

ASPB News



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2008 SURF Recipients

2008 AAAS/ASPB Mass Fellow Named

President's Letter

Let Them Eat Cake? One Dickens of a Dilemma

It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness, it was the epoch of belief, it was the epoch of incredulity, it was the season of Light, it was the season of Darkness, it was the spring of hope, it was the winter of despair, we had everything before us, we had nothing before us, we were all going direct to heaven, we were all going direct the other way—in short, the period was so far like the present period, that some of its noisiest authorities insisted on its being received, for good or for evil, in the superlative degree of comparison only.

—Charles Dickens, *A Tale of Two Cities*

A French proverb says, “The more things change, the more they stay the same.” Much has changed from the revolutionary France of Dickens’s novel, yet we still encounter food shortages and the riots these shortages engender. A meeting in Washington, D.C., of economic ministers in mid-April of this year has drawn considerable attention to the newest iteration of this age-old problem (1).

Food shortages and increasing prices this year have contributed to political instability in many countries, including Haiti, Egypt, the Philippines, and Indonesia. According to the World Bank, global food prices have increased by 83% in the past three years. In Haiti, 80% of the population lives on less than \$2 per day, and the cost of many staple foods has increased 50% in the past year alone (2). So far



Rob McClung

this year, the price of rice, a staple in the diets of nearly half the world’s population, has almost doubled on international markets (3). In response, a number of countries (Cambodia, Egypt, India, Vietnam) have put restrictions or outright bans on rice exports.

Robert Zoellick, president of the World Bank, warned that many (more than 30) nations are at risk of social unrest because of the rising prices of

food. He said, “For countries where food comprises from half to three-quarters of consumption, there is no margin for survival.” In some countries, the vast majority of people’s income is devoted to food. In Indonesia, this proportion is 50%, in Vietnam it is 65%, and in Nigeria it is 73%! In the United States, that figure is much less (about 10% nationally, and reaching only 16% among the poorest 20% of the population). Nonetheless, even in the United States, there is concern because food banks are depleted, and even school lunch programs are suffering.

The recent food riots in Haiti contributed to the dismissal of the prime minister. The economic ministers declared at their meeting that food shortages pose a potentially greater threat to economic and political stability than the turmoil in capital markets!

At one level, this is a story we’ve heard before, but we should pay close attention, as there are some new twists to the story that affect us as plant biologists.

What has caused these food shortages and the rapidly increasing prices? As one might suspect for

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ASPB Executive Committee & Staff

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\$321/ 100 g (I2481C100-ASPB)

X-Gluc: **

\$39/ 100 mg (G1281C-ASPB)	\$149/ g (G1281C1-ASPB)	\$292/ 2 g (G1281C2-ASPB)
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\$419/ 3 g (G1281C3-ASPB)	\$529/ 4 g (G1281C4-ASPB)	\$629/ 5 g (G1281C5-ASPB)
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X Alpha Gal:

\$80/ 250 mg (XA250-ASPB)	\$144/ 500 mg (XA500-ASPB)	\$240/ g (XA1-ASPB)
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**nominal shipping charge for 5 g IPTG and 100 mg X-Gluc

Premium Pure Chemicals and Antibiotics:

AEBSF:***

\$123/ g (A5440-1-ASPB)	\$337/ 5 g (A5440-5-ASPB)
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Bialaphos:

\$199/100 mg (B0178-100-ASPB)	\$472/250 mg (B0178-250-ASPB)	\$897/500 mg (B0178-500-ASPB)
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Cefotaxime:

\$45/ g (C0111-1-ASPB)	\$92/ 5 g (C0111-5-ASPB)	\$429/ 25 g (C0111-25-ASPB)
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Chloramphenicol:

\$66/ 25 g (C0113-25-ASPB)	\$106/ 100 g (C0113-100-ASPB)
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Coelenterazine:

\$74/ mg (CZ1-ASPB)	\$213/ 10 mg (CZ10-ASPB)
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Digitonin Special Grade

\$320/ g (D3200-1-ASPB)	\$675/ 2.5 g (D3200-2.5-ASPB)
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Luminol:

\$101/ 25 g (LUM25-ASPB)	\$157/ 50 g (LUM50-ASPB)	\$223/ 100 g (LUM100-ASPB)
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MUG:

\$30/ 200 mg (MUG200-ASPB)	\$99/g (MUG1-ASPB)
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NBT:

\$78/ g (NBT1-ASPB)	\$134/ 2.5 g (NBT2.5-ASPB)
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\$213/ 5 g (NBT5-ASPB)	\$695/ 25 g (NBT25-ASPB)
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PMSF:***

\$85/ 5 g (P4170-5-ASPB)	\$192/ 100 g (P4170-100-ASPB)	\$341/ 250 g (P4170-250-ASPB)
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Phosphinothricin

\$125/ 250 mg (P0159-250-ASPB)	\$379/ g (P0159-1-ASPB)
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Rifampicin:

\$51/ g (R0146-1-ASPB)	\$117/ 5 g (R0146-5-ASPB)	\$335/ 25 g (R0146-25-ASPB)
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Streptomycin:

\$56/ 50 g (S0148-50-ASPB)	\$71/ 100 g (S0148-100-ASPB)
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TCEP:

\$15/g (TCEP1-ASPB)	\$29/ 2 g (TCEP2-ASPB)	\$59/ 5 g (TCEP5-ASPB)	\$95/ 10 g (TCEP10-ASPB)
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\$199/ 25 g (TCEP25-ASPB)	\$378/ 50 g (TCEP50-ASPB)	\$749/ 100 g (TCEP100-ASPB)
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any problem of this magnitude, there are many contributing factors. One is weather—the recent drought in Australia has had a serious adverse impact on the wheat crop. Global economic expansion has given many people access to better diets that include more meat, which has increased demand for grains as animal feed. Of course, oil prices surpassing \$118 per barrel (on April 22, Earth Day) raise costs of crop production and distribution.

As plant biologists, we know we must address the challenges of raising more food on less land that is subjected to increased environmental stress. New to this discussion of food shortage and price increase is the identification by the conference of economic ministers of the increased production of ethanol and other biofuels as a contributing factor.

Both Rick Amasino and I have spoken of biofuels in this space, identifying them as an important component of energy supplies that are greener because of, among other attributes, sustainability and reduced greenhouse gas (GHG) emissions. Now, though, critics of expanded biofuels production are linking increased biofuels production with food scarcity and increased food prices. There are calls to reconsider policies to expand biofuels production (4).

The extent to which the demand for biofuels has contributed to the rise in food prices is not clear. Work by the International Food Policy Research Institute suggests that biofuel production accounts for 25% to 30% of the recent increase in global commodity prices (5). The Food and Agriculture Organization of the United Nations took a more moderate view, estimating late last year that biofuels production, assuming that current mandates continue, would increase food costs by 10% to 15%. Such analyses are fraught with hazard, both as predictions and even in hindsight, because the accounting is extremely complex.

It seems intuitively obvious that conversion of food into fuel offers a direct competition with food supply. Replacing fields of food crops with fields of nonfood biofuel feedstocks renders that competition only

slightly more indirect. In addition, it seems equally obvious that those at the bottom of the world's economic ladder will be the most vulnerable to decreases in food availability and increases in cost. For example, an editorial in *Nature* (6) cited World Bank studies as indicating that for the poorest people in the world, a 1% increase in the price of staple food leads to a 0.5% drop in caloric consumption.

In the United States, corn is the bioethanol crop of the day, while elsewhere sugar cane and sugar beet are major sources of the sugars for fermentation. There are a number of arguments that ethanol from corn is not a desirable solution in the long term. The substantial energy inputs associated with corn production in the developed world greatly reduce the net energy gain associated with ethanol produced from corn to about 20%. Excessive nutrient (nitrogen and phosphorus) inputs and subsequent runoff have substantial negative implications for water quality (7). Nitrogen fertilizer is a key source of the potent greenhouse gas nitrous oxide.

Estimates of energy gain and associated GHG emissions are highly sensitive to underlying assumptions. For example, the GHG emissions associated with ethanol production from corn are extremely sensitive to the choice of process fuel, with one study calculating a net increase of 3% for coal and a net decrease of 53% for wood chips (8). Widespread adoption of no-till agriculture in corn and soybean farming, and inherent in adoption of perennial grasses, would convert agricultural lands into a net carbon sink (9). However, it has been argued that the conversion of forests and grasslands to biofuel farms growing either corn or switchgrass greatly increases GHG emissions, because the organic carbon stored as plant biomass and in soils is released following clearing and conversion to agricultural use (10–12).

These calculations are sensitive to assumptions about the use of the cleared materials. For example, firewood, including that derived from lands cleared for biofuels production, is used to replace oil for the drying and processing of virtually all of the Brazilian soybean crop (61 million tons), with concomitant reduction of GHG emis-

sion. Similarly, analyses of the energy gains associated with ethanol from corn are dramatically affected by consideration of products of ethanol production from corn, including dried distiller grains, corn gluten feed, and corn oil (13).

It is widely predicted that cellulosic biomass (so-called second-generation biofuels) will eventually offer considerably more favorable energy yields and GHG emissions than corn (14). For example, *Miscanthus*, a perennial grass being investigated as a cellulosic biomass crop, effectively sequesters carbon in the soil at rates of 0.5 t [C] per hectare per year (15, 16) and yields more than 2.5 times as much ethanol per hectare as corn. Lignocellulosic materials make up the majority of the cheap and abundant nonfood materials available (17). However, both production of lignocellulosic biomass and its processing into ethanol are extremely new, and many advances are necessary before the potential of this route can be realized (18).

More data are needed, as many of the estimates of energy gains and GHG emissions are based on modeling, and we need solid experimental data to substantiate the assumptions upon which the models rest. As scientists, we have the responsibility to generate these data and to use them to inform our elected policymakers. Critically, we need good and fair accounting in which assumptions and system boundaries are apparent and realistic.

Significant sums of research dollars are being made available for research into all aspects of biofuels. For many aspects of plant research, these are the best of times. Has plant science lost sight of the world's poorest, for whom these are the worst of times? I do not think so. Most major biofuels research initiatives have deliberately targeted nonfood crops to avoid even the appearance of a food versus fuels competition. Where the work has addressed grain crops, it is not the grain but the stover that is targeted for biofuels. Moreover, a major effort is to develop biofuels crops that can be grown on land not currently used for food production.

One common currency between food and fuels is crop production, so increases in

productivity can allow both food and biofuel. The theoretical maximum energy conversion efficiency of plants is 6%, and crops worldwide average 0.1% to 0.2% (19), offering an opportunity and a challenge for plant biology.

Over the past few decades, the plant research community has made enormous progress in understanding basic and agro-nomic topics such as photosynthesis and water use efficiency. New and powerful tools of genome research and systems and synthetic biology will aid current efforts to adapt crops to specific environments and in response to global climate change. For many reasons, biofuels remain an attractive source of fuel. However, we cannot wash our hands of our responsibility to the world's poor and vulnerable. Can we have both food and biofuel? We can, and one route to that goal is to emphasize research to increase plant production. All will benefit.

I would like to thank Andy Friedland (Dartmouth College) and Steve Long (University of Illinois) for useful comments on this letter.

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ASPB welcomes its latest recruit, born May 20, 2008, on the grounds of ASPB headquarters in Rockville, Maryland.



ASPB 2008 Award Winners Announcement

It is my pleasure to announce the winners of ASPB's 2008 awards. These awards will be presented during the Plant Biology 2008 Awards Ceremony, which will be held on Friday, June 27, at 1:30 p.m. in Mérida, Mexico.

ASPB—Pioneer Hi-Bred International Graduate Student Prize

- Colleen Doherty, Michigan State University
- Michael Grillo, Michigan State University
- Tracie Hennen-Bierwagen, Iowa State University
- Charles "Chip" Hunter III, University of Florida
- Ajay Sandhu, University of Nebraska

Early Career Award

- Ping He, Massachusetts General Hospital/Harvard Medical School

Charles Albert Shull Award

- Sheng Luan, University of California, Berkeley

Charles Reid Barnes Life Membership Award

- Tsuneyoshi Kuroiwa, Rikkyo University, Japan

Corresponding Member Award

- Chu-Yung Lin, National Taiwan University
- Federico Sánchez, Instituto de Biotecnología, Universidad Nacional Autónoma de México
- Alessandro Vitale, Istituto di Biologia e Biotecnologia Agraria, Italy

Stephen Hales Prize

- Peter Quail, University of California, Berkeley

Charles F. Kettering Award

- Robert Blankenship, Washington University

Lawrence Bogorad Award for Excellence in Plant Biology Research

- Steven Huber, USDA Agricultural Research Service, University of Illinois

Fellow of ASPB Award

- Daniel Bush, Colorado State University
- Jerry Cohen, University of Minnesota
- Sabeeha Merchant, University of California, Los Angeles
- Jack Preiss, Michigan State University

Congratulations to all of the 2008 award winners!

