics, and for national and international recognition of his research leadership in abiotic stress research, especially drought tolerance



Peter K. Hepler

University of Massachusetts, Amherst

For contributions as one of the most influential plant cell biologists, who continues to achieve breakthroughs that have guided research directions of numerous plant scientists



Peggy Ozias-Akins

University of Georgia

For distinguished contributions to the field of agricultural biotechnology, particularly in the areas of apomixis research and peanut genetic engineering and molecular breeding

continued on page 6

AAAS Fellows
Section on Agriculture, Food, and Renewable Resources
continued from page 5



Anireddy Reddy
Colorado State University
For distinguished contributions to the field of plant biology, particularly for advancing understanding of plant cell biology and service to professional societies

Section on Biological Sciences



Sarah Assmann
Pennsylvania State University
For distinguished contributions to the field of plant biology as realized through a holistic approach to understanding the response of plant cells to environmental stimuli



Donald P. Weeks
University of Nebraska, Lincoln
For a body of work that includes the development of broadleaf crops, such as soybean and cotton, that are resistant to treatment with the highly effective and environmentally friendly broadleaf herbicide, dicamba, as well as for pioneering work with the model plant cell system *Chlamydomonas reinhardtii*



W. Zacheus Cande
University of California, Berkeley
For contributions toward understanding cell division in eukaryotes

Section on Education



Susan Singer
Carleton College
For lifelong leadership in analysis and synthesis of evidence for use in improving science education at the K-12 and undergraduate levels, and for exemplary teaching



Timothy Close
University of California, Riverside
For exemplary pioneering research and international service and leadership in the field of crop genomics



Darleen A. DeMason
University of California, Riverside
For pioneering research into development of crop plants, including onion, lupin, date palm, maize, and pea, and exemplary leadership in campus administration, including department vice chair, director of the campus honors program, and associate dean in the graduate division

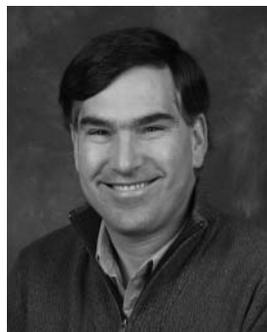
AAAS Fellows
Section on Biological Sciences
continued from page 6



Natalia Doudareva

Purdue University

For contributions to the understanding of the biochemistry and molecular biology of volatile secondary metabolites and the regulation of their production and emission in plants



Joseph Kieber

University of North Carolina–Chapel Hill

For contributions to plant hormone biology, particularly to his team's understanding of cytokinin signal transduction and ethylene biosynthesis and signaling



Erich Grotewold

Ohio State University

For distinguished contributions in the field of plant gene expression, particularly in the areas of control of plant metabolism and plant development



Robert L. Last

Michigan State University

For distinguished contributions to the field of plant biochemistry, particularly through the development of creative, novel approaches in genetics and genomics



Sarah Carter Hake

U.S. Department of Agriculture

For distinguished contributions to the field of plant biology, particularly for elucidating the mechanisms underlying the vegetative and reproductive development of flowering plants



Donald R. Ort

University of Illinois, Urbana–Champaign

For research accomplishments in the area of photosynthesis, ranging from molecular mechanisms to ecosystems scale responses, and for leadership through service in professional societies



Steve A. Kay

University of California, San Diego

For studies that impact our understanding of the molecular architecture of circadian clocks in plants, fruit flies, and mammals



Michael Scanlon

Cornell University

For contributions to the field of plant developmental genetics and genomics in the area of leaf development and shoot meristem function, and for graduate and undergraduate teaching

continued on page 8

AAAS Fellows
Section on Biological Sciences
continued from page 7



Jen Sheen
Massachusetts General Hospital
For seminal studies of signaling pathways in plants



Su-May Yu
Institute of Molecular Biology, Taiwan
For achievements in deciphering the mechanism of sugar regulation on rice growth, and for contributions in the development of rice biotechnologies and establishment of a rice mutant library for the worldwide plant science community



