ASPB News

THE NEWSLETTER OF THE AMERICAN SOCIETY OF PLANT BIOLOGISTS

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President's Letter

Plant Biologists and the Development of Renewable Energy Sources

Mike Thomashow

These are exciting times for plant biology. With the development of "genomic sciences" and sophisticated new instrumentation, we can now probe the life of plants at levels that just a few years ago seemed, at best, to be wishful thinking. Indeed, given the distance that we have come since the plant sciences entered the modern "molecular genetic era," ushered in with the advent of plant transformation systems during the 1980s, the goal of understanding plant processes at a "systems" level would not appear to be just a trendy pipedream, but a real, attainable goal within the not-too-distant future.

How will we use these powerful new approaches and the insights that we gain about basic plant biology? The answer, of course, is that they will be used in many ways and have many applications, ranging from the nutritional enhancement of food products to the production of feedstocks for the chemical and pharmaceutical industries. One area that is particularly exciting is the development of renewable energy sources.

We are all well aware of the geopolitical challenges that are posed by our current dependence on nonrenewable sources of energy. In addition, we are well aware of the negative impacts that using many of these energy sources can have on the environment, such as emissions of greenhouse gasses attendant to the use of petroleum-based transportation fuels. When pondering these issues, we may find ourselves yearning for the development of clean, renewable energy sources. The thought occurs that it would be wonderful if we could replace petroleum-based transportation fuels with more environmentally friendly "biofuels" produced from renewable "energy crops." But then the doubt arises whether this is even within the realm of possibility. Could the United States, for instance, grow and harvest enough "biomass" on an annual basis to produce enough ethanol and biodiesel to significantly decrease our dependence on petroleum-based transportation fuels without jeopardizing the production of food to feed the nation and to meet export demands?

This general issue was recently addressed in a joint study by the U.S. Department of Energy and the U.S. Department of Agriculture. The results were published in a report titled "Biomass as Feedstock for a Bioenergy and Bioproducts Industry: The Technical Feasibility of a Billion-Ton Annual Supply" (http://www.eere.energy.gov/biomass/pdfs/final_billionton_vision_report2.pdf). In particular, the committee asked whether the land resources of the United States would be capable of producing a sustainable supply of biomass sufficient to displace 30 percent or more of our current petroleum consumption, a goal that would require the production of approximately 1 billion dry tons of biomass feedstock per year. In short, the committee concluded that the answer to this question is "yes"; that annually,

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

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Deadline for May/June 2006
ASPB News: April 5, 2006

The *ASPB News* is now being delivered to all Society members in both print and online formats. Please feel free to circulate the print version among your colleagues.

ASPB Officers & Staff

ASPB News

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ASPB Awards to Be Presented in 2006

In 2006, ASPB will be awarding nine awards to accomplished plant biologists across all areas of the discipline and at all stages of their careers. These awards, which recognize the major scientific contributions of the recipients, will be presented during the Plant Biology 2006 annual meeting August 5–9 in Boston, Massachusetts. Most of the awards are monetary, and winners also will be reimbursed up to $1,000 for travel expenses to Boston.

Brief descriptions of the 2006 awards appear below. If you know of an individual who you think would be a worthy recipient of any of these awards, please consider making a nomination. For instructions on the nomination process and for a complete description of each award, please visit our website at http://www.aspb.org/awards/nominate.cfm. A hardcopy of the "Call for 2006 Nominations for ASPB Awards" was mailed to all ASPB members in early January. But please hurry—nominations close February 21, 2006.

ASPB is very excited to announce a new award this year, the Lawrence Bogorad Award for Excellence in Plant Biology Research. This is a monetary award that honors Dr. Bogorad's many contributions to plant biology. It will be awarded biennially. (See article on page 5)

ASPB is also delighted to announce the ASPB–Pioneer Hi-Bred International Graduate Student Prize. With support from Pioneer (http://www.pioneer.com), ASPB will be awarding three $5,000 prizes each year from 2006 through 2009 to students whose work demonstrates the application of plant biology to research topics related to commodity crops.

ASPB–Pioneer Hi-Bred International Graduate Student Prize
The ASPB–Pioneer Hi-Bred International Graduate Student Prize is awarded to students whose work demonstrates the application of plant biology to research topics related to commodity crops.

Charles F. Kettering Award
The Charles F. Kettering Award was established by an endowment from the Kettering Foundation in 1962 to recognize excellence in the field of photosynthesis.

Charles Albert Shull Award
Created in 1971 to honor the Society's founding father and the first editor-in-chief of *Plant Physiology,* the Charles Albert Shull Award is designed to recognize young researchers.

Charles Reid Barnes Life Membership Award
The Charles Reid Barnes Life Membership Award is made annually to a plant biologist who has produced an excellent body of work during the course of his or her career.

Corresponding Membership
The Corresponding Membership award, initially given in 1932, provides life membership and subscription to the Society's journals to distinguished plant biologists from outside the United States.

Dennis R. Hoagland Award
A triennial monetary award established by the Society in 1985 with funds provided by the Monsanto Agricultural Products Company, the Dennis R. Hoagland Award honors Dr. Hoagland, the first recipient of the Stephen Hales Prize.

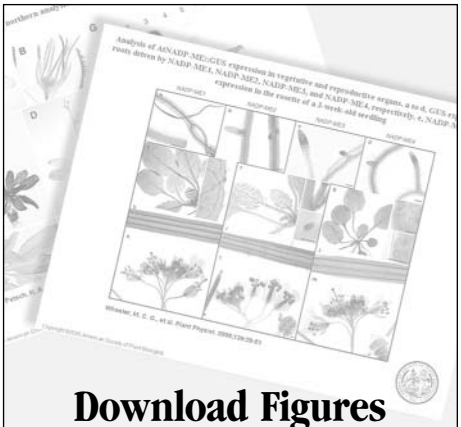
Early Career Award
The Early Career Award is a monetary award made annually for exceptionally creative, independent contributions by a member of the Society who is not more than five years post-PhD on January 1 of the year of the presentation.

Lawrence Bogorad Award for Excellence in Plant Biology Research
The ASPB Lawrence Bogorad Award for Excellence in Plant Biology Research is made biennially to a plant scientist whose work "both illuminates the present and suggests paths to enlighten the future."

Stephen Hales Prize
This award honors the Reverend Stephen Hales for his pioneering work in plant biology published in his 1727 book *Vegetable Staticks.* Established in 1927 for a scientist, whether or not a member of the Society, who has served the science of plant biology in some noteworthy manner, the award is made annually.

Please support the most notable contributions of your fellow plant biologists by making a nomination. The process is fast and easy. Don't delay; send in your nominations today! Remember the deadline is **February 21, 2006.**

For information on ASPB's nominating procedures, go to http://www.aspb.org/awards/nominate.cfm.



Download Figures from *Plant Physiology* and *The Plant Cell* as PowerPoint Slides!

The Plant Cell (www.plantcell.org) and *Plant Physiology* (www.plantphysiol.org), ASPB's premier plant science journals, now allow you to save any figure as a PowerPoint slide! This free feature is available for all articles published since 1998.

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We hope that you enjoy this new feature and that it enhances the teaching of plant biology in your classroom.

Lawrence Bogorad Award for Excellence in Plant Biology Research

ASPB is pleased to announce a new award, the Lawrence Bogorad Award for Excellence in Plant Biology Research, and to define a mechanism for endowing new awards.

The Lawrence Bogorad Award for Excellence in Plant Biology Research was approved by the Society's Executive Committee in 2004 to honor Dr. Bogorad's many contributions to plant biology, including his influential efforts to bring the techniques of molecular biology to bear on problems in plant biology; his groundbreaking research on chloroplast genetics, biogenesis, structure, and function; and his inspired teaching and mentoring. This is a monetary award made biennially to a plant scientist whose work "both illuminates the present and suggests paths to enlighten the future." The inaugural Bogorad Award will be given at the 2006 Plant Biology meeting in Boston, August 5–9. Information about nominating a candidate for this award is posted on the ASPB website at http:// www.aspb.org/awards/nominate.cfm, and nominations will be accepted until February 21, 2006.

Lawrence Bogorad
1921–2003

When Professor Bogorad passed away in 2003, many of his former students, postdocs, and colleagues contacted ASPB to ask if the Society could organize a special symposium to recognize his many contributions to plant science. As a standard policy, ASPB does not organize such activities simply because it is an untenable situation for the leadership to decide who deserves such recognition. However, the Executive Committee had just finished a review of the Society's awards and determined that it should increase the number of awards recognizing outstanding achievements by our members. Therefore, as described in the adjacent sidebar, ASPB established a mechanism for endowing new awards, and Dr. Bogorad's former colleagues raised the necessary resources to fund this one.