I would like to thank the chairs and members of each of the award committees for their hard work and dedication in making this year's selections. I'd also like to deliver a special thank you to those of you who took the time to make nominations. Your efforts are very important and are greatly appreciated.

I hope you will be able to join us in Mérida on June 27 for the ceremony and to congratulate these well-deserving friends and colleagues.

For more information on Plant Biology 2008, please see the meeting website at <http://www.aspb.org/MEETINGS/pb-2008/>.

C. Robertson McClung
ASPB President

Midwest Section Meeting

This year's annual meeting of the Midwest Section of ASPB was organized by Gustavo MacIntosh and held at Iowa State University on March 29 and 30. The meeting was attended by 130 people from throughout the Midwest. A record 79 abstracts were submitted, leading to a large number of outstanding oral and poster presentations. Awards for best graduate student oral presentation went to Brian Freeman and Yimo Liu (both at Iowa State University); for best graduate student posters to Alexis Hoffman, Matt Hillwig, and Guy Sander (all at Iowa State University); and for best undergraduate student presentation to Josh Kangas (Truman University) and Sebastian Goy (Purdue University).

A key feature of this year's meeting was a biofuels symposium featuring talks by Basil

Nikolau (Iowa State University), Tom Clemente (University of Nebraska), Nancy Carpenter (University of Minnesota Morris), and Markus Pauly (Michigan State University). The speakers addressed the historical need for and use of biofuels, as well as the advances in and challenges of using plant or algae oils and cellulose as sources. The complete abstract book, as well as pictures from the meeting, will be posted on the Midwest Section's web page.

This year, the position of chair-elect is open for nomination. The year's officers are



(From left) Josh Kangas, Guy Sander, and Alexis Hoffman.

Chris Wolverton (chair), Sarah Wyatt (treasurer), and Susanne Hoffmann-Benning (past chair).

Julie Thole Is 2008 AAAS/ASPB Mass Media Fellow

Julie Thole, of Washington University in St. Louis, is the 2008 recipient of the AAAS Mass Media Science and Engineering Fellowship, sponsored by ASPB. She will spend 10 weeks this summer working at *Discover* magazine in New York City, where she will learn about science reporting and various other aspects of magazine production. Julie is currently a PhD candidate in the plant biology program, where she is advised by Dr. Erik Nielsen (currently at University of Michigan) and Dr. Ralph Quatrano. Julie has focused her thesis work on



Julie Thole

understanding the role of phosphoinositides in polarized growth, particularly in *Arabidopsis* root hairs. She received her BS in plant biology from the University of Illinois in Urbana-Champaign in May 2003, where she studied anticancer compounds in elderberries with Dr. David Seigler. Her awards and honors include an honorable

mention NSF graduate research fellowship in 2004, and she was a 2005 ASPB travel grant winner. Julie enjoys writing and talking to people about science and hopes to pursue a career incorporating these interests.

She is grateful to ASPB for sponsoring her fellowship this summer.

The AAAS Mass Media Fellowship is designed to enhance coverage of science-related issues in the media to improve public understanding and appreciation of science and technology. Fellows work for 10 weeks during the summer as reporters, researchers, and production assistants in mass media organizations nationwide. They collaborate with media professionals at radio and television stations, newspapers, and magazines to make important science news clear and comprehensible to the public. This is ASPB's fifth year of participation in this 34-year old program, which has sponsored more than 500 fellows.



How to Approach Phone Interviews

Editor's Note: Brian Maricle spent some time in the job-hunting trenches before landing his position at Fort Hays State University, and he learned plenty along the way. One particularly challenging situation he regularly faced was the telephone interview. Aware that many other postgraduate students were about to go through what he went through, now that spring is in the air, he asked us whether the ASPB News might be interested in sharing a few of the lessons he learned in the world of phone interviews. We are happy to publish his advice and hope our postgrad community finds it of value. Good luck in the job market!

I finished my PhD about two years ago and began applying for jobs. Shortly into the application process, I had my first phone interview. That phone interview was unquestionably the worst experience of my professional life. I was completely unprepared for it. Since then, I have had temporary positions, so I have been in the applicant/interviewee pool for three consecutive application seasons. My interview skills have improved since then (I was hired!), but I always found the phone interview to be challenging.

One of my former lab mates from graduate school recently approached her first phone interview. She asked if I had any advice. For the benefit of both of us, I organized what I knew. I realized that my phone interviews all had common themes. Despite the different institutions and the

different positions, many types of questions were regularly asked. I am passing along what I have learned in the hope that others can learn from my mistakes. At the very least, those people who make phone interview blunders will know they are not alone.

The major challenge with a phone interview is that it occurs over the phone. In my opinion, it is far easier to relate to someone face to face. One cannot "read" people very well over the phone. You cannot see body language, or facial expressions, or the gestures they are making to each other (thumbs up, thumbs down, throat-slashing gestures, etc.). This leads to a strange awkwardness that always seems to be present during a phone interview.

Additionally, realize that you will probably be talking to a number of people crowded around a speakerphone. It can be

a little unnerving, which can compound the awkwardness. If possible, try to practice with someone else when preparing for phone interviews. Question each other over the phone about some of the following elements, and try to prepare some good responses. Keep notes, and have them handy while you are doing your real interviews.

Getting Started

Your first order of business is to develop a clear idea of what you want in your job and in your life. Prospective employers commonly ask about your long-term goals and what you would consider an ideal job. Remember, an institution is making a long-term investment in a faculty member. It is in their best interest to hire someone who will be happy and productive for a long time.

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Phone Interviews *continued from page 7*

During your phone interview, be prepared to answer specific and general questions about the various facets of the position. The more you know about the position and the institution, the better. Do your homework. Most institutions have websites that describe departments, course offerings, faculty research, and so forth. You will fare much better if you can demonstrate that you have a working knowledge of the institution.

For faculty positions, institutions will normally expect contributions in three areas: teaching, research, and service. Depending on the nature of the position, they will prioritize these differently and expect different commitments from you accordingly. For example, Research 1 institutions will expect you to spend the majority of your efforts in research, while teaching institutions will prioritize teaching above all else. Make sure you are getting yourself into something you want. Again, the more you know about the job, the better. Here are some specific suggestions relating to the three areas.

Teaching

Interviewers will ask what courses you want to teach. Often they are looking for someone to fill a specific niche. Try to play to this, but also try to be flexible. Show a willingness to teach introductory or general education classes. Be prepared to explain why you want to teach a particular class. If it is a new class for them, know what sorts of materials would be needed (especially the lab portion—reagents, materials, space, equipment, etc.).

In addition, expect them to ask some general questions about how you teach. Know your strengths and weaknesses. Identify techniques that you have found to work well. Talk about how you approach a class of students, how you try to motivate them (important for general education classes), or how you might try to align lecture and lab, for example. How do you keep students interested? Do you find it helpful to post notes online? (I have learned that many students do not come to class if you do.) How do you lay out expectations? Can you

focus on a “theme” for the term? Are you willing to team teach? Teaching is always an important area, so consider it well.

Research

Be prepared to describe what you do and what you would like to do over the next few decades of your life. Why is what you do important? Be able to provide specifics in case a specialist is present, but also be prepared to talk to nonspecialists. Have an idea what you need for lab space, equipment, and other requirements. They may want to know what you would expect for start-up funds as well as where you expect to apply for funding. Above all, talk about how to involve students, perhaps even undergraduates. Can you interest students in your research? If there is a graduate program involved, can you mentor graduate students? Tenure decisions often involve student mentoring, so make sure you address this.

Service

Although many experienced faculty members grumble about service, it is important. Committees are needed to keep the university going. Faculty members (especially those working toward tenure) are expected to contribute. In addition, there are many other types of service in academia. New faculty members may not be expected to advise students right away (although, if they ask, tell them you are willing to do so).

Other types of service might include various practices of student recruitment. This is important because universities need to make money. Thus, they want to recruit more students who pay tuition. Administrators pay attention to numbers of majors and numbers of student credit hours in departments. Will students want to take your class? Can you interest nonmajors in transferring into biology or botany? Can you go to high school recruiting events and interest people in biology? Administrators follow this closely.

Wrapping Up

Finally, the interviewers will likely ask if you have any questions for them. Make sure you ask something—someone who does not have questions does not seem

interested. You may ask about the facilities for teaching or research, or you may ask how your time is to be allocated. (For example, my contract says my time is supposed to be split 60-20-20 among teaching, service, and research. Although these numbers do not necessarily represent reality, it is good to know basic expectations.) It might be good to ask about tenure expectations or about what sorts of changes are expected in the department or college over the few years.

Ask about the town. What is the cost of living? Is it easy to find a place to live? What is the quality of local schools? What cultural or other activities are in the area? Remember, you are making a long-term decision here, so make sure this is a place you’d like to live.

After the interview, send a follow-up thank you note to the person chairing the search. Thank him or her for the interview and for the group’s interest in you as a candidate.

Normally, the round of phone interviews is finished quickly, and you will soon learn if you will be invited for an on-campus interview. Don’t worry too much if you do not hear anything for a week or so. It is okay to call or email the search committee chair to ask about your status. Do not become a nuisance, but some contact shows you are interested in the job. If you do not hear anything within about two weeks, you can probably shift your focus to other applications; they are likely wooing another candidate.

If you are invited for an on-campus interview, then you have made the next cut. It is in an institution’s best interest to move quickly, because the best candidates will soon be hired by someone else. Thus, you will probably not have a lot of time to prepare if you are invited to campus. On-campus interviews favor the prepared candidate. Have a 50-minute research seminar ready (refined and rehearsed), but also be ready to give a sample course lecture, and hope for that next call!

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Developing a Personal Protocol for Professional Success

by Beronda L. Montgomery-Kaguri

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Every laboratory has defined and systematic ways for conducting most experiments. The development and utilization of these lab protocols increase the likelihood of obtaining optimal and reproducible experimental outcomes. Just as every lab has detailed protocols that are followed for seed germination, stratification, and growth—as well as other routine assays—students and postdoctoral scientists likewise need to develop detailed roadmaps for their future careers.

Preparing systematically for one's career of choice will greatly enhance the likelihood of future success, in much the same way as does the methodical preparation we do for experiments. But just as laboratory protocols for routine procedures differ from lab to lab, a personal protocol for professional success will have nuances specific to each particular individual. Like nearly all useful standard operating procedures (SOPs), the protocol for professional success will be based on prior knowledge and tried-and-true themes, but it will also incorporate specific details and distinguishing characteristics that work best for a scientist's personal goals.

Setting the stage for a personal pathway to success and fulfillment requires some general considerations. Several questions to consider while crafting an individual SOP for success in your chosen discipline or profession include the following: (1) What do I want to do? (2) What resources do I need to get to my desired destination? (3) What can I learn from others' prior experiences to help me along my way?

What do I want to do?

This question requires a great deal of self-reflection and personal resolution, although there are certainly resources available to assist in answering it. These resources include workshops at disciplinary meetings, such as the Career Workshops organized by the Women in Plant Biology Committee at the annual ASPB meeting, conversations with trusted mentors,

and campus workshops or career days that allow students to interact with professionals working in various science-related arenas.

However, the end result is that you will have to make a personal decision regarding the best fit between your interests and strengths and the opportunities that are available. Once I decided that a position in academia was my desired goal, the things that I needed to do next came more clearly into focus.

What resources do I need to get to my desired destination?

Addressing this question is comparable to the data collection phase of an experiment. Having decided on a desired destination (or two), the next thing you'll need to do is to accumulate information on how to get there—preferably most successfully and most efficiently. In this regard, this question, unlike the first one, usually requires a good deal of input from others from the start. For many professional destinations, some of the fundamental requirements will be clear. For example, looking for a faculty position at a research institution will require postdoctoral experience beyond the PhD. Having decided on the academic track myself, toward the end of my PhD studies I began to focus on where and with whom I would complete my postdoctoral training.

The choices for postdoctoral experiences are varied. The variations include not only the requisite choice of host mentor and laboratory, but also the type of postdoctoral experience you would like to complete. There are traditional research postdoctoral positions, teaching postdoctoral positions, and a variety of hybrid postdoctoral experiences that merge research and teaching in a number of ways. Which type of postdoctoral experience you choose depends heavily on how you answered the "What do I want to do?" question. A well-calibrated choice can provide additional preparation and job market competitiveness at a time when the num-

ber of individuals vying for each quality permanent position continues to grow.