MariaElena Zavala
California State University, Northridge
For distinguished contributions to the promotion of diversity in science and in the development of effective mentoring programs for students

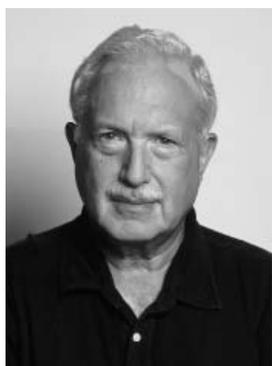
President's Letter
continued from page 4

meeting and/or for publishing papers in our two journals, *Plant Physiology* and *The Plant Cell*. While there is no doubt that these discounts are important membership benefits, the Society has much more to offer. The mission of ASPB is to promote the growth and development of plant biology and plant scientists in general. Besides organizing annual meetings and publishing journals, the Society is actively involved in education, public affairs, and diversity issues. Our voice is being heard in many places by many people, including schools, research institutions, government agencies, legislative bodies, and industries. Why not be a part of these efforts as well? How do you get involved? The first thing is to participate in choosing the leaders who are expected to carry out these missions on your behalf.

Many ASPB members, including myself, used to have the wrong impression that it would take a lot of time to cast a ballot by snail mail. However, the situation is much improved now. With the electronic voting website set up, it is really a cinch to vote. If you have managed to read this letter until this point, please don't go back to what you were doing just a few minutes ago. Instead, spend the next few minutes going to the ASPB website (www.aspb.org/voting) to vote by simply clicking on this web connection and proceed.

As I have promised, it is going to be easy and simple. And your participation will have made you a full-fledged member of ASPB.

Tuan-hua David Ho
ho@wustl.edu



Jonathan Gressel Wins Israel Prize in Agricultural Research

Professor Jonathan Gressel, of the Department of Plant Sciences of the Weizmann Institute of Science in Israel, has been named the winner of the Israel Prize in Agricultural Research. The Israel Prize is the Israeli government's highest award for scientific achievement. Minister of Education Gideon Saar made the announcement in February, noting that Prof. Gressel, an internationally renowned expert on biotechnology of plants, received the award for his breakthrough studies into the molecular mechanisms that allow the control of parasitic weeds in agriculture, especially Striga in Africa.

Jonathan Gressel

Special Airline Discount for 2010 Including a Discount for Your Traveling Companion

Star Alliance™ Member Airlines has been appointed as the Official Airline Network for Plant Biology 2010. Visit <http://aspb.org/pb-2010/airlines.cfm> for exclusive airline discounts for attendees through Star Alliance.

To obtain the Star Alliance Conventions Plus discount, please call the reservation office of a participating Star Alliance Member

Airline and quote the following: **Convention Code AC13S10**.

Registered participants, plus one accompanying person traveling to the event, are automatically granted a discount of up to 20%, depending on fare and class of travel booked.

The participating airlines for this event are Continental Airlines, Air Canada, Asiana Airlines, Air China, LOT Polish Airlines, Austrian Airlines, bmi, Scandinavian Airlines, Spanair, Turkish Airlines, SWISS International Air Lines, TAP Portugal, Lufthansa, Adria Airways, Croatia Airlines,

United, THAI, ANA, EgyptAir, and Brussels Airlines. Contact information for all the airlines is available on the Star Alliance website (<http://www.staralliance.com/en/business-solutions/conventions-plus/delegates/>).

For booking office information, please visit the Star Alliance Delegates website.

Don't forget to enter your convention code!

Where to Stay? So Many Choices!

Plant Biology 2010 will be held at the Palais des Congrès (the convention center). Hotel rooms with special discounted rates have been booked at the Hyatt Regency and the Embassy Suites. There is also special student housing at McGill University, which is a short walk from the center. Breakfast and a nightly reception are included in the Embassy Suites room rate. For more details, please visit <http://aspb.org/pb-2010/housing.cfm>.