Daniel R. Bush
dbush@lamar.colostate.edu

How to Endow an ASPB Award

First, the interested party must send a proposal to the ASPB Executive Committee stating the justification, nomination criteria, and desired frequency of the award they would like to endow for approval before initiating any kind of fundraising. If approved, the interested party is solely responsible for raising the funds to support the new award; ASPB cannot be directly involved. ASPB will not introduce a new award unless sufficient funds are raised to support it in perpetuity. For a biennial award, at least $50,000 is required in the endowment and for an annual award, $100,000. The proceeds from these funds will be used to fully support the award, including plaques, monetary recognition for the awardee, and travel funds and lodging to attend the Plant Biology meeting.

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continued from page 1

U.S. forest and agricultural lands have the potential to produce, respectively, more than 360 million and 990 million dry tons of biomass feedstock. Reaching these levels of biomass production, however, will require a number of developments, including changes in production practices and significant increases in crop yields. For example, cropland would likely be managed with no-till methods, and a 50 percent increase in the yields of corn, wheat, and other small grain crops would be required.

Using biomass feedstocks to provide significant levels of renewable energy is an exciting, inspiring vision for the future of America and the greater world community. President John F. Kennedy's goal of putting a human being on the moon by the end of the 1960s served as a unifying theme that helped nucleate efforts that led to spectacular advances in science and technology and, equally importantly, helped attract young people to these areas of study. Setting national and international goals for producing renewable, environmentally friendly energy sources also has, I think, the potential to stimulate important advances in science and technology and to attract young people to these areas of study. Specifically in regard to plant scientists, such goals also provide a framework for integrating much of plant biology research. Understanding plant growth and development at a systems level feeds into increasing biomass, as does understanding basic mechanisms of abiotic and biotic stress tolerance. Understanding how cell walls are synthesized and their composition determined is not only fundamental to our knowledge of basic plant biology, but is also a central issue in biomass production and conversion. The same can be said of understanding how plants synthesize and regulate the production of lipids and oils as well as many other plant constituents and processes.

Plant scientists have a fundamental role to play in developing clean, renewable energy sources. It will be extremely interesting to see how this role develops over the coming years. Indeed, these are exciting times for plant biology!

Michael F. Thomashow
thomash6@msu.edu

Attention: International Members Attending Plant Biology 2006

Dear ASPB International Member:

I'd like to take a moment of your time to let you know that at ASPB's request, the U.S. Department of State has added ASPB's 2006 annual meeting, Plant Biology 2006, to its register of approved international scientific meetings. This means that information regarding PB06 has been sent to U.S. consular offices worldwide, which should help expedite visa processing for those individuals planning to attend the meeting. Even so, it is still important for you to begin your visa application process 4–5 months in advance of your planned travel date—i.e., no later than March—if you intend to join us for PB06 in Boston, August 5–9.

With registration and abstract submission for PB06 opening in January 2006, you have extra time in which to obtain a letter of invitation from ASPB and take advantage of early-bird pricing at http://www.aspb.org/meetings/pb-2006. Many countries require a letter from ASPB as part of the visa application. To obtain a letter, just visit http://www.aspb.org/meetings/letterform.cfm. To find out more about abstract submission, go to http://www.plantbio.org/meetings/pb-2006/abstracts/.

To obtain the latest information on visa-processing times at your location, you may wish to visit this new feature on the U.S. Department of State's website: http://travel.his.com/visa/tempvisitors_wait.php. Scroll to the bottom of the page, select your city from the drop-down menu, and hit the "get wait times" button. The system will instantly tell you the current wait time for visa processing at that location. Please note, though, that this wait time does not include additional time that you need to allow for setting up an interview with a consular official or completing the application process.

You can find additional tips from ASPB's Visa Information web pages (http://www.aspb.org/meetings/visainfo.cfm). Check these pages regularly for updated information and advice.

ASPB has been working hard to make it easier for plant scientists from outside the United States to attend our meetings. I hope you will consider responding to our efforts by making your own plans to attend PB06 in Boston, and I look forward to meeting each of you there.

Best regards,

Crispin Taylor
Executive Director

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***President's Symposium:* Plant Responses to the Environment**
Michael F. Thomashow, Michigan State University

***CSPP President's Symposium:* Tree Physiology and Genomics**
Robert D. Guy, University of British Columbia

For more information contact the
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e-mail: info@aspb.org
http://www.aspb.org/meetings/pb-2006

Boston
Massachusetts

Hynes Convention Center
August 5–9, 2006

Photo Credit: Greater Boston Convention & Visitors Bureau

Welcome, Newest Members!

ASPB is pleased to honor the following individuals as first-time members of ASPB in 2005. We hope that you continue to benefit from your membership for many years. Contact us at info@aspb.org if you have any questions.

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Amit Nigam
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Chia-chune Wu
Gang Wu
Henry Wu
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Qiguang Xie
Dongmei Xu
Qi Xu
Weihui Xu
Xianfeng Xu
Yang Xu
Chien-chih Yang
Heping Yang
Jianjun Yang
Manli Yang
Ray Y.K. Yang
Seung Hwan Yang
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Ruby A. Ynalvez
Emlah M. Yosimbom
BuHyun Youn
Nevin Dale Young
Christine K.Y. Yu
YueYue Yu
Ling Yuan
Dae-Jin Yun
Kil-Young Yun
Michelle J. Zamarron
Huiming Zhang
Wenyan Zhang
Xiaoli Zhang
Hongwei Zhao
Xuechun Zhao
Zhi-Liang Zheng
Xuehua Zhong
Judith Zucati
Jianru Zuo

Getting Out with Outreach

It is 12:40 p.m. on Friday, and I have just inhaled a peanut butter sandwich (the only food available in our house by the end of the week). I have 135 genetics exams that need to be graded, my graduate student just walked into my office and reported that her DNA sequences only BLAST to small regions of human DNA, and *The Plant Cell* editor has just sent an e-mail message to remind me that the review I promised in 10 days is now overdue. What is a professor to do? Well, for seven weeks of the year, I run away and teach science to third-graders.

When I arrive at Longfellow Elementary School in Long Beach, California, I grab seven bags from my car, each containing tubes of ammonia, tubes of vinegar, and plastic cups. At the entrance of the school are six excited college students. They have downloaded the experimental design and mini-lecture guide from my web page and have a few questions about how detailed they should be in their descriptions of acids and bases. I remind them to keep it simple, to stay away from concepts like electron orbitals. I let the students know that the red cabbage juice ice cubes are in the school freezer, and then we are off.

We try to come to classrooms during recess so we can set up without too many kids around, but the third-graders have figured this out and when I reach my classroom nearly all of them have decided to forgo recess. "The Science Lady is here!" I explain what they will be doing in science class as I try to get everything set up. The classroom teacher is there, and ready to help if needed, although today he seems to be hovering over a large pile of papers.

Recess ends, and I begin my "lecture" on acids and bases, first asking if anyone has ever heard of these terms. They certainly have, mostly from cartoons, and they are really afraid of these chemicals… until they learn that their stomachs are filled with a strong acid. I continue to explain about hydroxyl ions and protons, but some of the students are losing interest and now I know it is time for the hands-on portion. I grab the red cabbage juice ice cubes and let the students know that the pigment is anthocyanin. They repeat the big word after me and ask if it is poisonous. The students then divide into groups of four and pour their acid, basic, and neutral solutions into cups. They drop in the red cabbage juice ice cubes, and WOW, the acid turns blue, the base turns green, and the neutral stays purple. Now the students set up a titration, and then there is time for free play. Suddenly, it's 2:15 p.m. and school is over. The parents are waiting outside while a mob of kids is still asking questions about acids and bases and why the final color was green when everything was mixed together (ammonia is more basic than vinegar is acidic), and do I need any more help cleaning up, and do I have any kids, and am I a doctor like their pediatrician. …

I feel very lucky that for seven weeks of the year, I can help the community and have so much fun. The college students who teach Third Grade Hands-On Science (TGHOS) as part of a one-unit science education class feel the same way. Many of them are initially motivated because community service is important for medical school applications, but they all comment on how incredibly fun it is to teach science to third-graders and how they look forward to each Friday. In addition, many of the students are from our science education department, and fostering the use of a hands-on curriculum for future elementary school children is a critical goal of the program.