Other aspects of planning the journey benefit tremendously from fact-finding from individuals who have already successfully completed a similar expedition or are further along than you are. These individuals might be local campus contacts or individuals from a larger network, including those you have met at conferences or who are at other institutions. The good news is that resources for career development are growing in range, depth, and availability. There are myriad professional workshops, proposal writing seminars, and literature resources available on most campuses and beyond, many of which are targeted to specific disciplines.

Other resources are targeted to broad training for future laboratory leaders. For example, the Howard Hughes Medical Institute and the Burroughs Wellcome Fund developed a course entitled "Course in Scientific Management for the Beginning Academic Investigator" that also resulted in a valuable companion text *Making the Right Moves: A Practical Guide to Scientific Management for Postdocs and New Faculty*. This text is available free online (<http://www.hhmi.org/resources/labmanagement/moves.html>).

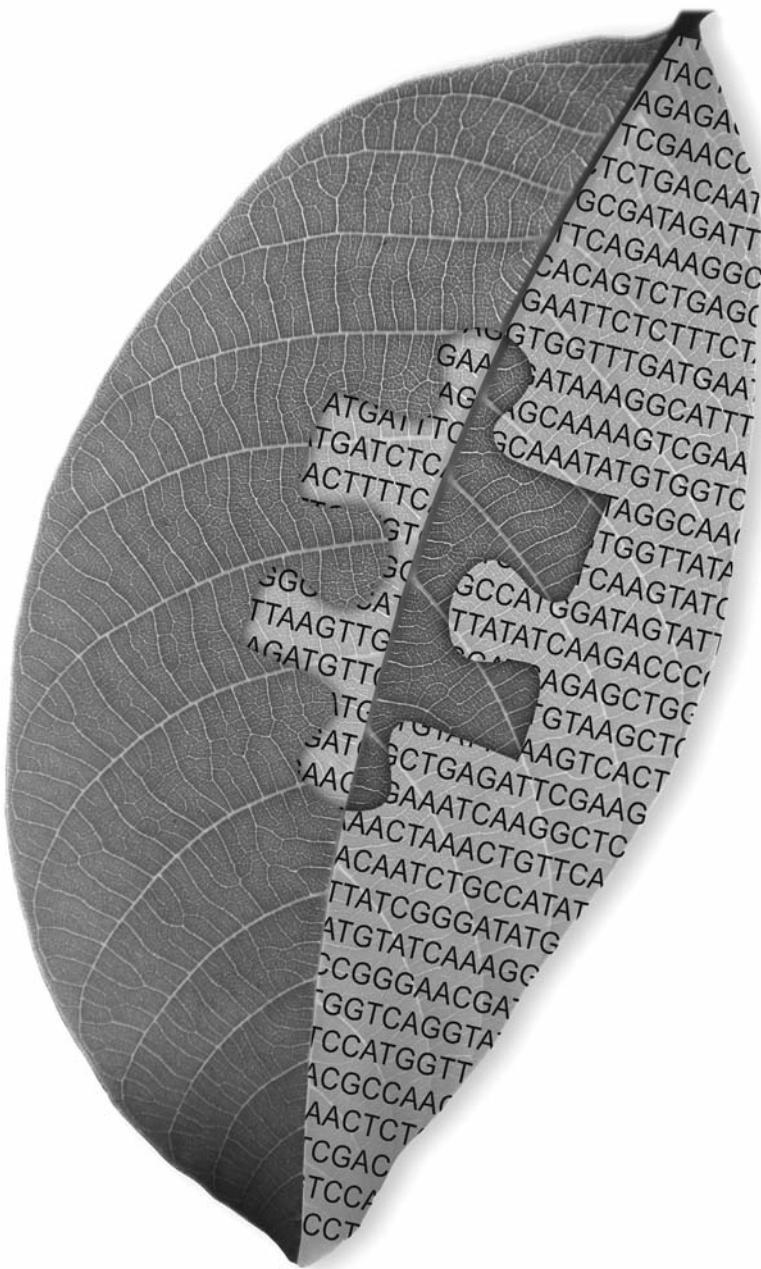
More recently, ASPB held its first Lab Leadership Workshop, which focused on leadership training for successful laboratory management. Taking full advantage of such resources, in addition to the training and guidance received in host laboratories, is beneficial for successfully traversing from scientist-in-training to productively, and hopefully contentedly, employed scientific investigator.

What can I learn from others' prior experiences?

Similar to the literature surveys we conduct to find out what has worked and what has not for research-based questions—and there-

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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: Madhugiri Nageswara-Rao and Jaya R. Soneji

Titles: Postdoctoral Research Associate

Place of Work or School: University of Florida, Institute of Food and Agricultural Sciences, Citrus Research and Education Center

Research Area: Plant Functional Genomics and Biotechnology, Evolutionary and Population Genetics, Host–Pathogen Interactions

Members since: 2007

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

Though we joined ASPB recently, we were garnering the benefits long before becoming members. We used to access online journals to keep ourselves abreast of the most recent publications and information in the field of plant biology. The articles used to inspire us to achieve higher goals in life and to continue pursuing science with more passion, perseverance, and dedication. The job postings were advantageous to us, as they gave all the information on current openings in the field of plant sciences.

2. Why has being members of ASPB been important?

Being members of the Society means you are a part of an organization, and being a part makes it your own. ASPB offers burgeoning opportunities to

interact with researchers actively involved in diverse fields of plant biology. For us it is a boon, as we get endless occasions to evolve as independent researchers and build strong networks with colleagues and collaborators from our field. It gives us an inside view regarding the types of research being carried out internationally. This will certainly enrich our scientific endeavors and will be rewarding for our career developments.

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

Journals published by ASPB and the regular web activities inspired us to become members. A few of our friends who were members had also suggested that we join.

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

We would make the nonmembers aware that ASPB represents diverse aspects of and an unfettered passion for plant biology. We would let them know that ASPB provides a plethora of resources for keeping up with developments in the field of plant biology. Programs organized by ASPB are worthy of support for their focus on the networking opportunities, career development, and excellent benefits such as discounts on registration fees for ASPB meetings, travel awards, online Job Bank, personal member websites, etc.

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

Though we didn't get our current positions through an ASPB job posting, browsing the job listings definitely gave us a sense of the job market and prepared us to compete for the position.

6. Have you hired anyone as a result of a job posting at the meeting or on our online Job Bank?

We have not yet used this for recruiting anyone. However, in the future, when we start our own research group, we believe that this will be an excellent source to explore. At that time, we would also consider posting a vacancy on the Job Bank.

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

We give a quick look to the online journals and print the articles of interest to read later at work or home. We also like to visit the library and leaf through the print journals, because you can never say what may catch your eye and what new ideas may flash in your mind while you're flipping the pages.

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

We feel that genome sequencing and nanotechnology are the next “big things” in plant biology. In the past decade, it was a dream and a challenge to have the sequence of a whole genome. But now, with the rapid advancement of molecular techniques and bioinformatics, genome sequencing has become a reality. These projects are generating (and will continue to generate) enormous amounts of sequence data. The time has come to switch the analysis from a single gene to the whole genome. Also, the emerging field of nanotechnology will lead to unprecedented understanding and control of the fundamental building blocks of all physical things and has immense potential applications. It can be achieved by collaborations among biol-

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by to place our work and future experiments on a successful path—we should survey the field when planning for future professional endeavors and when attempting to answer profession-related questions. Basically, you should assess defined ways for moving forward in your chosen path.

This knowledge can stem from both theoretical and practical experiences. There is a deluge of literature on job-related issues, from how to write successful CVs to what questions to ask in an interview. These are certainly valuable tools, but practical experience is also important. One avenue for gaining practical experience is to begin actively developing skills that will be required in your future position. For example, proposal writing is requisite for most academic positions.

By beginning to write proposals for graduate and postdoctoral fellowships, you not only gain insight into the process of putting together a cohesive, viable proposal, but also begin establishing a record of being fundable.

Practical experience about the job search process itself can also be gathered from serving as a graduate or postdoctoral representative on faculty search committees to gain insight into the candidate assessment and hiring process. Using such theoretical resources and practical opportunities allows you to tailor your path to fit your own individual goals and specific future endeavors while increasing your competitiveness and personal skill set.

Where will this all take you?

Refining a future career trajectory certainly does not fit perfectly to the scientific

method, but using tools to increase your chances of finding future success and fulfillment can only be constructive. I suggest drawing on all of the valuable sources you can find. Maximize your utilization of resources, knowledgeable colleagues and mentors, and practical experiences. Leverage these to assist you in successfully navigating the pathway to professional success. Personally, although I've often found myself wishing I had more information about a particular situation, it's a rare case that I've thought I had too much!

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



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The Bioethics Imperative XXXIV

Sexual Harassment Cases from NSF

(continued from the March/April 2008 issue of the ASPB News)

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

In the previous edition of the TBI (TBI XXXIII, *ASPB News*, 35[2]:19), I noted that 14 of the 45 cases of alleged mentor/student improprieties addressed by the NSF Office of the Inspector General (OIG) between 1989 and 2000 involved sexual harassment or gender discrimination as part of the complaint. Of these, two were too old to pursue (6 and 10 years old at the time they were brought to the OIG), and two were closed due to a lack of follow-through by the complainant. Another three were closed because NSF determined that no party had any connection to NSF "in proposing, carrying out, or reporting results from activities funded by NSF [45 C.F.R. 689.1(a)(1)] at the time of the alleged misconduct." In TBI XXXIII, I addressed four of the cases and summarized the NSF findings. The most egregious and complex of the sexual harassment cases is discussed by itself in this column.

Case I89110010. Dr. Off Kilter, a scientifically well-respected and powerful academic, has a field site outside the USA at a center where he serves as the director. He runs summer classes there with the help of teaching assistants (TAs). In 1988 and 1989, two summer courses were funded by an NSF Research Experiences for Undergraduates (REU) award. Ten female students and TAs allege that Dr. Kilter has engaged in "sexual assaults and unwanted and unexpected sexual advances" from December 1988 to August 1989. The allegations include unwanted touching and rape. "In addition ... [he] threatened [his] subordinates with damage to their careers if they revealed [his] sexual misbehavior, and [he] withheld data and assistance from students for the purpose of sexual advantage."

This is the last case of sexual harassment from 1989 to 2000 that I received from the NSF OIG under the Freedom of Information Act (FOIA) request 07-17. One section

of the 81-page report of this case details the statements that an NSF special interviewer obtained from the women, including the TA who was raped. These statements were obtained in person, via telephone interviews, or from sworn affidavits prepared by the complainant. The interviews were conducted from Madison, Wisconsin, to Scotland because the 10 women lived in different places and involved 17 separate incidents (1). Many of the women did not know each other (2). The most compelling thing in this section of the report is the consistency of the pattern of the sexual harassment: Although the responses of the women to the advances and the severity of the advances differ from event to event, the women all describe the same kinds of situations in which the events occurred and the same kinds of actions on the part of Dr. Kilter. For example, neck and back rubbing was one common way that these events were initiated by Dr. Kilter (3). For logistical reasons some of the students stayed with Dr. Kilter and his family and ate meals with them (4). During these times Dr. Kilter initiated sexual advances while his wife was elsewhere (5)—for example, getting ice cream with the children in the kitchen or putting them to bed (6). At least two of the women reported feeling overwhelmed by the physical size of Dr. Kilter (7). Most of the events occurred while Dr. Kilter was alone with individual students (8), but the rape occurred in the back of a truck and was witnessed by a second TA (9). During several of these incidents, Dr. Kilter was intoxicated (1). In addition, Dr. Kilter threatened one student "with professional blackmail if she reported his actions (See Attachment 3, Incident 2)." This incident was emblematic of a second pattern of behavior, and "these incidents of non-physical coercion ('through control over computer and data') are also central to this case" (10).

Dr. Kilter rebuts the allegations with statements that some of the women were witches, that some of them offered sex but that he refused (11), that some had physically assaulted him (12), that many of the women were engaged in profligate behaviors with other men (13), and that the women "had been conducting a mind probe of [him]" (14). He claimed that the allegations of sexual harassment were designed to destroy the entire field in which he has a PhD (15) and that the mafia or the U.S. government was involved in these allegations or in the students' behaviors (16). He was sure that wiretapping and video surveillance had occurred (16). Clearly, the views of Dr. Kilter and those of the women do not match.

If ever there was a topic that we do not discuss freely, it is sexual harassment. I myself have been the victim of unwanted sexual advances by some of my mentors or colleagues in the course of my professional career. My response was to blame myself or to pretend that it had not really happened. I certainly did not report these events because society has a tendency to blame the victims ("Oh, wearing that/being there with him/saying that/acting the way she was was 'just asking for it'" are commonly heard statements [see 17]), and I did not want this blame to compound my already sore and confused feelings. Are such behaviors more surprising in our ivory tower than in the general populace? As the prior column and this one attest, academia is hardly immune to sexual harassment: Emotional intelligence (18) is unlikely to be correlated with one's intelligence quotient, one's accomplishments, or the extent of one's education. One expert about such things (who wishes to remain anonymous) tells me that it tends to be the same individuals who make unwanted sexual advances again and again. Since the founding of the

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Membership Corner
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ogists, chemists, physicists, and other disciplinarians. We are certainly gaining more knowledge on genetics, heredity, and the interactions between the functional gene products and the environment.