Getting Around Montréal

The average temperature in Montréal in July and August is about 70° F (21° C)—perfect walking weather. But if you want to venture out to Mount Royal or the Latin Quarter, you can consider several options. Montréal is a BIXI city. BIXIs (public bicycles) are available at 300 different locations throughout the city. You can rent a BIXI from the automated racks along street corners. The first 30 minutes of your ride is free anywhere in the city. If you keep your BIXI longer, your credit card will be charged for each subsequent 30-minute period. Once you're at your destination, just drop your BIXI off at the nearest station.

Metro is also available throughout the city, accessible throughout the 18-mile underground full of shops and food courts. In fact, a metro stop is available within the Palais des Congrès, where Plant Biology 2010 will be held.

Plant Biology 2010 is the ideal venue for great science and great networking with your colleagues from around the world. Make your plans and register today at <http://aspb.org/pb-2010/registration.cfm>. If you have any questions, please contact us at info@aspb.org.

See you in Montréal!



ANNOUNCING ON-SITE CHILD CARE AT PLANT BIOLOGY 2010!

New Attendee Benefit Intended to Facilitate Parental Participation in Montréal

Plant Biology 2010 is very pleased to announce a new attendee benefit at the meeting: on-site child care for children from infants through 13 years of age. Rates are subsidized by the ASPB Women in Plant Biology Committee for the first 20 children in each time slot.

Plant Biology has contracted with Kimberlee Care (www.kimberleecare.com), a bonded, fully accredited child care service with 25 years' experience in providing services for corporations and meetings. Kimberlee Care's staff members are certified child care specialists, and the company is fully insured. Most staff members are bilingual (English and French). Kimberlee Care will set up a facility in the Palais des Congrès (the convention center) in rooms adjacent to those that will be used for the annual meeting. They will bring all supplies for fun, engaging activities for your children while you attend scientific sessions and networking events. Kimberlee Care will provide arts, crafts, puzzles, and other games, as well as a rest area with pillows and blankets. For older children, there will be a wide selection of board games, magazines, and other age-appropriate activities. Kimberlee Care will be open during the opening awards session, the opening mixer, all major and minisymposia sessions, and selected poster sessions. Kimberlee Care will not be open during the events where children are allowed, including the evening poster session and the final party.

You must pre-register for this service at <http://www.aspb.org/pb-2010/childcare.cfm>. Sign up for only one or for multiple time slots. Visit the website for specific information and rates.

The Women in Plant Biology Committee thanks the estate of Eli Romanoff for providing funds to support this on-site child care center.

Passport and Visa Requirements

U.S. RESIDENTS. All U.S. citizens are now required to present a passport when entering Canada by land, sea, or air. Please visit the U.S. State Department website for details (http://travel.state.gov/travel/cis_pa_tw/cis/cis_1082.html).

NON-U.S. RESIDENTS. Visit the Canadian Immigration website (<http://www.immigration.ca/>) for details on which countries require a tourist visitor visa.

Call for Proposals: Deadline June 4 (midnight ET)

ASPB Education Foundation—Grant Awards Program

In this call for proposals, the ASPB Education Foundation seeks projects that address the aims of the Foundation (see sidebar) and at the same time catalyze new opportunities for ASPB members to educate the public about the importance of plant biology.

Proposals must be submitted to the Foundation between March 15 and June 4. No forms are needed. Send proposals by e-mail to the Education Foundation assistant at info@aspb.org. Include your full name and ASPB member number in the body of the submitted e-mail. Attach documents in Word (.doc extension) or as PDF files. Proposal reviews will begin after the closing date. Questions? Contact Katie Engen at katie@aspb.org.

Each grant proposal should include

1. Cover Page
 - project title
 - project manager's name
 - ASPB membership number
 - address, phone, e-mail, and fax
 - coinvestigator name(s)
2. Project Description
 - topic, purpose, and outreach impact
 - five-page limit
 - double-spaced
3. Itemized Budget
 - up to \$30,000
 - justification for each component
 - use of resources for promotion, if needed

Quality **GAP Proposal Samples** are available for review at <http://www.aspb.org/education/foundation/gap.cfm>.

Project managers from winning GAP 2004–2009 projects can be found in the **Winning GAP Projects** at <http://www.aspb.org/education/foundation/gap.cfm>.