I began TGHOS at a local public elementary school two years ago. My children were in school, and I was appalled by the lack of experimental science in the curriculum. Science needs to be fun and engaging so children develop a passion for understanding the natural world around them. The general population has little understanding of basic science and often feels threatened by scientific theories such as evolution. *National Geographic* (November 2004) reported that 44 percent of the population agrees with the following statement "God created human beings pretty much in their present form at one time within the last 10,000 years or so." This question was asked by Gallup polls five times, in 1982, 1993, 1997, 1999, and 2001, and each time the results were similar. The rejection of genetically modified crops also stems from a lack of understanding. A successful democracy must have an educated electorate, and although I realize I cannot change the world with my limited time, it is still possible to instill an interest in science in some children.

The TGHOS program reaches 140–160 third-grade students each year and is taught mostly by college students, although I usually teach as well. I have developed five experiments; these include isolation of DNA from onion cells, freeze-point depression with Kool-Aid ice cubes, pinhole cameras, and elasticity measurements in addition to the acid/base experiment. These labs are explained in detail on my website (http://www.csulb.edu/~bruss) for those who would like to start a similar program at a local school in their area. The last week of the program is set aside for the college students to design their own experiments. The quality of these experiments varies, but it is critical for future teachers to feel confident to try out their new ideas and to find out how they need to be modified for future use.

Of course, none of us has time for outreach. We are overburdened in every way, leaving little time for our families or outside interests, so a simple outreach program over a limited period of time is the key to success. In addition, my presence onsite has kept the quality of TGHOS consistently high.

There are many benefits to outreach. The obvious one is that NSF takes criterion II seriously, and thus a meaningful outreach program could increase chances for funding. In addition, if you are concerned about the future of our country, an outreach program contributes to an educated electorate. But the biggest benefit simply comes from the enjoyment of outreach; it is fun to interact with enthusiastic children!

Judy Brusslan, professor
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Membership Corner

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

Name: Ning Jiang
Title: Assistant Professor
Place of Work: Michigan State University
Research Area: Plant Transposable Elements
Member since: 2002

1. **Why has being a member of ASPB been important?**
   This is something psychological. To me, ASPB is the home for plant biologists, and I need a home.

2. **Was someone instrumental in getting you to join ASPB?**
   Not really. I was an international student, and I was struggling to survive for the first few years, mainly because of the language problem and culture shock. Within that period I didn't know how long I was going to stay in the United States, so I didn't bother to join ASPB. By 2002 I was about to get my PhD degree, and I decided to stay in the States for my postdoctoral study. Then I thought I should become a member of ASPB, and I did. I believe many international students have a similar experience, and I hope that professors put more effort into understanding their international students to help them adapt.

3. **What would you tell colleagues to encourage them to join?**
   I'd tell them that this is the best way to interact with other scientists in all plant areas, master new knowledge about plants, and enjoy the practical benefits such as discounts for meetings and products.

4. **Have you enhanced your career using ASPB job postings or through networking at an ASPB function?**
   No, I used the Careers website associated with the journal *Science,* which is a very comprehensive website for job posting.

5. **Have you had any success at finding candidates as a result of a job posting at the Plant Biology meeting or on our online Job Bank?**
   No, I have not needed to use these resources.

6. **Do you read print journals? If so, where do you usually read them?**
   Yes, I read *Plant Physiology, The Plant Cell, Science,* and *Nature Genetics Review*. I read them when I am at home or when I am waiting for a doctor's appointment.

7. **What do you think is the next "big thing" in plant biology?**
   To me, breakthroughs in science are always accompanied by advances in technology. I think the next big thing in plant biology will be the artificial chromosome that can be the stable component of the genome. In this case, one can deliver as many genes as he or she would like to a known genome or even make an artificial plant.

8. **What person, living or deceased, do you most admire?**
   When I was a kid, I admired Olympic champions. After I started my undergraduate study, I began to admire famous scientists. Right now the person I admire most is Barbara McClintock, who first identified transposable elements. What touched me most is not her achievement in science. Instead, it is her confidence to continue her study when few people could understand her. Fortunately, she lived long enough to win the Nobel Prize and the respect of the public.

9. **What are you reading these days?**
   I am reading *I Wish I'd Made You Angry Earlier* by Max Perutz, which is a collection of essays on science and scientists.

10. **What are your hobbies?**
    I like outdoor activities like jogging, hiking, or simply enjoying the sun. In addition, I like knitting; I used to make sweaters for my family. I can't afford to do that anymore because my job and my child keep me pretty busy.

11. **What is your most treasured possession?**
    I prefer not to tell.

12. **What do you still have left to learn?**
    This is an interesting question because it makes me feel that I must have already learned a lot. However, that is not necessarily true. As a scientist, I think biology is much more knowledge-based than any other science, so one might have sufficient knowledge for a certain project, but he will never have too much knowledge for the big picture. Actually, the more we learn, the more unknowns appear, and the more is left to learn or to discover. In the near future, I would like to learn more about evolutionary biology and biochemistry.

Membership Corner

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

Name: David R. Gang
Title: Assistant Professor
Place of Work: University of Arizona
Research Area: Plant Specialized Metabolism
Member since: 1997

1. **Why has being a member of ASPB been important?**
When I was a graduate student, I went to the (then) ASPP meeting in Vancouver, B.C. It was incredible. Not only was the meeting in a great city, but I found that I hardly spent time going around Vancouver for wanting to soak in as much as I could from the great meeting. Here was a group of more than a thousand scientists who were also interested in plants. And the things that they studied! I learned about QTLs, floral patterning, apomixis, cell wall structure, alkaloid biosynthesis, salt stress tolerance, leaf development, and plant–insect interactions. It really opened my eyes to the breadth of the field and to the possibilities for the future of plant biology research. It lit a fire under me, and my interest in learning all that I could about plant biology took off.

2. **Was someone instrumental in getting you to join ASPB?**
I joined when I went to the meeting in Vancouver. Since my PhD adviser wanted me to go, I guess you could say that he was instrumental in getting me to join.

3. **What would you tell colleagues to encourage them to join?**
If you are interested in a broad-based society that includes all aspects of plant biology, this is the place for you.

4. **Have you enhanced your career using ASPB job postings or through networking at an ASPB function?**
When I was a postdoc looking for an academic position, I found two of the universities at which I interviewed through the ASPB job postings.

5. **Have you had any success at finding candidates as a result of a job posting at the Plant Biology meeting or on our online Job Bank?**
Yes, I have. I have hired two postdocs so far who I found in this manner. I will definitely use the online Job Bank again.

6. **Do you read print journals? If so, where do you usually read them?**
Yes, at home, in my office, on the plane when traveling, in the library, although the latter doesn't happen now as often as I wish it did.

7. **What do you think is the next "big thing" in plant biology?**
That is always such a difficult question. People's responses are always so biased by their own interests, and I'm no exception. First of all, what we need is a plant metabolome "sequencing" project for plants like Arabidopsis, rice, maize, wheat, tomato, and Medicago (and ginger in my opinion). Several groups are now working in this area, but we need the same large-scale, coordinated effort that has been brought to bear on the genome sequencing projects. This will open the same number of doors that the genome sequencing projects have opened. NIH has begun this for the human metabolome. The plant community should not be left behind, especially because the plant metabolome is much richer than the human metabolome. Second, the field of plant metabolic engineering is ready to explode. We finally have most of the tools needed to drive this area forward. The rest of the tools should mature or be developed within the next few years. These tools include not only biology-based technologies, but also theoretical, mathematical, and visualization tools needed to describe metabolic systems accurately.

8. **What person, living or deceased, do you most admire?**
Scientists: Einstein and Darwin. Politician (yes, it's possible to admire these guys too, at least the ones that lived a long time ago): George Washington… who among our current politicians would give up the chance to be king? (Most of the ones we have now act like they are king already.) Athlete: Bob Beamon…what a jump! Writers: Goethe, Shakespeare, and Peter Handke (look between the lines). Philosophers: Kierkegaard and Heidegger, among others. Religious leaders: Jesus Christ and Joseph Smith.

9. **What are you reading these days?**
The mass spectrometry literature. *Understanding Control of Metabolism* (again) by David Fell. *The Mismeasure of Man* by Gould. Factor analysis literature. "Nero Wolf" books and short stories by Rex Stout (highly recommended).

10. **What are your hobbies?**
Bicycle riding, camping, hiking, woodworking (cabinets and furniture), playing board and computer games with my children, reading.