9. What person, living or dead, do you most admire?

We feel each and every individual has some unique quality that is admirable; we just have to discover it in that person. We admire those people who, in their own way, try to make this world a better place to live.

10. What are you reading these days?

We are currently reading *Plant Functional Genomics* by D. Leister. We also enjoy reading about current affairs and innova-

tive popular scientific articles. Other than scientific books, we just finished reading *Harry Potter and the Deathly Hallows*.

11. What are your hobbies?

Rao: I enjoy photography, hiking, cricket, and badminton.

Jaya: I like pencil sketching, gardening, listening to music, swimming, and cooking.

But above all, we both love to spend quality time with our 8-month-old daughter, Yasheeta.

12. What is your most treasured possession?

We treasure our family (especially Yasheeta) and friends and the millions of memories associated with them.

13. What do you still have left to learn?

Learning is a never-ending phenomenon that engenders ever more question marks. It is something like, "The greater

our knowledge increases, the more our ignorance unfolds." However, looking at our daughter, we feel we should learn a lot from her. We have to learn to have fathomless enthusiasm, like her, to see, feel, touch, and get to know new things; to quickly learn from the mistakes; to leave the protective environment behind to explore the world as it is; and to be able to accept and pursue the unknown. We also have to learn her mesmerizing way of making strangers quickly become her friends and bond with her.

Bioethics
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Ombudsman's Office in 1982 at the University of Washington, the first sexual harassment complaint against an individual remains informal, but subsequent complaints are formally remanded to the vice provost. It is hoped that this policy is part of the solution for repeat offenders.

I found this report deeply troubling and am not sure how to reach closure on this topic. I suspect that the five cases I have dealt with in this and the previous column are only the tip of the iceberg: It is well known that sexual harassment is underreported. I do know that breaking the lock that *mokita* has on this topic would be a good step in the right direction.

Next time: Gender Discrimination Cases from NSF

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1. Investigative Report p. 1
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3. For example, Incident 1 and 2, p. 12.
4. For example, Incident 4, p. 13.
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6. Incidents 6 and 7, p. 14.
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12. Rebuttal on NSF Investigative Report, p. 31.
13. Rebuttal on NSF Investigative Report, pp. 27, 31.
14. Rebuttal on NSF Investigative Report, p. 30.
15. Rebuttal on NSF Investigative Report, p. 39.
16. Rebuttal on NSF Investigative Report, p. 38.
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Rob McClung Testifies in Support of NSF Before House Appropriations CJS Subcommittee

ASPB President Rob McClung presented oral testimony April 2 as a witness before the House Appropriations Subcommittee on Commerce, Justice, Science, and Related Agencies chaired by Congressman Alan Mollohan (D-WV). Congressman Rodney Frelinghuysen (R-NJ) is the ranking member of the subcommittee. This subcommittee has a key role in determining spending for NSF. Following are major portions of McClung's testimony:

"ASPB urges Subcommittee support for the FY09 budget request of the National Science Foundation of \$6.85 billion, including \$5.59 billion for Research and Related Activities and \$790 million for Education and Human Resources. In addition, ASPB recommends a 16% increase for the NSF Directorate for Biological Sciences, which is the average of increases for all directorates in the FY09 request.

"ASPB joined with 17 other science societies in a letter to the Chairman and Ranking Member expressing appreciation for your leadership in supporting NSF and comparable increases for all science disciplines. Our concern is that the FY09 budget request tries to distinguish among the disciplines in its proposed increases for the research directorates and specifically suggests lower increases in the biological sciences than in several other disciplines.

"The Consolidated Appropriations Act of 2008 indicates that the 'Committees also believe the Foundation should maintain comparable growth in fiscal year 2008, to the extent possible for the biological sciences and social, behavioral, and economic sciences directorates. Each of the science disciplines is valuable in maintaining U.S. competitiveness.' This reflects language in the House Report. Thank you, Mr. Chairman and Mr. Ranking Member, for your leadership on this provision.



Rob McClung

"Investment in basic research sponsored by NSF contributes to U.S. leadership in science and technology, which is needed for U.S.-based development of new technologies required in the highly competitive global market.

"Support for NSF is an investment in the knowledge base of our nation. Educating and training its citizens to be world-leading scientists at all levels and the existence of a

highly educated workforce have been key to success for the U.S. science community and its related industries.

"However, grant approval rates for the Directorate for Biological Sciences are below the average for all directorates. The current high rate of rejection of even highly rated biology proposals discourages some talented young students from pursuing a career in science. We cannot afford this loss of talent.

"The NSF is the major source of support for fundamental nonmedical biology research conducted at universities across the nation. It is important to distinguish the NIH from the NSF and other nonmedical biological research agencies. No one is inherently superior, but each has a distinct mission and supports distinct research.

"One example to illustrate the importance of nonbiomedical research is research into biofuels to assure a reliable and affordable energy supply that does not contribute to global warming through greenhouse gas emissions. Economically viable production of fuels from plant biomass will require increases in plant productivity and advances in plant biomass-to-fuel conversion.

"A recent report of the National Academies found that basic plant genome research serves a wide diversity of agricultural and environmental purposes. For example, by increasing

knowledge of how plants cope with extreme environmental stresses, plant genomics research can help scientists more precisely breed or engineer plants that can thrive as climates change. Let us consider one example, water, which should be considered a critical limiting resource. Wars have been and will be fought, both figuratively and literally, over water. Improved water use efficiency in agriculture is critical! The basic research supported by the NSF provides the essential knowledge base to improve water use efficiency in agriculture.

"A key to maintaining the health and security of the U.S. and its citizens is to continue to provide secure food supplies. Plants are the first step of every food chain, and NSF-sponsored research on plants plays an essential role in maintaining a secure supply of domestically produced food, fiber, and bioenergy.

"Thank you again for this opportunity to present our testimony before the Subcommittee."

Following presentation of his testimony to the Subcommittee, McClung conducted constituent visits with his two Senate offices. Senator Judd Gregg (R-NH) sits on the Senate Appropriations Subcommittee on Commerce, Justice, Science, and Related Agencies, which develops the appropriations bill for NSF in the Senate. McClung met with Gregg's appropriations staff, provided a copy of his testimony, and cited the importance of increased funding for NSF and NSF biology.

Senator John Sununu (R-NH) is a member of the Commerce, Science, & Transportation Committee that authorizes funding for NSF. McClung also shared his testimony with Sununu's science staff. He explained problems created in the research community by low grant approval rates at NSF and the NSF Directorate for Biological Sciences. He noted that low grant approval rates could deter students who had been considering science from entering the field.

Comparable Increases for NSF BIO, SBE, GEO Sought by ASPB and 17 Science Organizations

ASPB joined with 17 science societies in sending a letter to the House Appropriations Subcommittee on Commerce, Justice, Science, and Related Agencies Chairman Alan Mollohan and Ranking Member Rodney Frelinghuysen. The letter calls for comparable increases for biological, social, behavioral, economic, and geological sciences as for the physical sciences. The letter was drafted by ASPB, the Consortium of Social Science Associations, and the American Society for Biochemistry and Molecular Biology. Following is the body of the letter that 18 organizations sent March 17 to Chairman Mollohan and Ranking Member Frelinghuysen:

We are writing to express our appreciation for your continued support for significant increases for the National Science Foundation (NSF). We also want to thank you for your leadership in supporting comparable increases for all science disciplines in the NSF Research and Related Activities account.

We are concerned that the NSF fiscal year 2009 budget request again tries to distinguish among the disciplines in its proposed increases for the research directorates. In doing so, it ignores three important admonitions: from the reports accompanying both the FY 2008 Consolidated Appropriations Act and your House version (House Report 110-240), from *Rising Above the Gathering Storm*, and from the America COMPETES Act passed by the Congress in 2007.

The report accompanying the NSF appropriations in the Consolidated Appropriations Act of 2008 indicates that the "Committees also believe the Foundation should maintain comparable growth in fiscal year 2008 to the extent possible for the biological sciences and social, behavioral, and economic sciences directorates. Each of the science disciplines is valuable in maintaining U.S. competitiveness." This echoes the language in the House version of the 2008 appropriations bill.

In *Rising Above the Gathering Storm*, the recommendation of an engineer-chaired panel for increasing funding for basic research emphasizes the physical sciences, engineering, mathematics, and information sciences. It also says that there should not be a "disinvestment in such important fields as the life sciences and social sciences."

The America COMPETES Act includes language that the director shall give priority in the "allocation of Foundation resources to proposed research activities . . . that can be expected to make contributions in physical or natural science [biology, chemistry, physics], technology, engineering, social sciences, or mathematics, or that enhance competitiveness, innovation, safety, and security in the United States." Thus, COMPETES treats all disciplines as priorities.

It is only through advances in all science disciplines that the nation will take advantage of the full range of innovation the science community has to offer. There is not a global movement to fund one area of science to the exclusion of another area of science. The U.S. is out of step with the global science community by favoring a small number of science disciplines at the expense of comparable increases for all science disciplines.

We encourage the Subcommittee to again include report language in the fiscal year 2009 Appropriations report that asks NSF to ensure that the biological sciences, geosciences, and social, behavioral, and economic sciences directorates receive increases in fiscal year 2009 that are comparable to the other directorates. Last year's language should be reiterated:

"The Committee strongly supports increases for the math and physical sciences, computer sciences, and engineering directorates in fiscal year 2008 for research and related activities (R&RA). However, the Committee also believes the Foundation should maintain com-

parable growth in fiscal year 2008 for the biological sciences, geosciences, and social, behavioral, and economic sciences directorates. As the Innovation Agenda moves forward, it is important to note that maintaining U.S. competitiveness will depend on advances in, and interactions among, all fields of science. The Committee expects NSF to ensure that the biological sciences, geosciences, and social, behavioral, and economic sciences directorates receive increases in fiscal year 2008 that are comparable to the other directorates."

Thank you again for your outstanding leadership of the entire science community serving the nation.

Sincerely,

American Institute of Biological Sciences

American Ornithologists Union

American Society for Biochemistry and

Molecular Biology

American Society of Agronomy

American Society of Plant Biologists

American Society of Plant Taxonomists

American Society for Horticultural Science

American Society for the Study of Ichthyology and Herpetology

Association of Ecosystem Research Centers

Botanical Society of America

Consortium of Social Science Associations

Crop Science Society of America

Ecological Society of America

Federation of Animal Science Societies

Long Term Ecological Research Network

Natural Science Collections Alliance

Society for the Study of Amphibians and Reptiles

Soil Science Society of America

Committee on Public Affairs Visits with Congress and DOE

The Committee on Public Affairs met March 9 to 11 in Rockville, Md., and Washington, D.C. Committee members held a business meeting March 10 and visited Capitol Hill and government agencies on March 11.

Committee Chair Gary Stacey of the University of Missouri was joined by ASPB President Rob McClung of Dartmouth College, Stephen Howell of Iowa State University, Martha Hawes of the University of Arizona, David Salt of Purdue University, and Richard Sayre of Ohio State University. Rob Last of Michigan State University participated by conference call.

During the business session, budget requests for the NSF, USDA research, and Department of Energy (DOE) Office of Science were the subject of considerable discussion. The move of the Plant Genome Research Program to the Integrative Organismal Systems division raised some questions. The committee cited the importance of having all Plant Genome Research Program dollars go to plant genome research.

The budget request increase for the NSF Directorate for Biological Sciences is at 10.3%. The average increase requested for Research and Related Activities is 16%. Social, Behavioral, and Economic Sciences is also below the average increase and is increased 8.5% in the request. Committee members discussed efforts to seek comparable increases for biology and the social, behavioral, and economic sciences as those requested for math, physical sciences, and engineering.

ASPB has coordinated with 17 other science societies in the signing of a letter seeking comparable increases for the sciences to Chairman Alan Mollohan (D-WV) and Ranking Member Rodney Frelinghuysen (R-NJ) of the House Appropriations Subcommittee for Commerce, Justice, Science, and Related Agencies (see story on page 16). The letter was drafted by ASPB, the American Society for Biochemistry and Molecular Biology, and the Consortium of Social Science Associations. A similar request was supported in report lan-



Martha Hawes of the University of Arizona meets with her congressman, Raul Grijalva (D-AZ), March 11 in his Washington, D.C. office. Martha thanked Congressman Grijalva for his support for science.

guage by the subcommittee for fiscal year 2008. ASPB President Rob McClung subsequently testified as a witness for ASPB before the subcommittee. McClung urged acceptance of comparable increases for the sciences at NSF. (Please see related story on page 15.)