Guidelines for the 2010 program

1. The project manager must be a current member of ASPB.
2. Proposals that leverage funds from the Foundation with support from other sources are encouraged, particularly with regard to larger grant requests.
3. No indirect costs (overhead) will be covered by the Foundation for project awards.
4. No language translations, direct publishing, or support of other foundations will be covered.
5. No projects that would more appropriately receive their money from another source, especially when that project serves a limited audience (i.e., one campus), will be covered.
6. The Foundation seeks projects with wide and/or long-term dissemination.
7. ASPB expects to have the right to the use of projects developed with grant funding.
8. Proposals are encouraged from members both within and outside the United States. Projects may serve communities from any country.
9. The total funding will not exceed \$30,000, including allocations for promotion or web hosting. Projects may run beyond one year.
10. All recipients agree to advise future applicants who seek their consultation on developing winning proposals.

Awardees will be notified by e-mail and announced at Plant Biology 2010 in Montréal, Canada, July 31–August 4. 🌱

ASPB's Education Foundation

seeks proposals from ASPB members to support education and outreach activities that advance knowledge of and appreciation for basic concepts and contributions of plant biology.

In support of the mission of ASPB, the Education Foundation was established in 1995 to provide information and education to increase the public's knowledge about the role of plants in all areas of life.

The Foundation reaches its goals through programs that

- promote a broad understanding of the importance of plant science in providing an ongoing supply of affordable, high-quality food, fiber, and renewable resources
- provide education on the importance of plants to agriculture, medicine, the environment, and more
- make available accurate information on the latest developments in genetic modification of crops and plant biotechnology
- contribute to the knowledge of plant biology among K–12 schoolchildren through developing educational materials and assisting teacher development
- encourage young scientists to pursue careers in the growing field of plant biology
- increase plant science activities in science museums and discovery centers by developing programs, exhibits, background information, and links to scientists.



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



Name: Hari Pratap Singh

Title: Research Professional

Place of Work or School: Fort Valley State University, Fort Valley, Ga.

Research Area: Biotechnology, Genomics, and Environmental Stress Physiology

Member since: 2004

1. **Why has being a member of ASPB been important to you?**
It has really helped me be a part of a wide network of scientists and researchers across the disciplines in plant biology. ASPB is a unique resource portal, where information is made available at the simple click of the mouse for everybody, from a high school student to an established scientist, researcher, or educator.
2. **Was someone instrumental in getting you to join ASPB?**
Professor Brijja Bhoosan Singh, F.N.A.S.
3. **What would you tell colleagues to encourage them to join?**
ASPB offers access to a network of plant scientists and reputable publications such as *The Plant Cell* and *Plant Physiology*, as well as annual international scientific meetings. It also encourages budding scientists through travel grants and fellowships.
4. **Have you enhanced your career using ASPB job postings or through networking at an ASPB function?**
No, not yet.
5. **Have you had any success at finding candidates as a result of a job posting at the meeting or via our online Job Bank?**
No, but I am sure the ASPB Job Bank will prove to be a great resource in helping me find candidates for my postings in the near future.
6. **Do you read print journals? If so, where do you usually read them?**
For me, it seems like electronic versions have taken over. Occasionally, I might read at the library or between experiments, on breaks, or during travel.
7. **What do you think is the next “big thing” in plant biology?**
Genomics and computational biology.
8. **What person, living or deceased, do you most admire?**
I admire my dad, D. P. Singh, the most. He has been my role model. Today, I am successful because of his training, love, care, and continued motivation.
9. **What are you reading these days?**
As a reviewer, I am reading a lot of manuscripts. As a researcher, I have little time left after reading about biofuels.
10. **What are your hobbies?**
I enjoy traveling, photography, teaching, and research, although computers are my obsession.
11. **What is your most treasured possession?**
My most treasured possession would be the love of my exceptionally unique and wonderful wife, Archana, and my dear son, Harsh.
12. **What do you still have left to learn?**
If I count, there will be a long list. The learning process never ends. It's an ongoing process, although I would very much like to contribute a landmark event to the field of plant biology. In addition, I wish I could learn Spanish and more dance routines. 