11. **What is your most treasured possession?**
My family.

12. **What do you still have left to learn?**
How to derive the equations of quantum mechanics (that one is still on the back burner). How to rebuild a Chevy Suburban transmission. What keeps bumble bees up in the air. How to write the perfect novel. How to make designer plants. What isn't left to learn?

The Bioethics Imperative XXIII

An In-depth Look at Effort Certifications: The Good, the Bad, and the Ugly

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

My email traffic last time with James T. Kroll, head of Administrative Investigations of the Office of the Inspector General (OIG) at NSF, was especially intense during our discussion of Case #3 in TBI XXII (http://www.aspb.org/newsletter/novdec05/11mandoli22.cfm), the one involving effort certifications. From our email dialogue, I realized that there were many aspects of effort certifications that I did not understand or had never thought about. Kroll and I decided to make the case in TBI XXII black and white and then explore the nuances in this subsequent column. Because it worked so well in stimulating our discussion (and my learning!) last time, we will again make use of the question-and-response format that we devised in the last column.

Effort certification is a requirement of the federal government. The Office of Management and Budget's (OMB's) Circular A-21, "Cost Principles for Educational Institutions," defines cost principles for colleges and universities. A-21 identifies which costs are allowable and allocable to federal grants. A-21 also provides guidance regarding acceptable methods of charging salaries and wages to federally sponsored projects. For example, A-21 requires a payroll distribution system that directly charges salaries to appropriate projects and requires that institutions have a system to determine how individuals actually expend effort related to the federally sponsored project. Each university has its own time-and-effort system, so there is no universal "right way" to fill out an effort certification.

Most time-and-effort allegations of wrongdoing come to the OIG either because an audit has identified significant problems with the time-and-effort reporting documentation or from individuals who may have worked in a lab and have firsthand knowledge that time-and-effort reports are being falsified.

Now that we understand these basics, let's explore how effort certifications are judged if falsified. Each civil or criminal statutory law is based upon written elements, which all must be met for the act in question to constitute a civil or criminal violation. Generally, one element listed is a description of the act or acts that constitute the particular civil or criminal violation. Another element of many civil and criminal statutes is intent, although some crimes are actually strict liability crimes where no intent is even necessary. The prosecution has to prove every element of the statute charged, including the requisite level of intent, or it cannot prevail. The burden of proof is higher for a criminal charge than for a civil matter, the former requiring evidence beyond a reasonable doubt and the latter requiring only a preponderance of evidence.

Levels of intent, from least to most severe, are "reckless disregard," "knowing," "and "willful." The layman's definitions of these are

- reckless disregard: the person did not know it was wrong but should have known based on their education, experience, etc.
- knowing: the person knew that is was wrong and did it anyway
- willful: the person knew it was wrong and did it with direct purpose to deceive.

For example, a falsified time-and-effort claim or **false claim** can be charged **criminally,** under law 18 U.S.C. 287. The elements of this crime are that the charged party (1) knowingly (2) makes or presents (3) to the United States (4) a claim against the United States (5) that is false, ficticious, or fraudulent. This must be proven beyond a reasonable doubt, but there is no requirement that the accused have actual specific intent to defraud the government or violate the law; the accused must only have knowingly committed the act in question.

Alternatively, this same violation can be charged **civilly** under 31 U.S.C. 3729. The elements here are that the individual (1) knowingly presents, or causes to be presented (2) a false or fraudulent claim for payment or approval. Again, there is no need for the government to prove an actual intent to defraud the government or break the law; only general intent to do the act in question is necessary. Note that there is no requirement that the government actually pay the amount requested by the false or fraudulent claim, and the burden of proof is only preponderance of evidence.

In italics are the opinions of Jim Kroll concerning the likely federal *and* institutional consequences for each of these cases. Keep in mind that Kroll is not making specific comments about what the OIG actions would be in each individual case; rather he is just giving us insights into the potential issues.

Case 1: Assistant professor Ivy Brains needs to obtain preliminary data for her next proposal. She is not yet funded for this project, but she assigns a technician in her lab who is funded 100 percent from another grant to garner those data. She signs off on the effort certifications with a clear conscience. What actions would the institution and the OIG take in this case? Would the outcome be the same if the principal investigator (PI)was a full professor? *If the preliminary data were also related to the existing research grant, then the PI might be able to charge the technician's time against the existing grant. If not, then charging the time against the existing grant would be problematic.*

Case 2: While Professor I. B. Blanched was on a year-long sabbatical in South America, he signed off on all his effort certifications so that his personnel would continue to be paid regularly. Meanwhile, the technician back in the United States had been working on another project to help a postdoctoral fellow in the lab who had run into trouble with her project. When Professor Blanched returns from his year away, he realizes that many of the effort certifications were wrong.

continued on next page

continued from page 13

How should the PI have set up the routine signing of effort certifications in his absence? What should he do to correct the errors upon his return? *The PI should have arranged for some alternate individual to approve the time-and-effort reports. He should immediately work with the appropriate individuals at the university to correct the errors and have the time-and-effort assigned against the appropriate grants. I would be very concerned about any department that allowed these certifications to go forward knowing that the certifying official was on a year-long sabbatical.*

Case 3: Dr. Soe Anxious has trouble sleeping after signing off on a few effort certifications for himself. Knowing they were wrong, he wants to correct the error but is afraid of reprisals from the university and from the federal government. What should he do? *The PI should immediately work with the appropriate university personnel to correct the falsification regardless of the potential repercussions. Self-disclosure about falsifications can be considered a potentially mitigating factor if the government decided to prosecute the matter.*

Case 4: Each year, Professor Holly Day signs off on her own summer effort certifications in advance while she is really on vacation. She has a nine-month appointment, but she needs the income for all 12 months to meet the tuition for her college-age children. She has her long-time technician submit the effort certifications at the correct times while she is away, telling him she is working remotely while on the beach. Dr. Day knows that the effort certifications are wrong but figures that because she won the grant, it is all right for her to spend the money any way she wishes. *This is probably the most clear-cut case of fraud within the seven cases presented here. Clearly the PI is knowingly submitting a false claim against the government and is at risk for prosecution.*

Case 5: Dr. Trevor "Tre" Key Dick asks one of his technicians, paid 100 percent on Grant A, to work on Grant B for the month of February. He does this by asking for an advance from his university and justifies it in his own mind because the needed cell lines are not yet available and because he has no other funds to pay the technician. In April of the same year, funds from Grant B first become available from the federal agency. He switches 100 percent effort of the same technician to Grant B at that time. When the cell lines for the first grant are ready in June, he switches the effort of the technician back to Grant A for one month in order to make up the time spent on Grant B in February. Is it a falsification of time-and-effort reports if the funds were used for fulfilling the aims of one grant but not in the same time period stated in the effort certification? *The old shell game, perhaps reminiscent of the character Wimpy in the old Popeye cartoon—"I'll gladly pay you Tuesday for a hamburger today." Using grant money to cover for one month while waiting for another grant to become available is not appropriate, unless of course you can show that the work is also directly related to the advancement of the grant that is being used to pay the technician's salary.*

Case 6: Pursuing an interesting lead in his research on a current grant, Dr. Feliciano "Fella" Yurnose encourages a graduate student to work on this, even though this constitutes a new, unfunded project. The student is paid 100 percent on the grant in question. In capitalizing on this new direction uncovered by his research, has the PI put himself in jeopardy of falsifying the student's effort certifications? *It is understood that research does not always follow the path that was originally proposed. As long as the research was a derivative of the original proposed research, it would seem to me that paying the student's stipend would be legitimate. However, it might be a good idea to check with the program officer at the funding agency to make sure he/she is on board with this offshoot research project.*

Case 7: A technician is working on a project that entails long incubations on a routine basis and long plant growth times between and during genetic selections. Rather than have the technician sit idle, Dr. Dee Viden-Conquer asks to use her time profitably by taking on a new project that is funded from a different grant. Dr. Viden-Conquer keeps the salary of the technician 100 percent on the first grant. Is the PI at fault for wanting to get the most from his grant funding in this manner? *The bottom line is that if the technician is splitting her time between two different funded projects, then the PI needs to assess the time expended to each grant and charge each grant proportionately.*

Next Time: Faculty effort certification in a sea of change: Unsettled issues in current compliance practices.

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We thank NSF OIG's J. T. Kroll for extensive input and Fara Damelin for her legal editing and input.

RESOURCES:
Bioethics Conversation Starters
On page 15 is a list of online resources that we hope will be useful to members of ASPB.