During consideration of the budget request for the DOE Office of Science, the increased staffing sought for the Energy Biosciences program was noted. (For more on this, please see the last two paragraphs in this article.)

For the Genomics:GTL (Genomes to Life) bioenergy research centers, a total of \$75 million in continuing support is in the FY2009 budget request. The centers are based in Tennessee, Wisconsin, and California. ASPB members have been active in the centers' research activities.

Pursuant to the 2009 budget request, the DOE Office of Science, Office of Basic Energy Sciences announced April 4, 2008, the initiation of Energy Frontier Research Centers (EFRCs) to accelerate the rate of scientific breakthroughs needed to create advanced energy technologies for the 21st century (see article on page 18). The EFRC awards are expected to be in the \$2 million to \$5 million range annually for an initial five-year period. It is anticipated that approximately \$100 mil-

lion will be available for multiple EFRC awards. Some 20 to 30 research center awards are expected to be made.

Although the National Research Initiative (NRI) appears to have a huge increase in the \$257 million budget request, much of the increase reflects a transfer of \$42 million that formerly supported integrated activities to focus on water quality, food safety, organic transition, and pest management initiatives. Also included in the budget request for the NRI is \$19 million for the department's bioenergy and biobased fuels research initiative. FY2008 funding for the NRI is \$191 million. The FY2009 request for the Agricultural Research Service (ARS) is \$1.07 billion, down from the current year \$1.19 billion.

In ASPB testimony subsequently submitted to the House Appropriations Subcommittee on Agriculture, Rural Development, FDA, and Related Agencies, McClung expressed support for the NRI's budget request and urged an increase for ARS above the current-year level. Timothy Nelson of Yale University and ASPB staff subsequently met with Subcommittee Chairman Rosa DeLauro's (D-CT) staff on the need to support the NRI and support basic research within the NRI.

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McClung Commentary Explains Benefits of Plant Research Leading to New Biofuels

The following commentary was published in The Washington Times on March 6, 2008.

The Next Generation of Biofuels

Oil closed at \$100 a barrel Feb. 19 for the first time. *The Washington Times* reported on Feb. 20 ("Oil Tops \$100 on Refinery, OPEC," Business section) that fears that the Organization of the Petroleum Exporting Countries may cut production contributed to the price increase.

Some analysts see this \$100 mark as just a stop on the way to \$200-per-barrel oil, possibly by the end of this decade. The reason cited is similar to newspaper reports on the bump to \$100 per barrel—OPEC's control of supply.

In addition to the economic and political challenges imposed by our reliance on for-

eign oil, we also need to be concerned that greenhouse gas (GHG) emissions associated with the use of fossil fuel contribute significantly to global warming, evident from observed increases in global air and ocean temperatures, widespread melting of snow and ice, and a rising global average sea level. Is there a large-volume alternative to the use of increasingly costly oil with its high GHG emissions? There will be.

We are at the early stages of research on the next generation of biofuels using plant cellulose. Plant stems, stalks, and leaves will become low-cost feedstocks for biofuels. A 2005 report from the U.S. Department of Agriculture and the U.S. Department of Energy projects that there will be enough biomass

(cellulose) to meet more than one-third of the current U.S. demand in transportation fuels.

At the same time, next-generation biofuels will greatly lower emissions of stored carbon compared to gasoline. Biofuels will be better for Americans' pocketbooks and the environment.

The president and Congress are to be commended for initiating needed investments in new-generation biofuels research. Additional investment is needed in all phases of plant research. This will help hasten the day when biofuels make up 33% instead of 3% of the transportation fuels used in the United States.

C. Robertson McClung
President, ASPB
Professor, Dartmouth College

DOE Announces Competition for 20 to 30 Energy Frontier Research Centers

The Department of Energy's (DOE's) Office of Science, Office of Basic Energy Sciences announced on April 4, 2008, the initiation of Energy Frontier Research Centers (EFRCs) to accelerate the rate of scientific breakthroughs needed to create advanced energy technologies for the 21st century. The EFRCs will pursue the fundamental understanding necessary to meet the global need for abundant, clean, and economical energy.

The EFRC awards are expected to be in the \$2 million to \$5 million range annually for an initial five-year period. A Funding

Opportunity Announcement has been issued that requests applications from the scientific community for the establishment of the initial suite of EFRCs. About \$100 million is expected to be available for EFRC awards to some 20 to 30 research centers. As the EFRC program matures, it is anticipated that EFRC competitions will be held every two or three years and that renewal submissions will openly compete with new submissions.

For more information, please go to www.sc.doe.gov/bes/EFRC.html.

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DOE Selects Four Small-Scale Biorefinery Projects to Advance Biofuel and Biochemical Production

The U.S. Department of Energy (DOE) announced Jan. 29 the selection of the first round of small-scale biorefinery projects that will advance production of current and next-generation biofuels and industrial products.

DOE Secretary Samuel W. Bodman announced that DOE will invest up to \$114 million over four years (fiscal years 2007 to 2010) for four small-scale biorefinery projects to be located in St. Joseph, Mo.; Commerce City, Colo.; Boardman, Oreg.; and Wisconsin Rapids, Wis..

Building on President Bush's goal of making cellulosic ethanol cost competitive by 2012, these biorefineries, with a capacity of 10% of commercial scale, will use a wide variety of feedstocks and test novel conversion technologies to provide data necessary to bring on line full-size, commercial-scale biorefineries. On average, commercial-scale biorefineries input 700 tons of feedstock per day, with an output of approximately 20 million to 30 million gallons a year (MMGY); these small-scale facilities will input approximately 70 tons of feedstock per day, with an estimated output of 2.5 MMGY.

Because of the overwhelming response to this solicitation, the DOE anticipates selecting a second round of small-scale projects later this spring, bringing DOE total investment up to \$200 million should a second round of selections be made.

"These project proposals were innovative and represent the geographic diversity that we strive for when making the widespread use of clean, renewable fuels commercially viable," Secretary Bodman said. "Spurred by the President's ambitious plan to reduce projected U.S. gas consumption by 20% by 2017, our goal is to aggressively push these technologies forward to get them out into the marketplace as quickly as possible, so they can have a real impact. Advanced biofuels offer tremendous promise for helping our nation to bring about a new, cleaner, more secure and affordable energy future."

Expected to be operational in four years, the selected small-scale biorefinery projects will produce liquid transportation fuels such as cellulosic ethanol, as well as biobased chemicals and biobased products used in industrial applications.

Combined with industry cost share, more than \$331 million will be invested in these four projects. DOE is also working with these companies and other research partners to develop methods for reducing water and fertilizer needs associated with production of these fuels. With all of these projects, the amount of fossil fuel used to produce the biofuels is significantly less than that associated with gasoline—on average, as much as 90% less over the life cycle.

Negotiations between the selected companies and DOE will begin immediately to determine final project plans and funding levels. Funding is subject to appropriations from Congress. The four projects selected will be headed by ICM Incorporated, Lignol Innovations, Pacific Ethanol, and Stora Enso North America.

ICM Incorporated of Colwich, Kans.

The proposed plant will be located in St. Joseph, Mo., and will use diverse and relevant feedstocks, including agricultural residues such as corn fiber, corn stover, switchgrass, and sorghum. DOE will provide up to \$30 million. ICM will integrate biochemical and thermochemical processing and demonstrate energy recycling within the same facility. This project stands to broaden the company's focus from corn-based to energy crop-based ethanol production. ICM is a privately held company with the mission of sustaining agriculture through innovation, primarily through the engineering and construction of ethanol biorefineries.

ICM's collaborators in this effort include Ceres, Inc.; Edenspace; South Dakota State University; AGCO Corporation; DOE's National Renewable Energy Laboratory;

National Center for Agricultural Utilization Research; Novozymes; VeraSun Energy Corporation; and SunEthanol, Inc.

Lignol Innovations, Inc., of Berwyn, Pa.

The proposed plant, co-located with a petroleum refinery, will be located in Commerce City, Colo. Using biochem-organisolve, it will convert hard and soft wood residues into ethanol and commercial products. DOE will provide up to \$30 million. Lignol Innovations is a U.S.-based company with a publicly traded Canadian parent based in Vancouver, British Columbia. Lignol has acquired and since modified a solvent-based pretreatment technology that was originally developed by a subsidiary of General Electric. Lignol Innovations's participants and investors include Sunocor Energy and Parker Messana & Associates.

Pacific Ethanol, Inc., of Sacramento, Calif.

The proposed plant will be located in Boardman, Oreg., and will convert agricultural and forest product residues to ethanol using Bio-Gasol's proprietary conversion process. DOE will provide up to \$24.3 million. Pacific Ethanol is a leading producer of low-carbon renewable fuels in the western United States. The company is planning to add cellulosic conversion capability to their corn-based ethanol facility in Oregon.

Pacific Ethanol's investors and participants include Biogasol LLC and DOE's Joint Bioenergy Institute (Lawrence Berkeley National Laboratory and Sandia National Laboratories).

Stora Enso North America of Wisconsin Rapids, Wis.

The proposed plant will be located in Wisconsin Rapids, Wis., and proposes to take wood wastes and convert them to Fischer-Tropsch diesel fuel. NewPage Corporation of Miamisburg, Ohio, recently acquired Stora Enso North America, the original applicant for this funding opportunity announcement. DOE will provide up to \$30 million.

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Maize Genetics Conference Announces Genome Sequence, Advances in Bioenergy, Drought Tolerance, and Nutrition

The 50th Annual Maize Genetics Conference featured presentations on leading research in many areas. The conference organizers highlighted research on areas including the genome sequence, bioenergy, drought tolerance, and nutrition.

A consortium led by Richard Wilson, professor of genetics at Washington University in St. Louis, announced the genome sequence for maize. The maize sequence contains more than twice as many genes as the human sequence. Understanding the genome sets the stage for rapid advances in sequencing other crops.

Michael Edgerton, a research scientist at Monsanto, described maize varieties that further optimize current ethanol production. Nicholas Carpita, professor of plant biology at Purdue University, presented research on lignocellulosic sources for exploiting biomass available from corn stalks in generating biofuels.

A series of talks by Geoff Graham of Pioneer Hi-Bred, Tom Green of Dow AgroSciences, and Paul Chomet of Monsanto presented examples of improved corn varieties that have enhanced tolerance to drought and high temperature stress. These varieties would improve food, feed, and renewable energy productivity.

Jianbing Yan, a research scientist with the International Maize and Wheat Improvement Center in Mexico, explained provitamin A accumulation in corn. Using molecular techniques, maize researchers have developed molecular markers that enable plant breeders to enhance the provitamin A content in varieties now being grown in Africa. In Africa, where vitamin A deficiencies lead to increased disease and blindness in millions of children, the biofortification of maize is an important solution in ending this epidemic.



(Above) Taking part in the 50th Maize Genetics Conference were (from left) James Collins, National Science Foundation assistant director heading the Directorate for Biological Sciences; conference chair Thomas Brutnell of the Boyce Thompson Institute at Cornell University; Brian Klippenstein, chief of staff for Senator Christopher Bond, and Ed Coe of USDA-ARS and the University of Missouri. Brian accepted a maize genetics community award of appreciation on behalf of the senator.

(Below) ASPB member Jeff Bennetzen of the University of Georgia and USDA Research, Education and Economics Under Secretary Gale Buchanan, formerly of the University of Georgia, toured the maize exhibit at the U.S. Botanic Garden on display in coordination with the 50th Annual Maize Genetics Conference.



Many attendees participated in the 50th Annual Maize Genetics Conference reception February 28 to celebrate the announcement of the release of a draft maize genome sequence by the project led by Rick Wilson (Washington University). From left are Brian Klippenstein, chief of staff for Senator Christopher Bond; Thomas Brutnell of the Boyce Thompson Institute and chair of the Maize Genetics Steering Committee that was responsible for organizing the conference; Sarah Hake, director of the Plant Gene Expression Center; Mary Clutter, former NSF assistant director of the Directorate for Biological Sciences (BIO); James Collins, current NSF assistant director of BIO; and Patrick Schnable of Iowa State University and chair of the Maize Genetics Executive Committee and a co-PI on the maize genome sequencing project. Both Brian, on behalf of Senator Bond, and Mary were recognized by the maize genetics community for their outstanding contributions to maize genome research.