Plant Scientists Among Victims of Huntsville Shooting

Two of the people killed in the February 12 shooting at the University of Alabama, Huntsville, were former ASPB members. Gopi K. Podila, chair of the Department of Biological Sciences, worked in the areas of bioenergy, plant–microbe interactions, plant genetics, and biotechnology. Maria Ragland Davis had a doctorate from North Carolina State University and studied molecular biology and plant genetics. ASPB extends its condolences to the victims' families and to the faculty, students, and staff of the University of Alabama, Huntsville. 

Fast Track Your Research



You stake your reputation on the data you publish. Clearly, the instrumentation used to collect that data must be up to speed. Time and time again, scientists throughout the world choose the **LI-6400XT Portable Photosynthesis System** for high quality data collection - and all that's riding on it.

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- **Superior analyzer performance - measurement precision and sampling frequency.**
- **LI-COR's scientists and analysts offer a wealth of knowledge and experience.**
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The success of the PlantingScience.org program, a science discovery and inquiry program for level 7–14 students (middle school through undergraduate) and their teachers, can be measured by the numbers. In the fall 2009 semester, 338 student teams with about four students per team from 18 states participated. The program matches up professional scientist mentors with student teams and their teachers, and the three cohorts interact online through a blog-like interface. Some of the mentors are graduate student “Master Plant Scientists,” who are cosponsored by ASPB and the Botanical Society of America, which directs the PlantingScience.org program. These graduate student mentors work with the middle and high school students and other mentors to keep the online interaction timely and lively. They also receive membership benefits from the society that sponsors them.

The current modules for the program are the “Wonder of Seeds,” which provides guidance for students and teachers into how to conduct inquiry into seed germination and growth, and “The Power of Sunlight,” which focuses on photosynthesis in leaf disks. New modules being field-tested (primary science author in parentheses) are

- “Corn Competition,” which encourages students to explore ways to grow the largest corn plant (Gordon Uno)
- “Pollen: Where Does It Come From? Where Is It Going?” (Beverly Brown)
- “Genetics and Evolution in Rapid Cycling *Brassica rapa*” (Paul Williams)
- “Genetics and the Environment in *Arabidopsis thaliana*” (Lawrence Griffing)

Modules in initial testing include

- “Celery: Cell Structure and Function in Response to the Environment” (Marshall Sundberg)
- “C-Ferns: Reproduction and Life Cycles of Ferns” (Renee Lopez-Smith)

A goal of the modules is to develop them in a way so that plant scientists from a wide spectrum of disciplines and career stages can reasonably reach out to a broad audience, providing an avenue for broadening the impact of their own research. They use their expertise in plants and scientific research to “encouragingly guide student research teams as they design and carry out plant investigations.” The topics are being chosen so that students can relate their research to that of the scientists and vice versa. For many of us, this kind of mentoring did not happen until graduate school. We would like to open up that kind of mentoring about scientific discovery so that students at much earlier levels can enjoy the feeling that not all is known. Unlike teachers, who have a mandate for success in the classroom, scientists, like the students they are mentoring, have a mandate to learn from both successes and failures in the lab. Mentoring positive learning outcomes from these lab experiences virtually, via the web, places the school student at the same lab bench as the science mentor.

In-the-trenches testing of the modules ramps up with presentation of the theme at a PlantingScience.org Summer Institute for teachers, cosponsored by the National Science Foundation (Grant No. DRL-0733280), Texas A&M University, and the Botanical Society of America. Here, teachers and the module developers collaborate to see how inquiry can be combined with teaching standards and teaching outcomes. In addition to the primary science author of the module, the program’s director, Claire Hemingway, and an excellent staff of advisers to PlantingScience.org work together to generate separate sets of background and inquiry materials for teachers, students, and mentors. An important part of the program is its continuing ongoing assessment and education research conducted by Carol

Stuessy-Dickson at Texas A&M University. The modules are extensively field-tested with master teachers before being released. Many field-testers (usually postdocs or grad students) are recruited to work through the modules without a classroom.