RESOURCES: Bioethics Conversation Starters

Taken from *Science* October 17, 2005: "From the morality of tinkering with human genes to the complexities of determining the order of authors on a paper, tough ethical questions await tomorrow's biomedical researchers. This new Web site from the Howard Hughes Medical Institute (HHMI) aims to spur future scientists to think about these issues. The content complements a free DVD [that] users can order from HHMI that features conversations with more than 30 scientists, ethicists, patients, and other commentators. Covering topics such as genetic alteration and scientific integrity, the site provides discussion questions, case studies, and reading lists."
http://www.hhmi.org/bioethics

RESOURCES: Plagiarism

Stanford University

Office of Judicial Affairs home page on plagiarism resources and definitions
http://www.stanford.edu/dept/vpsa/judicialaffairs/students/plagiarism.sources.htm

Writing Program Administrators (WPA) Best Practices Statement on Plagiarism
http://www.stanford.edu/dept/vpsa/judicialaffairs/faculty/materials.wpaplagiarism.htm

Princeton University

Academic Integrity (delivered as hardcopy to all entering students, with additional copies available)
http://www.princeton.edu/pr/pub/integrity/index.html

Spelman College

Policy Guideline on Scientific Misconduct
http://www.spelman.edu/administration/business/human_resources/handbook/pol780.html

Academic Integrity Policy
http://www.spelman.edu/academics/catalog/catalog0405/11academicintegritypolicy.htm

University of California at Berkeley

Graduate Student Instructor: Teaching & Resource Center: Detecting academic dishonesty: Plagiarism
http://gsi.berkeley.edu/resources/conduct/detecting.html

University of Michigan

Plagiarism detection services for instructors
http://www.lib.umich.edu/acadintegrity/instructors/violations/detection.htm

The UM Faculty Handbook Section 8.D.2
http://www.provost.umich.edu/faculty/handbook/8/8.D.html

Specific academic integrity policies are handled by individual departments and units.

Macalester College

Memo to Faculty on What Plagiarism Is, Prevention, and Detection in the Internet Age
http://www.macalester.edu/academicprograms/plagiarism.html

Academic Integrity—written policy
http://www.macalester.edu/hr/handbook/sec1210.html

Plagiarism prevention resources
http://www.macalester.edu/max/links.html#anchor1690524

Important Dates in 2006

February 24
Mid-Atlantic Section Meeting
University of Maryland
College Park

February 25
Executive Committee Meeting
ASPB headquarters
Rockville, Maryland

February 25–27
Southern Section Annual Meeting
Daytona Beach, Florida

February 28
Abstracts (minisymposia) deadline for Plant Biology 2006

March 24–25
Midwestern Section Annual Meeting
University of Illinois
Chicago, Illinois

April 14
Early registration cutoff for Plant Biology 2006

April 8–9
Northeastern Section Annual Meeting
Smith College
Northampton, Massachusetts

May 2
Abstract deadline for inclusion in Plant Biology 2006 program book

June15
Pre-registration cutoff for Plant Biology 2006

July 1
Housing cutoff for Plant Biology 2006

August 4 and 8
Executive Committee Meetings
Boston, Massachusetts

August 5–9
Plant Biology 2006
Boston, Massachusetts

September
(date to be determined)
Mid-Atlantic Section Crab Feast
ASPB headquarters
Rockville, Maryland

October 10–14
The Biology of Transpiration: From Guard Cells to Globe
Snowbird Mountain Resort, Utah

USDA–CSREES Plant and Pest Biology Workshop Hears Growers', Science Societies' Priorities

ASPB Coordinates Stakeholders' Workshop with USDA–CSREES Grant Support

ASPB and its Committee on Public Affairs coordinated the U.S. Department of Agriculture–Cooperative State Research Education and Extension Service (CSREES) Stakeholders' Workshop on Plant and Pest Biology Research, Education and Extension Priorities on November 16 in Alexandria, Virginia. USDA–CSREES provided grant support to ASPB to cover expenses for the conference room, catering, printing, and related expenses.

More than 20 stakeholder organizations provided presentations for the workshop. Approximately 60 people attended the workshop representing science societies, growers, USDA–CSREES, USDA–Agricultural Research Service (ARS), the National Science Foundation, and the Department of Energy.

Roger Innes represented ASPB at the stakeholders' workshop. Photo courtesy of Indiana University.

Colien Hefferan

Anna Palmisano

Colien Hefferan, CSREES administrator, opened the full-day workshop, welcoming the comments of participants and expressing appreciation for their assistance in setting priorities for CSREES research, education, and extension programs. **Anna Palmisano,** CSREES deputy administrator, Competitive Programs, explained CSREES program opportunities, moderated the workshop, and participated in a panel presentation. **Mike Fitzner,** director of plant systems, Plant and Animal Systems, joined Palmisano and **Debby Sheely,** director of integrated programs, for the panel discussion.

Stakeholder presentations were made by **Roger Innes** for ASPB; **Michael Davis** for the American Malting Barley Association; **Stella Coakley** for the American Phytopathological Society; **William Dolezal** for the American Seed Trade Association; **David Maynard** for the American Society for Horticultural Science; **Mark Westgate** for the American Society of Agronomy, Crop Science, and Soil Science Societies; **Chuck Rice** for the American Society for Microbiology; **Barbara Glenn** for the Biotechnology Industry Organization; **Dick Stuckey** for CAST (Council for Agricultural Science and Technology); **Lori Leach** for the International Wheat Genome Sequencing Consortium; **Gabriele Ludwig** for the Almond Board of California; **Darren Coppock** for the National Association of Wheat Growers; **Andrew Jordan** for the National Cotton Council; **John Keeling** for the National Potato Council; **Jeff Dahlberg** for the National Sorghum Producers; **Terry Niblack** for the Society of Nematologists; **Angela Bezon** for the United Fresh Fruit & Vegetable Association; and **David Shaw** for the Weed Science Society of America. The National Corn Growers Association participated in question-and-answer sessions, as did a number of other organizations.

Written submissions by those who weren't in attendance the day of the workshop were made by the American Peanut Council, the Society for Range Management, the USA Rice Federation, the United Soybean Board, and the American Soybean Association.

Anne Vidaver of the University of Nebraska was the luncheon speaker. Afternoon panel presentations were given by **Gail McLean, Mary Purcell-Miramontes, Ann Lichens-Park,** and **Ann Marie Thro** of USDA–CSREES; **Kay Simmons** of USDA–ARS; **Machi Dilworth** of the National Science Foundation; and **Sharlene Weatherwax** of the Department of Energy.

Liang-Shiou Lin, Ed Kaleikau, and **Gail McLean** of USDA–CSREES coordinated planning for the workshop on behalf of USDA–CSREES. ASPB Committee on Public Affairs and staff from ASPB public affairs and meetings worked with them in coordinating the workshop. They also worked together in coordinating the earlier USDA–CSREES Stakeholders' Workshop on Plant and Pest Biology in 2002. Hefferan indicated that the agency would consider stakeholders' recommendations made at the November 16, 2005, workshop in considering future aspects of its programs.

What follows are major portions of ASPB's research priorities summary developed by Roger Innes of Indiana University, his colleagues on the ASPB Committee on Public Affairs, including committee chair **Pamela Ronald,** and the Society's leadership.

Each of the five CSREES major issue areas and strategic goals benefits from research conducted by ASPB members. Basic plant research supported by USDA–CSREES, including the National Research Initiative Competitive Grants Program (NRI), provides new knowledge that leads to improved and

value-added crops. This enhances economic opportunities for America's farmers (issue 1). This in turn benefits rural economies and the quality of life in rural communities (issue 2). National Research Initiative Competitive Grants Program–funded research performed by ASPB members has also led to major advances in enhancing and protecting the safety of the nation's agriculture and food supply (issue 3). ASPB members are also studying how plants accumulate nutrients in order to develop crop plants with higher nutrient content (issue 4) and are learning how plants use water and soil nutrients (e.g., nitrogen and phosphorus) in an effort to develop crops that require less fertilizer, which would have major environmental, economic, and health benefits (issue 5).