Achievements of the National Plant Genome Initiative

The National Research Council (NRC) report *Achievements of the National Plant Genome Initiative and New Horizons in Plant Biology* (2008) evaluates some of the key research programs in plant genomics and describes

how these programs support fundamental biology research and drive technological advancement. NRC noted that plant genome sciences are essential to understanding how plants function and how to develop desirable

plant characteristics. To explore the report, read background information, submit feedback on the report, and see related resources, visit http://dels.nas.edu/plant_genome/. 

ASPB Members Gallo, Vermerris, UF Colleagues Receive \$1 Million for Energy Research on Sugarcane Residues

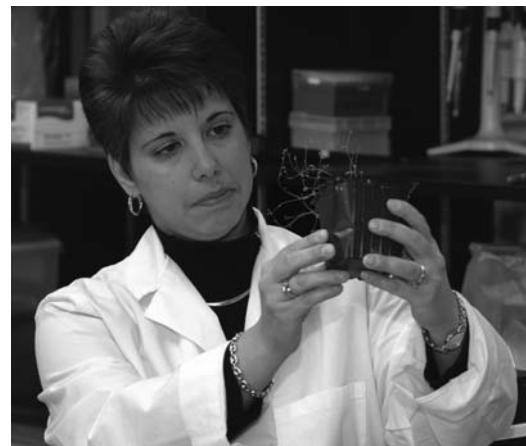
The University of Florida (UF) received a \$1 million federal grant and local match package in March for research aimed at increasing the amount of fermentable sugar obtained from sugarcane stalks and leaves.

The three-year grant was announced March 4 by the Biomass Research and Development Initiative, a joint project of the U.S. Department of Energy and Department of Agriculture. Nearly \$870,000 of the UF funding comes from the federal project. Another 20%, nearly \$217,000, is from nonfederal matching funds.

"What makes sugarcane an attractive target is [that] it produces a particularly large amount of biomass," said Project Director Fredy Altpeter, an assistant professor of agronomy with UF's Institute of Food and Agricultural Sciences.

The research team also includes three co-principal investigators, all from UF—Maria Gallo, associate professor of agronomy; Wilfred Vermerris, associate professor of agronomy; and James Preston, professor of microbiology and cell science.

The researchers will use the funding to create genetically modified sugarcane varieties, Altpeter said. They aim to improve the quantity and accessibility of the crop's hemicellulose, a complex carbohydrate that is one of the building blocks of plant cell walls. Hemicellulose represents up to one-third of



Maria Gallo



Wilfred Vermerris

the material in sugarcane residues that could be used for biomass ethanol feedstock.

The research will focus on combinations of three transgenic improvements: altering the cell wall composition so that hemicellulose can be separated more easily, causing the sugarcane to produce enzymes that will speed cell wall breakdown during processing, and suppressing flower production. The latter improvement will cause the sugarcane to devote more resources to biomass production while also ensuring that the vegetatively propagated transgenic crop doesn't produce seeds.

Gallo, who researches sugarcane biotechnology, said she's particularly interested in methods of suppressing flowering. "It's a well-researched area in many other plants,"

she said. "Now it's just a matter of trying to get it to work in sugarcane."

Preston will study the effect of genes from bacteria that will be transferred to sugarcane, causing the plant cells to produce enzymes that chemically break down hemicellulose into simple carbohydrates for efficient production of fuel ethanol. The enzymes would remain inactive while the crop grows but could be activated after harvest to streamline processing.

"We have good candidate enzymes for expression in sugarcane," Preston said. "Dr. Altpeter is going to be doing most of the work on this—he will develop technology to produce these enzymes at high quantities in

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Congressional Visits
continued from page 17

The committee discussed the recent National Academies of Science report on the National Plant Genome Initiative, the Farm Bill, the iPlant Center, controlled environment agriculture, and Perspectives of Science Leaders programs and identified participants to ask to represent ASPB for an April 9 Hill visits day (Timothy Nelson) and at the Coalition for National Science Funding Congressional Exhibition and Reception June 25 (Sandy Clifton).

On March 11, the committee members met with nearly 20 congressional offices, including the offices of senior members of key committees. Anna Palmisano, the new

DOE Office of Science associate director for the Office of Biological and Environmental Research, met with committee representatives that afternoon to discuss the office's support for plant research. The committee urged continued support for GTL bioenergy research centers and for the GTL sequencing of important plant genomes.

In a meeting with Richard Greene, who manages the DOE Energy Biosciences program, Greene discussed the expanded staffing of the Energy Biosciences program that is planned. In discussing the expansion, Greene commended Patricia Dehmer, deputy director for science programs, Office of Science, for her support of the Energy Biosciences program. The Office of Basic Energy Sciences

is seeking two Energy Biosciences program managers—one for the Photosynthetic Systems Program and one for the Physical Biosciences Program. Greene, who currently manages these programs, is also the lead for the new Photo- and Bio-Chemistry Team in which these programs are housed. Joining the Biosciences Programs in this team is the Solar Photochemistry program. The team is designed to promote cross-disciplinary research that will lay the foundation for breakthroughs in future energy capture and conversion strategies. The budget request for all three activities combined is more than \$75 million.

DOE Selects Biorefinery Projects
continued from page 19

NewPage Corporation is the largest printing paper manufacturer in North America based on production capacity, with more than \$4.3 billion in pro forma net sales for the 12 months ending Sept. 30, 2007. The company's product portfolio includes coated freesheet, coated groundwood, supercalendared, and specialty papers.

Stora Enso's partners include TRI, Syntroleum, DOE's Oak Ridge National Laboratory, and the Alabama Center for Paper and Bioresource Engineering at Auburn University.

Cellulosic ethanol is an alternative fuel made from a wide variety of nonfood plant materials (or feedstocks), including agricultural wastes such as corn stover and cereal straws, industrial plant waste like sawdust and paper pulp, and energy crops like switchgrass grown specifically for fuel production. By using a variety of regional feedstocks for refining cellulosic ethanol, the fuel can be produced in nearly every region of the country. And because these fuels rely on nonedible portions of crops as well as agricultural residues and forest wastes, they have the added advantage of not competing with

food crops. Although it requires a more complex refining process, cellulosic ethanol contains more net energy than traditional corn-based ethanol and has the potential to reduce greenhouse gas emissions by more than 85% relative to gasoline. E-85, an ethanol-fuel blend that is 85% ethanol, is already available at nearly 1,350 fueling stations nationwide and can power millions of flexible fuel vehicles already on the roads.

UF Gets \$1 Million Grant
continued from page 21

transgenic sugarcane, coinintroduce genes that modify cell wall composition, and confirm their value at a molecular level."

Vermerris, who studies plant cell wall biochemistry, will evaluate biomass from the transgenic sugarcane varieties the team develops to determine whether it can be processed more easily than standard varieties now in use.

"We expect to work all the way from generating plants with enhanced properties to conversion to bioethanol," Altpeter said. "We want to do it on a laboratory scale first. But after the grant's completed, the next step is demonstration in the field."

In modifying the sugarcane, the researchers want to avoid reducing its sugar content. The result could be a dual-purpose crop—the juice could be used conventionally for sugar production, and the leaves and

crushed stalks, known as bagasse, could be processed to extract both cellulose and hemicellulose and break them down to yield simple carbohydrates used in ethanol production.

"Targeting efficient conversion of sugarcane residues to ethanol reduces raw material costs [and] enhances productivity and sustainability," Altpeter said.

Calcium Signaling and Ion Channel Regulation: From Brain to Roots

Sheng Luan of the Department of Plant and Microbial Biology, University of California, Berkeley, spoke at a seminar sponsored by the ASPB Mid-Atlantic Section on March 27 at the University of Maryland. His talk addressed the CBL–CIPK calcium-signaling network in plants. Following is an abstract from his talk:

Almost all signal transduction processes in plants involve Ca^{2+} that serves as a vital second messenger. Understanding how Ca^{2+} mediates the cellular responses triggered by myriad environmental signals is one of the most important goals for plant biologists in the years to come.

Recent studies uncovered a new family of Ca^{2+} sensors (CBLs) that target a family of protein kinases (CIPKs), establishing a novel paradigm for Ca^{2+} signaling in plants (1–3). The calcium sensors and protein kinases are encoded by two multigene families. In Ara-

bidopsis (with the smallest genome among flower plants), at least 10 CBLs and 25 CIPKs were identified. Each CBL interacts with a selected repertoire of CIPKs, and each CIPK interacts with one or more CBLs. Some CBLs have common CIPK targets, and some CIPKs share CBL regulatory proteins.

Such specific and overlapping schemes in the CBL–CIPK interaction suggest both specific and redundant functions among the members of the two gene families. Genetic analysis has begun to reveal the function of individual CBLs and CIPKs. Available results indicate that CBL–CIPK interactions form an extensive network that functions in a number of signaling pathways, including plant responses to abiotic stress, nutrition status, and abscisic acid (4–11). Such analysis, and analysis using other means such as RNAi approach (12), will place each CBL–CIPK complex into a functional context of signal transduction in plants. ¶

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Washington University Professor Ralph Quatrano (second from right), former ASPB president and former editor-in-chief of *The Plant Cell*, is reunited with individuals he mentored. Second from left is ASPB Executive Director Crispin Taylor, and Professor Heven Sze of the University of Maryland is at right. ASPB Public Affairs Director Brian Hyps is at left. Ralph presented a talk on “Physcomitrella: The System and Genome to Address Plant Functions” at the ASPB Mid-Atlantic Section’s annual spring meeting March 28.



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ASPB Undergraduate Fellowships

For the eighth year in a row, the ASPB Summer Undergraduate Research Fellowship (SURF) program will make a big splash in the summer plans of 15 SURF winners and their mentors from ASPB. Each student has won a \$3,000 fellowship to support full-time work on his or her plant biology research project for a 10-week period this coming summer. The award also includes a free student membership in ASPB through August 2009 and travel grant assistance to attend the Plant Biology 2009 meeting in Hawaii. Each recipient's project mentor also receives \$500 for lab supplies.

ASPB is pleased to recognize the hard work and expertise of the two new SURF cochairs, Amy Clore of the New College of Florida and Ken Helm of Siena College. With timely consultation from seven-year veteran past SURF chair Mark Brodl of Trinity University, Clore and Helm managed the challenging selection process very effectively.

Clore and Helm concur that the SURF program is so effective because it allows awardees both to engage in potentially publishable research and to get feedback from experts in the field. The research experience can inspire a graduate degree in science, and attending a major conference can "seal the deal" for selecting a plant program. Additionally, faculty members who mentor a SURF recipient can discover the rewards of collaborating with undergraduates, who often prove to be reliable and enthusiastic research colleagues. Potential SURF mentors should check the APSB home page starting in December 2008 for the next SURF announcement and review the e-mail announcements of SURF opportunities sent to all ASPB members.

Clore and Helm appreciate the ASPB Executive Committee's devotion to helping propagate the future of plant biology research by providing ASPB Good Works funds that support this fellowship program. The cochairs especially appreciate the SURF reviewers who volunteered their time and expertise to select this year's recipients.

The SURF reviewers were impressed by the quality of all the 2008 applicants' projects, as well as the commitment of the students and their mentors to their ongoing research. The high quality of the applications made it very difficult for the review committee to select this year's 11 Category A (research and doctoral universities) and four Category B (master's universities, baccalaureate colleges, and associate of arts colleges) awardees. Congratulations to this year's recipients.

ASPB Education Forum

2008 Summer Undergraduate Research Fellowship Recipients

CATEGORY A

Research and Doctoral Universities



Erin Beisner, Rice University

Project: *Elucidating crosstalk between auxin and ethylene signaling pathways*

Mentor: Bonnie Bartel

I am very excited to be given this fellowship to continue my research during the summer. This award has encouraged me to further consider a career in research. I thank Dr. Lucia Strader and Dr. Bonnie Bartel for their encouragement and guidance. I look forward to presenting my research and learning from others' research projects in Honolulu next summer.

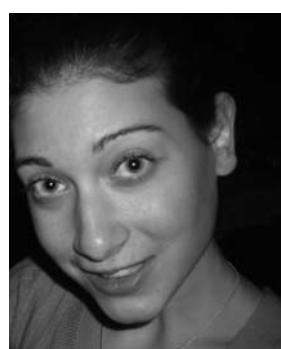


Edgardo Bresso, National University of Rosario, Argentina

Project: *Structure-function relationships in miRNA processing in *Arabidopsis thaliana**

Mentor: Javier Palatnik

I thank ASPB and Dr. Javier Palatnik for granting me this great opportunity. The application process has already been a rewarding experience, so I'm really looking forward to starting my research, since I'm sure I'll learn a lot during this summer.