The next round of PlantingScience.org programs in the classroom began on February 15 and will continue through April 30. Student investigations based on the modules usually run about two weeks, and mentors must be able to respond to student questions and experiments in a timely manner, usually every day (averaging one-half to one hour per day). Over the past winter break, more than 100 new mentors came online. The next PlantingScience.org Summer Institute is June 21–29, and teachers can apply online by April 9. Look for the Summer Institute for Teachers application links, get further program information, or survey the plant science work being done by students across the nation at www.plantingscience.org. 

L. R. Griffing
Texas A&M University

Framing Controversies: Strategies for Finding Common Ground in the Science Classroom

Classrooms, unlike the working environments of practicing scientists, represent the intersection of science and society. Teachers must, therefore, plan with, around, or through the controversy that will potentially surface in the classroom. (1)

Although many may argue that biological topics such as evolution, climate change, and genetically modified organisms are controversial because the public does not understand the underlying science, only small correlations between scientific knowledge and attitudes toward scientific advances have been identified (see references 2–8 for examples). In contrast, research on how people make decisions supports the premise that public attitudes toward science are influenced by the way in which scientific ideas are framed. Grounded in the Nobel Prize-winning work of cognitive psychologists Daniel Kahneman and Amos Tversky (9), “framing” acknowledges that individuals are not able to process all of the available information as they make decisions. Thus, they take “cognitive shortcuts” to sift through the available information and form attitudes about scientific issues by taking up only the information they think they need to reach a decision (10, 11). They use “interpre-

tive schemata,” including moral, religious, cultural, and political perspectives, to decide what information is important and what information can be discarded. The process of framing involves including or excluding keywords, common phrases, images, or information sources, as well as combining, emphasizing, or repeating certain thoughts to make it easier for audiences to fit scientific ideas into their current schemas (12–15).

As an example of framing, consider the issue of genetically modified (GM) foods in the marketplace. Individuals and organizations either in favor of or opposed to GM foods use framing to evoke particular images and values that can influence audience attitudes (Table 1). Describing GM foods as “Frankenfoods” brings to mind images of science out of control, which ultimately generates an unexpected “monster.” In contrast, emphasizing the potential that GM foods hold in mitigating hunger and malnutrition resonates with the values of human health and well-being.

Several arguments have been made within the scientific community against the idea of framing (16). First, some view framing as inappropriate “spin” and suggest that the scientific profession would be undermined by

scientists’ failure to remain “objective” and “neutral” in their explanations of scientific ideas to students and the general public. This view ignores the fact that scientists already use framing extensively in their scientific communications, from conference presentations to journal articles to grant proposals. For example, a hypothetical scientist plans to give a seminar about her research on carbon storage in seeds of the model plant *Arabidopsis thaliana* to an audience of colleagues at the International Conference on Arabidopsis Research. Most likely, she would not provide much background information or rationale for choosing Arabidopsis as a system for study. If she presents the same research at the American Association for the Advancement of Science annual meeting, she may assume that interested biologists with more diverse backgrounds would be present. As a result, she might provide a brief explanation about the choice of Arabidopsis as an organism of study and what is known in the field as it relates to her work. Finally, if she were discussing the same research with a group of university benefactors, she would likely deemphasize the organism and focus more on the importance of understanding carbon storage for producing biofuels. Thus, framing is likely to be a universal feature of communication.