Research leading to improved energy crops could boost economies in rural and urban areas of America while it reduces dependence on foreign oil. USDA and DOE reported in April how more than 33 percent of our nation's transportation fuels could be supplied by homegrown biofuels—compared to the current 2 percent. This would help cut the nation's trade deficit while reducing carbon emissions. The nation's September 2005 trade deficit set an ominous record of $66 billion. A frightening $24 billion of that trade deficit went to purchasing foreign oil. We applaud USDA–CSREES for its own efforts and collaborative efforts with the Department of Energy and the National Science Foundation to increase basic understanding of plants for enhanced production of biofuels. Advances in plant research that have helped farmers give Americans the world's lowest cost for food (as the share of personal income) could also lower fuel costs and stabilize energy supplies.

The majority of ASPB members perform research that addresses fundamental questions in plant biology. It is this basic research that leads to unexpected breakthroughs and new approaches to improving crop production. For example, the discovery of RNA interference arose from basic research on the control of gene expression and on virus resistance in plants, but is now revolutionizing research and applications in both plant and human biology. ASPB urges CSREES, including the NRI, to continue supporting world-leading basic plant biology research rather than shift funding to specific agricultural applications. New enhanced crops result from research on crops and on simpler model plants with shared traits, such as Arabidopsis.

Tremendous advancements in our understanding of plant genomes have been made in the past five years. These advancements have greatly accelerated our ability to identify genes controlling important agricultural traits, such as disease resistance, flowering time, and drought tolerance. These genomic resources have also greatly enhanced our abilities to use molecular breeding tools to develop superior crop varieties. Such resource development has required significant investments by both the USDA and the NSF and has been accomplished by consortia of laboratories. Although continued resource development in some crop plants is still needed, it is time to focus again on solving specific biological questions, which is best accomplished by individual laboratories rather than large consortia.

Concerns

We have recommended in the past that the USDA–NRI program increase the dollar amount given to individual research grants for both direct and indirect costs, but *not* decrease the total number of grants awarded. This requires additional funding for the NRI program. Unfortunately, the NRI budget for existing programs has not increased substantially. As a result, to accomplish an increase in award sizes, the NRI has had to fund fewer grants. This has caused funding rates to plummet. If such low funding rates are maintained, many research labs will close and universities will find it difficult to justify keeping faculty in these areas. It also will become difficult to attract new students and faculty into plant biology, just at a time when the opportunities for rapid advancement are unprecedented. A substantial increase (14 percent a year over five years) of the NRI budget would multiply the positive impact that plant biology has on human health and nutrition, environmental quality, clean energy production, and farming practices.

ASPB Open Access Option

The Open Access movement in scholarly publishing advocates that research content should be freely available to all immediately upon publication. This approach has prompted publishers to examine the feasibility of a shift from traditional subscription-based ("user pays") financial models to an "author-pays" model, in which some or all of the costs of publication are typically borne by authors.

What does our author community think about Open Access? To gauge the plant science community's interest in this new approach to publishing and to help ASPB determine the viability of "author-pays" publishing models, the Society is conducting an 18-month Open Access "experiment." Beginning with the December 2005 issues of *Plant Physiology* and *The Plant Cell*, authors of articles accepted by the journals will be given the option to pay a surcharge to make their online article free from the moment of publication to anyone with Internet access. The surcharge, which is in addition to the usual author charges, will be $1,000 (discounted to $500 if the author's institution subscribes to the journal).

For more information, go to http://www.aspb.org/publications/openaccess.cfm or contact Nancy Winchester, ASPB director of publications, at nancyw@aspb.org.

Congress Increases NSF FY2006 Appropriation Higher Than Agency Request

Plant Genome Research Boosted to $100 Million

Congress has approved and the president has signed into law (Public Law 109-103) appropriations for the National Science Foundation in the Commerce–Justice–Science FY2006 spending bill.

The law reflects agreements reached by House and Senate conferees determining spending for FY2006 for the National Science Foundation. The conference agreement included Senate language for plant genome research. This boosts plant genome research support to $100 million ($99.72 million with current overall 0.28 percent reduction), compared to $94 million in FY2005.

Senator Christopher Bond

Although no longer chair of the appropriations subcommittee with spending jurisdiction over NSF (Commerce, Justice, and Science Subcommittee), **Senator Christopher Bond** (R-MO), the Senate champion of the plant genome research program, remains an influential member of the subcommittee. Bond worked with Senate Subcommittee **Chair Richard Shelby** (R-AL), and **Ranking Democrat Barbara Mikulski** (D-MD), who led negotiations with House Subcommittee **Chair Frank Wolf** (R-VA) and **Ranking Democrat Alan Mollohan** (D-WV). Shelby, Mikulski, Wolf, and Mollohan joined Bond and their colleagues in agreeing to $100 million for plant genome research.

Not counting the overall 0.28 percent reduction, here are appropriations for NSF:

- NSF: $5.653 billion—3.3 percent above the 2005 amount and nearly 1 percent above the president's request.
- NSF Research & Related Activities: $4.387 billion—4 percent above the 2005 amount and 1.2 percent above the president's request.
- NSF Education & Human Resources: $807 million—9.5 percent above the president's request and equal to the House-passed number. The Math and Science Partnership is $4 million above the president's request.
- NSF Major Research Equipment & Facilities Construction: $193.35 million—equal to the versions passed by the House and Senate—providing full funding to all ongoing projects.
- NSF Salaries & Expenses: $250 million—12 percent above 2005, but 7 percent below the president's request and equal to the House-passed number.

Plant Feedstock Genomics Competitive Grants Research Program Initiated by DOE, USDA

The U.S. Department of Energy's Office (DOE's) of Science, Office of Biological and Environmental Research (OBER), and the U.S. Department of Agriculture, Cooperative State Research, Education, and Extension Service (CSREES), National Research Initiative (NRI) have launched a new competitive grants program for genomics-based research that will lead to the improved use of biomass and plant feedstocks for the production of fuels such as ethanol or renewable chemical feedstocks.

Specifically, applications have been requested for fundamental research on plants that will improve biomass characteristics and yield, or that will facilitate lignocellulosic degradation. Systems biology approaches to identify genetic indicators enabling plants to be efficiently bred or manipulated, or research that yields fundamental knowledge of the structure, function, and organization of plant genomes leading to improved feedstock characterization and sustainability, are also encouraged. The solicitation can be found at http://fedgrants.gov/Applicants/DOE/PAM/HQ/DE-FG02-06ER06-03/listing.html.

The solicitation noted that renewable energy from biomass has the potential to reduce or remove dependency on fossil fuels as well as reduce negative environmental impacts from emissions of greenhouse gases and toxic pollutants. Realizing this potential will require the simultaneous development of high-yielding biomass production systems and bioconversion technologies that efficiently convert biomass energy into the forms of energy usable by industry, the solicitation noted. First-year funding for the program is at $4 million.

Pre-applications were due December 15. The solicitation was forwarded by ASPB to campus contacts the week it was issued and placed on the ASPB website under Hot News and Public Affairs Research and Education Programs.

Sharlene Weatherwax of DOE and **Ed Kaleikau** and **Chavonda Jacobs-Young** of USDA–CSREES–NRI made major contributions to developing this new program. They have been supported in their program development by OBER Associate Director **Ari Patrinos** and by USDA–CSREES Administrator **Colien Hefferan** and Deputy Administrator **Anna Palmisano.** The solicitation lists Weatherwax, Kaleikau, and Jacobs-Young as contacts for further information on the program.

Congress Approves DOE Spending Request for Basic Energy Sciences

The Energy and Water Development FY2006 appropriations approved by Congress provide $1.146 billion for the Department of Energy (DOE's) Office of Basic Energy Sciences—the same as the budget request.

The appropriations include $221.8 billion for the Division of Chemical Sciences, Geosciences, and Energy Biosciences—the same as the department's budget request. Of that total, DOE plans to spend $32.5 million in FY2006 for the Energy Biosciences program as outlined in its budget request made in February.

The Office of Science, which includes Basic Energy Sciences, is funded at $3.633 billion, which represents an increase of $33 million over last year. The House approved the conference report for energy and water appropriations on November 9. Senate approval was granted on November 14 and the bill was signed into law (Public Law 109-103) by the president on November 19.

We appreciate the support of ASPB members who contacted their members of Congress in support of basic research, including basic plant and microbial research, sponsored by the DOE Office of Science.

NRI, ARS Receive Spending Increases; Formula Fund Cuts Rejected

The president has signed into law (Public Law 109-97) FY2006 appropriations legislation that includes an increase of nearly $3.5 million for the National Research Initiative Competitive Grants Program (NRI). The conferees approved $183 million for the NRI. The FY2005 appropriation was $179.5 million.