Alyssa DeLeon, SUNY, College of Environmental Science & Forestry

Project: *Differential expression of genes related to arsenic uptake and detoxification in sensitive and tolerant varieties of shrub willow*

Mentor: Lawrence B. Smart

I am thrilled to receive the ASPB SURF, as the award will enable me to pursue my honors thesis pertaining to phytoremediation. The environment has always been my passion, so I am particularly interested in the applications of plant biology to environmental conservation. I

am fortunate to be conducting research in the laboratory of Dr. Lawrence Smart, working on a project concerning the uptake, transport, and detoxification of arsenic by shrub willows (a viable bioenergy crop). I welcome the opportunity to meet scientists in the field of plant biology at the 2009 ASPB conference and to benefit from their insights. I am eager to learn what topics or organisms are currently being explored, what future research might be done, and how I might find my niche in the field.

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CATEGORY A Research and Doctoral Universities (continued from page 25)



Cory Frederick, Ohio University

Project: *Investigation of paramagnetic effect on the development of Arabidopsis thaliana*

Mentor: Sarah Wyatt

I am ecstatic that I have been awarded a 2008 SURF, and I look forward to conducting my research and presenting at the annual conference next summer. The recognition for my work will bolster my confidence and prepare me for future professional work. My experience with ASPB has been positive and wholly rewarding, and I hope that other students are encouraged to excel.



Rachel Hesler, Clemson University

Project: *Effect of humidity and temperature on seed stability in A. thaliana AtEm mutants*

Mentor: William Marcotte

I am looking forward to a rewarding research experience this summer working with my faculty mentor. It is great to have an opportunity to contribute to meaningful research in the field of plant biology, and I am excited to learn firsthand about research techniques. I will be working with my faculty mentor on the effects of humidity and temperature on seed stability in *A. thaliana* AtEm mutants.



Matthew Juergens, Webster University

Project: *Molecular basis of cyanide detoxification in plants: Structure and mechanism of B-cyanoalanine synthase*

Mentor: Joseph Jez

I am excitedly looking forward to my summer SURF experience. I will be continuing a current project involving the solving of the crystal structure of B-cyanoalanine synthase and determining why it differs from o-acetylserine. Already from the SURF experience I have gained a respect for the amount of work that goes into applying for grants, along with a greater knowledge of my project in having to describe it. Science excites me, and I am truly grateful for the ability to do my own research over the summer. What I learn now will be invaluable to me later on, helping me to set up my future.



David Kern, Brown University

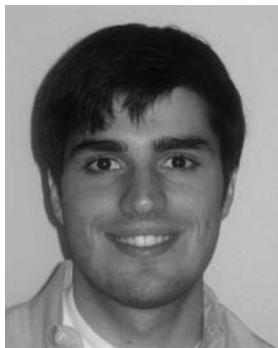
Project: *Role of B-galactosidase in pollen tube growth*

Mentor: Mark Johnson

I am excited to receive SURF funding for this summer. My project involves pieces of genetics, biochemistry, and organic chemistry. I am interested in the intersection of these disciplines, so hopefully these pieces will combine for some cool results. I am looking forward to a productive summer and to presenting at the meeting next year. Thank you for the opportunity.

CATEGORY A Research and Doctoral Universities (continued)**Kelli Pattavina**, University of Massachusetts–Amherst**Project:** *Genotyping moss ADF overexpression lines***Mentor:** Magdalena Bezanilla

It is an honor to be chosen for this prestigious award. The ASPB SURF will give me the opportunity to gain valuable knowledge and experience working in a research lab. I'd like to thank my mentors, Dr. Magdalena Bezanilla and Dr. Robert Augustine, for helping me with the application process and for helping me in the lab. I'm very excited that I have been given the chance to do something I love to do and can't wait to contribute significant research to the plant biology community.

**Adam Perricone**, University of Alabama**Project:** *Characterization of an Arabidopsis E3 ligase involved in plant defense***Mentor:** Katrina Ramonell

I was ecstatic when I found out that I was a recipient of an ASPB SURF. The fellowship will provide me with valuable experience in researching plant biology. I am very excited to be given the opportunity to discover some unique features regarding plant defense. I am also looking forward to discussing the results of my research at the 2009 ASPB meeting in Hawaii. Many thanks to my mentor for all her support and to ASPB for selecting me for the award.

**Ross Peterson**, University of Minnesota**Project:** *Characterization of homologous chromosome pairing, synapse, and recombination during Arabidopsis autotetraploid meiosis***Mentor:** Changbin Chen

One foot in the door! After working in the plant genetics lab for more than half a year, I am enthusiastic about what this ASPB fellowship will teach me. My mentor, Dr. Changbin Chen, always urged me to consider individual research, and often I was unsure of whether or not an opportunity like this one would come along. Since I found out our proposal was chosen, I decided to learn more about what others have discovered in the research surrounding my topic of investigation. Now, I am ready to begin my first guided research as a sophomore, and this is only the beginning of my chance to learn more about the field of plant biology!

**Molly Simis**, West Virginia University**Project:** *Genetic analysis, characterization of freezing tolerance, and population distribution of Cornus canadensis***Mentor:** Stephan DeFazio

I am extremely grateful to ASPB for this exceptional opportunity to continue my research. This opportunity is an invaluable beginning to my career as a scientist. I'm looking forward to joining the community of plant biologists. Thank you, ASPB!

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CATEGORY B Master's Universities, Baccalaureate Colleges, and Associate of Arts Colleges



Geoffrey Bader, Roanoke College

Project: *Studying the evolution of uptake and efflux of auxin and the polar auxin transport in land plant gametophytes*

Mentor: DorothyBelle Poli

Getting to be at the forefront of biological research at such a young age really is a wonderful opportunity. Preparing an application for such a prestigious grant was an arduous yet rewarding task in itself. Winning one is simply amazing! My thanks to ASPB for providing me such an exciting opportunity. I cannot wait to be able to give my complete focus to the study of plant evolution this summer.



Jordyn Brandsma, King's University College

Project: *Influence of growing conditions on the metabolite profile of the alga Chlamydomonas reinhardtii determined by nuclear magnetic resonance spectroscopy*

Mentor: Hank Bestman

I want to tell you how unbelievably grateful I am to have received this award! It is an incredible honor, and I am so excited to get started on my summer research.



Elizabeth Mayers, Ohio Wesleyan University

Project: *Phototropism and auxin flux in mutants of Arabidopsis thaliana*

Mentor: Chris Wolverton

I am honored to be a recipient of the prestigious SURF sponsored by ASPB for the summer of 2008. Over the course of the past semester, I have begun preliminary research that can now be continued with the help of the ASPB fellowship. I look forward to a productive summer of research and hope to draw valuable conclusions, which I will bring to the annual ASPB meeting in 2009. Again, I would like to express my sincere appreciation to ASPB for providing me with this invaluable research opportunity.



Toussaint Mears-Clarke, Oberlin College

Project: *Pectate lyase gene expression and lateral root emergence in Arabidopsis thaliana*

Mentor: Marta Laskowski

I am honored to be a 2008 ASPB SURF recipient. I am grateful and extremely excited about the summer experience. During the summer, I plan on investigating the potential role of candidate pectate lyase genes in lateral root emergence in *Arabidopsis thaliana*. I will visualize expression of pectate lyase genes AtPLA1 (Atlg04680) and AtPLA2 (Atlg67750) using a reporter construct. This experiment will allow us to better describe AtPLA1 and AtPLA2 gene expression as it relates to auxin response in the root. I am very excited to begin my work with transgenic plants.

Reaching Goals Through ASPB Education Outreach

For the ASPB Education Committee, 2007 was a busy and exciting year. Many committee members and volunteers gave of their time and energy to engage students, teachers, families, and scientists. We exhibited at the Family Science Days of the American Association for the Advancement of Science (AAAS) in San Francisco (Feb. 15–19), the National Science Teachers Association (NSTA) meeting in St. Louis (March 29–April 1), ASPB's annual meeting in Chicago (July 7–11), the Society of Experimental Biology's "Light and Life" conference in Glasgow, Scotland (July 25–27), and the meeting of the National Association of Biology Teachers in Atlanta (Nov. 28–Dec. 1).

An estimated 5,000+ people visited our booth during the year, with each one receiving handouts, engaging in one-on-one interactions with plant scientists, and most likely participating in hands-on plant activities. Nearly 8,000 bookmarks that graphically present the 12 Principles of Plant Biology were either given out or requested from ASPB headquarters in Rockville, Md.

Already in 2008, Jeffrey Coker (Elon University), Chad Jordan (North Carolina State University), and ASPB President Rob McClung (Dartmouth College) along with other volunteers, staffed our booth at AAAS in Boston. Suzanne Cunningham, Sherry Fulk-Bringman (both from Purdue Agronomy), Paul Williams and his Fast Plants group, ASPB Education Foundation assistant Katie Engen, and I staffed the booth at NSTA, also in Boston, where 20,000 to 30,000 science teachers gathered. I was impressed when Bill Nye, "The Science Guy," came looking for Paul in our booth, wanting to collaborate on yet another plant project.

This summer the booth will travel to the Federation of European Societies of Plant Biology conference in Finland. Mary Williams (Harvey Mudd College) will staff the booth at this meeting. We are considering taking our hands-on, inquiry-based plant science to other venues as well in the future.

The Education Committee is developing evaluations to assess our exhibit booth's

effectiveness. It is easy to count handouts and bookmarks taken or requested, but it is much more difficult to evaluate the long-term effects of the booth. We welcome your feedback on the booth, as well as any offers to become a booth volunteer.

One of our goals this year is to develop new outreach material. Katie Engen has been helping us develop new flyers, and these have been very popular. For example, three coordinated handouts are aimed at helping students take a closer look at plants in their daily lives. The flyers are entitled "Plants in Your Pants—Cotton," "Plants in Your Pants—Indigo," and "Genes in Your Jeans."

We also now offer a list of highly adaptable activities to accompany the three plant science radio shows partially sponsored by the ASPB Education Foundation or ASPB Good Works (*The Plant Detective*, *MicrobeWorld*, and *A Moment in Science*). There is a similar list for using our 12 Principles bookmarks as the basis for 10 different learning activities.

We have begun translating more of our handouts into Spanish. Thanks to Marisabel Oliveros, a student working with MariaElena Zavala (California State University), *Los 12 principios de la biología vegetal* will debut at Plant Biology 2008 in Mérida, Mexico.

Another ongoing project is to evaluate and update the education outreach resources and live links available through the ASPB website. If you would like copies of our new materials or have questions about any of our resources, please e-mail Katie Engen at katie@aspb.org.

We have been expanding our presence at the ASPB annual meetings. Education Committee member Chad Jordan has done an outstanding job organizing this year's education booth. Stop by the booth in Mérida to pick up plant science handouts and bookmarks. We will also have a hands-on activity for you and your family. Larry Griffing will be with us to discuss the latest on PlantingScience and how to get involved with this project.

The booth will feature the Annual Booth Competition Award Winners, including

"Video Podcasts as a Teaching Tool in Plant Physiology Laboratory Courses," exhibited by Michael van Oosten, Diana Nucera, Steven Holladay, and Burkhard Schulz of Purdue University. Booth visitors can bring iPods to the booth and record the podcasts to use in the classroom or lab. Debra Burhans (Canius College) will represent the project "The Dynamic Gene: An Educational Resource," whose goal is to develop plant bioinformatics educational material for high schoolers and undergraduates. The repository of this material is the Dynamic Gene website (dynamic-gene.cshl.edu).

We have prepared an Education and Outreach Minisymposium (Saturday, June 28, 3:00–4:40 pm) for the meeting in Mérida. This event will include an inquiry-based plant genomics course and workshop "Phenotype to Gene and Back Again," presented by Adán Colón-Carmona (University of Massachusetts–Boston, Department of Biology). Nancy Moreno (Baylor College of Medicine) will offer "Web-Based Biology Teaching Resources," a description of BioEd Online, Baylor College of Medicine's award-winning website of biology content, news, and professional development resources appropriate for educators of all levels, including undergraduate instructors. Christopher Cullis (Case Western Reserve University) will present "Lost Crops of Africa—Involving Undergraduates in Their Rediscovery and Development." And to round out the presentation Burkhard Schulz and his group from Purdue will present key components of their aforementioned video podcast project.

Recently, the Education Committee has been evaluating the following concept: "Whether you are broadening the impact of your research through educational activities or considering how to improve your own teaching, proper evaluation will help you learn when your efforts are effective and when they are not." To enter our conversation about this topic, please join Erin Dolan (Virginia Tech and Fralin Biotechnology Center)

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Education Outreach
continued from page 29

and Nancy Moreno (Baylor College of Medicine) during our Plant Biology 2008 Education workshop “Evaluation, Assessment, and Research in Life Science Education: What, How, and Why?” (Saturday, June 28, 7:30–9:30 pm). Come enjoy dessert, wine, and beer and partake in a lively discussion about designing and implementing science education evaluation and establishing mechanisms for getting funding and publishing results.