Making science personally meaningful and accessible, as framing does, is the main thrust of a number of research-based pedagogical approaches, including case study, problem-based learning, and place-based learning (for more information, see references 17–19). Instruction that uses framing effectively acknowledges the different worldviews of learners by

1. Recognizing that controversy exists. Science occurs within and is influenced by its cultural context. In fact, education

continued on page 16

Table 1. Frames specific to genetically modified foods

Frame	Example / Description
Economic	Make food production more cost-effective by reducing farmers’ use of pesticides, fertilizers, etc.
Emotional / Fear	“Frankenfoods,” risks of “unknown effects” from consuming “foreign” proteins
Morality / Ethics	“Playing God”
Public Accountability / Governance	Labeling would allow consumers to make the decision for themselves; control by big corporations of a few seed stocks; rights of farmers to save seed stocks
Public Health	Insufficient food for global population; more nutritious (e.g., Golden Rice)

Framing Controversies continued from page 15

- on socioscientific issues is a small but significant subdiscipline within science education that includes the study of learning in the context of social issues, including controversies (see references 20, 21 for examples).
2. Considering the audience. Just as one size does not fit all in communicating about science, different audiences have different values. Culture, economic factors, social and political values, trust, risk perception, and worldviews shape how a scientific message is received by an audience.
 3. Building on the research base. It is important not only to respect the roles of religion, culture, politics, and other nonscience factors in people's lives, but also to avoid making assumptions about what an audience values and understands. Recent research is revealing framing strategies that resonate with particular audiences (see references 1, 22, 23 for examples), which can then be used to inform future scientific communication efforts.
 4. Characterizing alternative explanations. Framing can be used not only to emphasize particular points, but also to respond to counterarguments. For example, the Frequently Asked Questions section of the National Academy of Sciences publication *Science, Evolution, and Creationism* includes respectful responses to concerns that it is only "fair" to teach evolution and creationism side by side and that evolution is "just a theory" (24, 25).
 5. Engaging key stakeholders. One of the most effective frames for addressing evolution as a controversy in the science classroom is discussion of various ways of knowing, with emphasis on what makes scientific epistemologies unique (26, 27). Teachers from disciplines such as history and philosophy or representatives of other worldviews, such as clergy, can be strong allies in helping students

distinguish different epistemologies with the aim of making decisions about appropriateness for science classrooms (28).

6. Framing is not just about using examples from daily life, although using such examples can be an element of framing. Rather, framing in the classroom involves identifying the values, beliefs, and worldviews of learners and tailoring instruction to connect with them. Although framing is not likely to convince staunch supporters of particular positions to change their minds, it may reach some of the "wobbly middle" who would otherwise disengage (14). 🌱

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We know there have been many important articles published in *Plant Physiology* over its history. To help refresh your memory, we have compiled a list of the 100 most cited articles (<http://www.plantphysiol.org/reports/mfc1.dtl>) from 1949 to the present, the period for which citation data are available. Note that this list is being provided merely as a starting point for your recollections of past research published in the journal. There is no expectation that all or even most of the selected articles will be on this list.

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Sam Aronoff

Samuel Aronoff, a highly respected plant physiologist and celebrated plant biochemist, died February 2, 2010, at his home in Corvallis, Oreg. His wife, Edith Moyer, who was a chemist, died in 1997. Sam was born in New York City on February 27, 1915. His father, Isadore Aronoff, was a tailor, and his mother, Sonia Berchoffsky, a housewife. Sam's parents, who were Jewish, had emigrated from Russia. The family moved from New York to California, where Sam graduated from Venice High School at the age of 15. He then enrolled at the University of California, Los Angeles (UCLA), where he earned a bachelor of science degree in geology. On the recommendation of a college teacher, Sam obtained a job in the seismology lab at the University of California at Berkeley that he described for Vivian Moses on July 8, 1996, as follows: "sorting out a charcoaled piece of paper with a needle scratching through the charcoal...my job was to change it every day and file it." He then became a graduate student at the University of California at Berkeley (1937–1942) and studied under Gordon McKinney (known for his work on carotenes, and one of the best chromatographers in the world) and under Melvin Calvin, who later (1961) won a Nobel Prize in chemistry for his work on the path of carbon in photosynthesis.