Formula funding restoration by Congress continued in the House/Senate Conference Report, which provided the basis for Public Law 109–97. For example, Hatch Act, McIntire-Stennis, 1890 Capacity Building Grants, and Animal Health and Disease all received the same funding or slightly higher funding than appropriated in FY2005.

Agricultural Research Service research and demonstration spending for FY2006 is at $1.135 billion, which is slightly above the FY2005 level and $121 million above the department's budget request.

The House adopted the conference report (HR 2744–H.Rpt. 109-255) on October 28. The Senate cleared the conference report on November 3, and President Bush signed the measure into law on November 10.

In view of the difficult budget environment this year, the appropriations approved by Congress and the president reflect strong support for the NRI, formula funds, and ARS. Support by ASPB and its members, other science societies, universities, and producers contributed to the support in Congress for key agricultural research programs.

Future ASPB Annual Meeting Sites

2006: Boston, Massachusetts

August 5–9
Hynes Convention Center

ASPB will hold its 2006 annual meeting in conjunction with the Canadian Society of Plant Physiologists, la Société Canadienne de Physiologie Végétale. Mark your calendars and look for more information soon.

Photo Credit: Greater Boston Convention & Visitors Bureau

2007: Chicago, Illinois

July 7–11
Hilton Chicago

ASPB will hold its 2007 annual meeting in conjunction with the Botanical Society of America (BSA), the American Bryological and Lichenological Society (ABLS), the American Fern Society (AFS), the American Society of Plant Taxonomists (ASPT), and the Phytochemical Society of North America (PSNA). Mark your calendars and look for more information soon.

Plant Biology 2008

to be determined

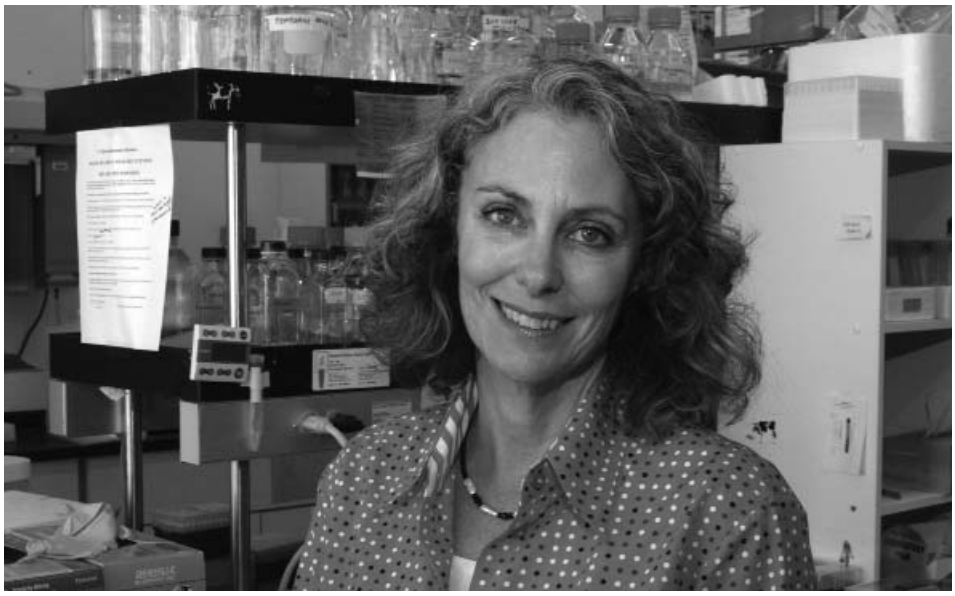
Plant Biology 2009

Honolulu, Hawaii
July 18–22

For more information go to http://www.aspb.org/meetings/.

NIH Support of Chandler's Applications of Plant Genetics Findings to Animal Systems Will Increase Understanding of Human Disease

ASPB Past President **Vicki Chandler,** University of Arizona (UA) Regents' Professor and director of the BIO5 Institute, has received the National Institutes of Health (NIH) Director's Pioneer Award. The award will provide Chandler with $2.5 million in direct funds to support her research, which has the potential to lead to significant advances in human health. Chandler is the first researcher in Arizona to receive the highly competitive award and is one of only 13 recipients selected this year from 840 scientists.



Vicki Chandler is studying how plant research can increase knowledge of human disease.

Chandler studies plants as model systems to understand the mechanisms that regulate gene activity. Her research, funded by the National Science Foundation for the past 10 years, has uncovered new evidence about the mechanisms by which living organisms transmit genetic information. She has shown that Mendel's laws, discovered more than 150 years ago, do not account for all aspects of inheritance, which could explain why certain human diseases are inherited in ways that have long puzzled researchers.

"The genetic mechanisms in plants, animals, and humans are strikingly similar," Chandler said. "We have reason to believe that the genetic processes we observed in plants also exist in humans. Applying our findings to animal model systems will help us better understand what causes certain diseases, such as diabetes and muscular dystrophy. This award is incredibly exciting and timely as it will enable us to take what we have learned from studying plant systems and apply it to animal systems, including humans."

Chandler's dean, **Eugene Sander,** said, "[Vicki] is one of the nation's truly great plant biologists, but the real significance of this award is that the medical community has recognized that her pioneering work on plant genetics can have an enormous impact on human medicine."

"The NIH Director's Pioneer Award adds to the luster of one of Arizona's most distinguished scientists, already recognized as a member of the prestigious National Academy of Sciences and world-renowned for her research in plant genomics," said UA President **Peter Likins.** "What I find most remarkable about Vicki is her astonishing versatility as a scholar, teacher, manager, and campus leader. She is an academic superstar."

"When my research group moves into the Thomas W. Keating Building, the future hub for BIO5, we will have colleagues side-by-side studying plant systems, animal systems, and human diseases," Chandler said. "BIO5 provides the innovative and interdisciplinary environment that is needed to fully understand the molecular basis of human diseases and develop new therapies."

BIO5 brings together scientists from five disciplines to collaborate on important problems, such as how to diagnose, treat, or prevent disease; how to better feed a hungry world; and how to maintain livable environments. It is through this collaboration that BIO5 is able to conduct cutting-edge research that translates into real-world applications and contributes to the state's economic development. In the past year, BIO5 members have filed 37 inventions and five start-up companies have been approved by the Arizona Board of Regents.

In addition to serving as the director of BIO5, Chandler is a Regents' Professor of plant sciences and molecular and cellular biology at UA, with a primary appointment in the Department of Plant Sciences in the College of Agriculture and Life Sciences.

The NIH Director's Pioneer Award is a key component of the NIH Roadmap for Medical Research. The roadmap is a series of far-reaching initiatives designed to transform the nation's medical research capabilities and speed the movement of research discoveries from the bench to the bedside. It provides a framework for the priorities addressed by NIH to optimize its entire research portfolio and lays out a vision for a more efficient and productive system of medical research.

This article is based on a news release from the University of Arizona.

ASPB Member Nikolau Leads National Effort to Use Metabolomics to Unlock Gene Functions

ASPB member and Iowa State University plant scientist **Basil Nikolau** is leading a national research team that will develop a new tool to decipher the functions of plant genes. By advancing the understanding of biological processes, its work could define new ways to improve oils, starches, and proteins from corn and soybeans.


Basil Nikolau

The National Science Foundation recently awarded $1 million to fund the project, which is led by Nikolau, professor of biochemistry, biophysics, and molecular biology and director of the Center for Designer Crops and the W. M. Keck Metabolomics Research Laboratory.

Nikolau and researchers from seven institutions will test the feasibility of using metabolomics to uncover the biological function of genes in Arabidopsis, a plant used as a model organism in research.

The Arabidopsis genome was the first plant genome completely sequenced, an accomplishment that has proved invaluable to understanding plant biology—including the biology of corn and soybeans. However, the functions of about one-third of the 25,000 genes in the Arabidopsis genome are still unknown.

"When we understand in detail how genes function to regulate biological processes in plants, we can develop foods and animal feeds that have better nutritional quality and crop-based sources for energy or industrial chemicals," Nikolau said.

The grant funds a two-year pilot project focused on deciphering the functions of 100 genes. The long-term goal is to establish an international consortium of research laboratories to further develop metabolomics as a tool in functional genomics.

Metabolomics uses sophisticated instruments to accurately measure, en masse, the biochemicals (metabolites) that make up an organism. Metabolites are the building blocks of all biological products, including those important to agriculture, like oils, sugars, and proteins. Metabolism—the complex network of biochemical reactions that converts metabolites to final products—is determined by the organism's genetic blueprint or genome.