The Education Committee has been working with NASA to promote their Engineering Design Challenge for K–12 students. In the Engineering Design Challenge, students design, build, and evaluate their own lunar plant growth chambers. Participants receive basil seeds flown on the space shuttle to test in their own growth chambers. We will provide NASA material for this project through our education booth and a link to NASA’s information from our website.

Some of our members are developing new plant investigations for PlantingScience, and the 2007 Master Plant Science Team (MPST) has been expanded to members sponsored by both the Botanical Society of America and ASPB. “This joint sponsorship represents a new level of partnership among plant organizations, which we hope to see expand as the program grows,” stated Claire Hemingway in *PlantingScience Update* (November 2007). The members of MPST commit to mentor four or five student teams in the fall and spring PlantingScience sessions. ASPB-sponsored MPST members for 2007–08 include Ed Gilding (University of Minnesota), Kelly Gillespie (University of Illinois), Emily Indriolo (Purdue University), Chika Nwugo (Miami University), and Aurea Siemens (University of Alberta).

The Coalition on the Public Understanding of Science is a project sponsored by the American Institute of Biological Sciences in collaboration with other scientific organizations to promote the Year of Science 2009.

Next year marks 200 years since Charles Darwin’s birth and 150 years since the publication of *On the Origin of Species*. Education Committee members are currently organizing activities to promote the Year of Science 2009.

We are always looking for new and innovative teaching and lab techniques, hands-on plant activities for K–12 and undergraduate education, new outreach program opportunities, evaluation and assessment methods, and volunteers to help us with our activities. The possibilities are endless—new technologies are being developed daily, along with new discoveries—but plant and inquiry-based science has lost ground in today’s classroom environment. We are working to reverse this trend.

If you would like to volunteer your time and talents to help on the Education Committee, just e-mail Katie Engen (katie@aspb.edu), Brian Hyps ([hyp@aspb.edu](mailto:hyps@aspb.edu)), or me (jellis@presby.edu). 

Jane Ellis

Education Committee Chair, ASPB

Pinus sylvestris, Hordeum vulgare, Arabidopsis thaliana, Chlamydomonas reinhardtii, Synechococcus sp. 7942

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ASPB, Fast Plants Exhibits Popular with Teachers at 2008 NSTA Conference

For the fifth year, ASPB hosted an education outreach booth at the National Science Teachers Association (NSTA) annual conference. Our eager booth volunteers flocked to Boston's new convention center and joined the exciting thrum of science exchange throughout the enormous exhibition hall. The ASPB booth featured a wide variety of hands-on materials developed by the ASPB Education Committee, ASPB Education Foundation, Purdue University, Planting-Science, and Wisconsin Fast Plants. Education Committee Chair Jane Ellis, Purdue University crop physiologist Suzanne Cunningham, Purdue's soil specialist Sherry Fulk-Bringman, and Education Foundation assistant Katie Engen engaged booth visitors in hands-on experimentation tailored to their teaching interests and dispensed free classroom-ready materials for them to take along. The ASPB booth was shared with Paul Williams, Hedi Baxter, Mary (Supaporn) Porntrai, and Dan Lauffer of Wisconsin Fast Plants.

Suzanne Cunningham kept a steady pace throughout the three days presenting enzyme assays and related experiments adaptable to all age groups. One experiment demonstrated how starch is converted to sugar through enzyme production. Sherry Fulk-Bringman's erosion display, using water bottles and various soil amendments, caught the interest of many booth visitors. Her odd-looking clump of clay clinging to a wire attached to a battery triggered many chats with teachers, who were shocked to learn that soil has a charge and curious about the science behind this gooey demonstration.

As usual, the many teachers who use Fast Plants flocked to the booth looking for new classroom ideas. Veterans and new recruits alike were pleased with the newest additions, including the launch of Fast Plants Network (FPN) at www.fastplants.org. This online exchange provides a means of engaging

teachers, students, scientists, parents, and the interested public in discussion relating to their uses of rapid-cycling brassicas (Fast Plants). Booth visitors were particularly impressed with the easy and affordable plant growth chambers and the clever methods for propagating and studying the many available plants. Many conference attendees returned to the booth multiple times with colleagues in tow to learn more about the inquiry-based learning style that Paul and his team promote so effectively. (For more on this topic, please read "Inquiring Minds Want to Know:

What Are Schools Doing About Inquiry-Based Learning?" on page 33).

NSTA proved once again to be fertile soil for ASPB's efforts to germinate healthy plant science ideas with proactive science teachers from all over the United States. Hundreds of visitors came to the booth during the four days. Jane Ellis noted that such effective outreach was possible thanks to our many hard-working volunteers and to the continued support of the ASPB Executive Committee for the ASPB and Fast Plants exhibits via the Society's Good Works Fund.



Sherry Fulk-Bringman (left foreground) and Suzanne Cunningham are ready to amuse and amaze each booth visitor.



Interested investigators invent inquiry-oriented tools with Mary Porntrai.



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CALL FOR PAPERS *Plant Physiology* Focus Issue on the Grasses

Deadline for Submissions: September 1, 2008

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

Plant Physiology is pleased to announce a Focus Issue on the Grasses to be published in January 2009. The issue will be edited by Elizabeth Kellogg and C. Robin Buell. This Focus Issue will have a biological focus on the grasses. Research articles reporting on all areas of biological research in the grasses including physiology, development, environmental stress and adaptation, genetics, cell biology, bioenergetics, photosynthesis, genomics, and ecophysiology will be considered. A set of targeted update articles on important areas of research and molecular/genetic/genomic resources within the grasses will be solicited. We hope the issue will impart excitement to the readers on the current state of not only research in the grasses but also the developing suite of molecular, genetic, and genomic resources available for research in the grasses.

Authors interested in contributing should indicate this in the cover letter when submitting papers online at <http://submit.plantphysiol.org/>. Please select "Grasses (January 2009)" from the Focus Issue list in the online submission system. Articles published within 2 years before and after the Focus Issue will be considered for inclusion in an online Focus Collection of articles relevant to the focus topic (see <http://www.plantphysiol.org/cgi/content/full/142/2/379> for an editorial about Focus Collections).

Please contact Elizabeth Kellogg (tkellogg@umsl.edu) or C. Robin Buell (buell@msu.edu) for additional information.

Image courtesy of Douglass Henderson.

Inquiring Minds Want to Know: What Are Schools Doing About Inquiry-Based Learning?

The following correspondence offers a clear look at the important issues driving ASPB's efforts to support quality plant science education outreach. Please note: Minor edits have been made to improve readability.

Colleagues:

I share these communications from John Fischer, an insightful physics and chemistry teacher from Ashwaubenon High School in Wisconsin. John spent quite some time observing what was taking place in the ASPB booth at the National Science Teachers Association (NSTA) Annual Convention, March 25–29, Boston. As ASPB moves forward in our continuing commitment to promote a deeper public understanding of the centrality and importance of plants and science to the welfare and future of all, I think we would agree that teachers such as John Fischer are the sort we must incorporate into our mix and support in every way possible.

Paul Williams

phwillia@wisc.edu

The following e-mail exchange took place between John Fischer and Paul Williams:

Dear Paul,

I enjoyed watching you try to battle upstream against the system concerning inquiry in science. I've heard you are the "god" of inquiry. Now I understand. After watching teacher after teacher answering your question with things like, "Well, I'd have to look it up in a book," it truly struck me how bad we've become as teachers.

As I told you at the ASPB booth, most activities with living things have been ridden out of our biology curriculum. My peers simply tell me "you don't understand biology" when I make suggestions to them. I am beginning to think perhaps I am the only one who *does* understand biology. You don't need a degree. You need interest.



Paul Williams shares the message, "Ask, and ye shall be conducting inquiry-based learning!"

Recently, our department at Ashwaubenon High School has had to analyze our budget for ways to cut costs. During that process, I suggested we try to culture the *Daphnia* we use rather than keep ordering it fresh every time we need it. It didn't seem to be too difficult a task. However, nobody had ever cultured anything (nor did they want to learn), so I volunteered. After some failures trying to follow suggested formulas, I experimented and found a means of culturing them that really is quite easy. How did I do it? By trying.

Last year we cultured over a dozen species at school, and we continue to add to the list. Who is leading the charge? The chemistry/physics guy whose last biology course was in 1973; however, the one thing working for me is that I know I don't know too much about what I am doing, so I am learning on the job. The biology folks just admit that they don't know....

As I look at all of the clever things you have done, from Fast Plants to bottle biology and beyond, the vision of what inquiry is has

become crystal clear. Don't answer a question that someone can easily figure out by trying. Does light affect how a fast plant grows? Figure it out, only figure it out scientifically. Does the plant grow or bend toward the light? Is it attracted to blue light or green light? Where does it get its nitrogen? Those were all questions that could be answered by experiment rather than by looking them up in a book.

As I once again take on the bio folks with regard to plants in the curriculum, I will take your approach. I am going to set up a half-dozen Fast Plant activities to present at our science staff meeting. I will ask the questions, ask for proof of their answers, and

hopefully open up their eyes a bit as to how we can invigorate our program. By showing them how simply we can offer students a multitude of learning opportunities, at low cost and expense (the shot glasses blew me away—I've paid \$6 to \$10 for comparable containers . . .), I hope to initiate some lasting changes. Not only can every kid grow their own garden; every kid can design what they want to find and do, and better yet, they can even do it at home, maybe even cleverly involving their parents or siblings. . . . You've opened my eyes. Thanks a bunch!!

JF

Hello, John:

How kind it was of you to share with me your thoughts after observing the little semi-circle of teachers [photo above] on the carpet around me in the American Society of Plant Biologists' booth at the recent NSTA annual meeting in Boston. It was particularly nice to meet you, if only briefly to say "hello," and most gratifying to learn that you, together with others at that meeting, recognize that

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Inquiring Minds
continued from page 33

there are critically important alternatives to the way we are approaching how to teach biology. What you had to say, I think, has great relevance to how the teaching of biology should be viewed, in that yours is the perspective from a teacher of physics and chemistry. Yes, biology is chemistry, physics, and math all equipping the curious mind.

To aid you in your improvement efforts, check out "Paul's Sandbox" on the Fast Plants website at www.fastplants.org, and look for lots of inexpensive tools for inquiry that kids and teachers can play with as they learn. Also, check out the new Fast Plants Network on the same site. It was established during the NSTA meeting, and perhaps you and your colleagues will want to join it.

Thanks for sharing your thoughts with me. I would like your permission to pass along your insights to some key people in the educational network. Your message must be shared.

I hope that your meeting with your teacher colleagues is productive, and please keep in touch.

PW

Hi, Paul,

Please feel free to share anything and any thoughts I share. I have already shared your thought about how many vendors at NSTA were actually showing live things. Interestingly enough, I was at a physics sharing session last night in Steven's Point, a gathering of about 25 to 30 physics teachers from the middle of Wisconsin who get together four times a year to share ideas. One of the topics that came up was from a couple of technical college teachers who were complaining about using simulators for learning electricity. They felt that though the simulator adequately conveyed a lot of the content of hooking up real circuits, when the students were asked to work with real circuits, they showed a severe lack of ability to proceed. The common

thought was that simulators had a place in education, but they couldn't replace working with the real wiring. To me, that is analogous to talking about genetics and crosses on paper without actually growing the plants and seeing living results, or growing plants on a computer instead of in a pot. You can get part of the point, but if you try to use that knowledge without practicing with the real thing, you have this huge empty void of what growing is all about and can form many misconceptions when you actually get around to planting (like the students who put 50 fertilizer pellets in the pot to make it grow better).

JF

Comments regarding this exchange can be sent to katie@aspb.org.



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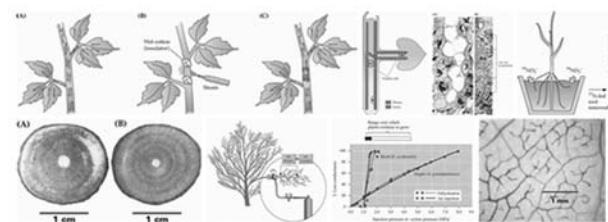
Further information about the University and the general terms of service for appointments is available at <http://www.cuhk.edu.hk/personnel>. The terms mentioned herein are for reference only and are subject to revision by the University.

Application Procedure

Please send full resume, copies of academic credentials, a publication list and/or abstracts of selected published papers, together with names, addresses and fax numbers/e-mail addresses of three referees to whom the applicants' consent has been given for their providing references (unless otherwise specified), to the Personnel Office, The Chinese University of Hong Kong, Shatin, N.T., Hong Kong (Fax: (852) 2603 6852). The Personal Information Collection Statement will be provided upon request. Please quote the reference number and mark 'Application - Confidential' on cover.

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