Sam completed his doctoral thesis, *The Chemistry of Porphyrins in Relation to Chlorophyll*, in physicochemical biology in 1942. His work on photosynthesis and carbon fixation soon followed. During 1942–1943, and then again during 1946–1947, Sam served as a postdoctoral visitor in Melvin's laboratory. During his work at Berkeley, Sam wrote one of the early detailed papers on "Photochemical Reduction of Chloroplast Grana" (1); it was preceded by a paper in *Science* (2). Shortly thereafter, Sam wrote a paper with Melvin on "Phosphorus Turnover and Photosynthesis" (3). Here, Sam could



Sam Aronoff

not find any correlation between light exposure (in grana from spinach leaf, in tobacco leaves, and in green alga *Chlorella vulgaris*) and the formation of organic phosphate from radioactive inorganic phosphate, as was then expected from the ideas of F. Lipmann, S. Ruben, R. L. Emerson, and others. However, Sam was careful to point out that their conclusion would be subject to change if only 1%–10% of total organic phosphate was involved, or if light converted one form of organic phosphate to another organic phosphate.

James Al Bassham, then working with Melvin and Andy Benson, remembers Sam for his contributions in growing algae. Al writes: "Sam was there only in about the first year of my joining the lab. Certainly Sam was important in establishing the algae cultures, which were very important to a large part of our subsequent research." Actually, Sam's official job was to grow algae! In a recent phone conversation, Andy remembered Sam as a great plant biologist as well as someone with a very good math background. He recalled Sam's important paper with him on the "Distribution of C¹⁴ in Photosynthesizing Barley Seedlings" (4). Sam's excellent mathematical skills were best demonstrated in a paper called "Catalase: Kinetics of Photooxidation" (5).

Sam taught chemistry at Boston University (1943–1944) to 200–300 students, whom he called an "auditorium of soldiers." He then did research with Hans Gaffron and James Franck at the University of Chicago (1945–1946) before his first tenured faculty position starting in 1948 in the Botany Department of the Iowa State University in Ames. At Ames, he later founded the Department of Biochemistry and made it his home for the next 20 years. His research during the late 1940s and early 1950s included studies on the "Degradation of Glucose-1-C¹⁴ and a Possible New Step in the Mechanism of Fermentation" (6), the "Separation of the Ionic Species of Lysine by Means of Partition Chromatography" (7), "A Homogeneous Cell Preparation from Soybean Leaves" (8), and "Carbon Dioxide Fixation by Roots" (9).

Among many other scientists, Leo P. Vernon started his research career in photosynthesis with Sam. In 1948, Leo used carbon-14 to follow the plant sugars formed in the leaf and tracked sucrose as the major sugar being translocated to the roots (10). Sam was a true plant physiologist; one of his early papers dealt with the metabolism of soybean leaves, in which he demonstrated the presence of organic acids produced in short-time photosynthesis (11). Sam's interest in the role of boron in plants is obvious from a novel paper called "Boron in Plants: A Biochemical Role" (12). Sam was involved in many aspects of *Plant Physiology*; the journal even included his work "Relative Kinetics of Chlorogenic and Caffeic Acids During the Onset of Boron Deficiency in Sunflower," published with John Dear (13).

Sam's 1956 book *Techniques of Radio-biochemistry* (14) served well in teaching hundreds of graduate students and young researchers during the time I was a graduate student and many years beyond my time. Sam left Ames to become the graduate dean and dean of the faculty of science at Boston College, a Jesuit college, and in 1971 he moved to Simon Fraser University in Vancouver,

continued on page 22

Samuel Aronoff
continued from page 21

British Columbia, Canada, as professor and the dean of science. He retired there at age 67. He was an outstanding administrator. He organized several conferences and in 1974 coorganized, with Paul Gorham and Jack Dainty, a series of well-known international meetings on *Phloem Translocation* held in Banff, Alberta, Canada.

Sam served several professional organizations, especially the American Society of Plant Physiologists (now ASPB) as secretary (1961–1963), vice president (1963–1964), and finally president (1964–1965). He had hobbies, too: he played games such as soccer, handball, and touch football. I am told that he swam until he was in his 90s.

Sam is survived by his children, Zena Seldon of Kamloops, British Columbia; Elizabeth Aronoff of Corvallis; and Margaret Aronoff of Mission, British Columbia, and five grandchildren.

Govindjee

University of Illinois at Urbana-Champaign

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