The research will be conducted at the interface of chemistry, biochemistry, genetics, and bioinformatics. Researchers will generate metabolomics and genomics data, conduct statistical analyses, develop standards for identifying metabolites, and complete biocomputational modeling and representation of the data. This work will enable the research community to integrate metabolomics data with and decipher the function of genes in the biological network.

Other Iowa State researchers involved on the project are Julie Dickerson, associate professor of electrical and computer engineering; Philip Dixon, professor of statistics; George Kraus, university professor of chemistry; Nicola Pohl, assistant professor of chemistry; and Eve Wurtele, professor of genetics, development, and cell biology.

In addition, researchers from the following institutions are part of the consortium: University of California–Davis; Carnegie Institution, Stanford, California; The Samuel Roberts Noble Foundation, Ardmore, Oklahoma; Kansas State University, Manhattan; Washington State University, Pullman; and Virginia Polytechnic Institute and State University, Blacksburg.

The project grew out of discussions last year among the scientists at the Third International Congress on Plant Metabolomics organized by Nikolau and colleagues and hosted by the Plant Sciences Institute at Iowa State University.

Southern Section Election Results

SS-ASPB Representative to Executive Committee
Caryl Chlan
(University of Louisiana)

Chair
Dalton Gossett
(Louisiana State University)

Vice Chair
Kent Chapman
(University of North Texas)

Secretary/Treasurer
Kelly Major
(University of South Alabama)

SS-ASPB Executive Committee
James Mahan
(USDA–ARS)

2007 Meeting Site
Mobile, Alabama

Art/Science Exhibit on s*L*owlife of Plants Puts Down Roots in U.S. Botanic Garden

About 100 visitors attended the opening reception for the "s*L*owlife" exhibit at the United States Botanic Garden (USBG) October 26, 2005. The exhibit, developed by ASPB Immediate Past President Roger Hangarter, USBG, and the Chicago Botanic Garden, is on display continuously at USBG through March 26, 2006. s*L*owlife will be a traveling exhibit that will be installed at other venues during the next several years, including the Chicago Botanic Garden in 2007.

Using time-lapse imaging, Hangarter and colleague Dennis DeHart accelerated the time-scale of plants in a series of movies that demonstrate the extraordinary movements of plants. At the entrance to the exhibit, alongside a traditional still-life painting, framed movies of cut tulips in vases beckon people inside with their dancing movements. The movies demonstrate how portraits of plants really aren't "still-life" images at all, leading Hangarter to speculate that many an artist has likely become frustrated when using mysteriously moving floral arrangements for their "still-life" models.

Visitors to the Darwin experiment reenactment can enjoy an interactive plant biology education experience as they chart the movement of plants the same way Darwin did in his landmark study of plant tropisms.

Plant movement above and below ground can be viewed in some of Hangarter's other time-lapse movies, including closeups of roots snaking their way through their underground environment. Plant biology educational lessons are woven into the exhibit in an entertaining manner, such as with the "microprocessing" display of time-lapse microscopy. This presentation "reveals a fascinating choreography in cell growth, cell division and the movements of cellular components," as a full-color exhibit catalog explains.

The exhibit was sponsored by the National Science Foundation, the ASPB Education Foundation, USBG, the Chicago Botanic Garden, and Indiana University, where Hangarter is a professor in the Biology Department. Hangarter submitted the grant proposals that supported the exhibit. This exhibit marks the first joint project by ASPB and the ASPB Education Foundation with USBG and the Chicago Botanic Garden to explain plant biology to the public. The botanic gardens hope to engage in continuing cooperative efforts with ASPB. Support by NSF and Indiana University was instrumental in making possible this joint effort between ASPB, USBG, and the Chicago Botanic Garden.

Images from s*L*owlife.

The three images on the left were taken at the exhibition opening. The image on the right shows a poster advertising s*L*owlife in the Judiciary Square Metro station in Washington, DC.

Throughout November and December, s*L*owlife posters could be seen in the Metro Stations, inside trains and buses, and on the outside of Metro buses. The exhibition will remain at the USBG until March 26.

Visit http://www.slowlife-exhibit.org to learn more about the exhibition.

The Biology of Transpiration: From Guard Cells to Globe

Snowbird Mountain Resort, Utah, October 10–14, 2006

Organizers: Sally Assmann, Steve Long, and Keith Mott

http://www.aspb.org/meetings/transpiration06/

There have been a number of successful meetings on stomata in past years, starting with an SEB symposium in Lancaster in 1979, followed by meetings in Hawaii (1983), an FESPP workshop in East Berlin (1989), an SEB-sponsored symposium in Canterbury in 1997, and a meeting sponsored by *New Phytologist* in Birmingham in 2001. The upcoming 2006 meeting will continue and expand that tradition, using the topic of transpiration as a focal point. During the past five years, there have been rapid advances at several organizational levels in the understanding and measurement of the biology of transpiration. These areas have developed separately, yet each has major implications for the others. To catalyze needed interactions among scientists working in diverse areas, all aspects of water transport will be covered at levels that span from gene expression to global modeling, including

- root water uptake
- regulation of water flow by aquaporins
- long-distance transport and xylem hydraulics
- guard cell physiology and development
- mechanisms controlling transpiration from the leaf to the globe.

A goal of this meeting is to bring together outstanding scientists from around the globe who might not otherwise meet. To provide the participants with an intimate retreat-like atmosphere for debate and interaction, the meeting will be limited to approximately 200 participants. The meeting will include invited talks, talks chosen from abstracts, and poster discussions; each day's program will cover topics at several organizational levels.

Invited Speakers and Tentative Titles

A Genomics Approach to Understanding Guard Cell Development
Dominique Bergmann
Stanford University, USA

The Stable Isotopic Signature of Stomata in the Atmosphere
Joseph Berry
Carnegie Institution, USA

Vesicle Trafficking and Ion-Channel Regulation in Guard Cells
Michael Blatt
University of Glasgow, UK

Stomatal Behavior in Photosynthetic Mutant
Susanne von Caemmerer
ANU, Australia

Root Signaling of Water Status
William Davies
Lancaster University, UK

Revisiting Optimization Theory and Transpiration Efficiency
Graham Farquhar
ANU, Australia

Stomata, Evapotranspiration, and Atmospheric Change
Carl Bernacchi
ISWS/University of Illinois, USA

Rising Tropospheric Ozone: The Role of Stomata in Mediating Damage
David Fowler
Centre for Ecology and Hydrology, UK

Signaling Networks in Guard Cell Responses to ABA and CO_2
Alistair Hetherington
Lancaster University, UK

Guard-Cell Electrophysiology in the Intact Leaf
Rainer Hedrich
University of Würzburg, Germany

The Interplay Between the Xylem and Transpiration
N. Michele Holbrook
Harvard University, USA

Remote Sensing of Stomatal Behavior from Leaf to Landscape
Hamlynn Jones
University of Dundee, UK

Aquaporins and Water Transport Through Roots
Christophe Maurel
INRA/CNRS, France

Functional Adaptation of Transpiration to Past Climates and Atmospheres
Jennifer McElwain
The Field Museum, USA

Landscape–Atmosphere Exchanges: The Role of Stomata
Russell Monson
University of Colorado, USA

Division Regulation in Arabidopsis Stomatal Development
Fred Sack
Ohio State University, USA

The Genomics and Cell Biology of Guard Cells
Julian Schroeder
UCSD, USA

Blue Light Regulation of Stomatal Function
Ken-ichiro Shimazaki
Kyushu University, Japan

Coordination of Stomatal and Xylem Function
John Sperry
University of Utah, USA

Vegetation Dynamics and the Role of Stomata
F. Ian Woodward
Sheffield University, UK

ASPB Headquarters

Telephone Extensions and E-Mail Directory

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

● Our office telephone number is 301-251-0560

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Missing journal issues								●						
Subscriptions, institutional and individual							●							
Plant Physiology (except missing issues)														
Disposition of a manuscript													●	
All other questions											●			
The Plant Cell (except missing issues)														
Disposition of a manuscript												●		
All other questions											●			
ASPB News										●				
Advertising														
Plant Physiology											●			
The Plant Cell											●			
ASPB News										●				
Membership														●
Accounts payable					●									
Accounts receivable						●								
Accounts payable/receivable problems				●										
ASPB meetings			●											
Public affairs/government relations									●					
Education									●					
Society governance	●													
ASPB Education Foundation									●					
International issues	●													
Awards		●												
Biochemistry & Molecular Biology of Plants										●				
Website														●
Online orders														●

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