ASPB News

THE NEWSLETTER OF THE AMERICAN SOCIETY OF PLANT BIOLOGISTS

Volume 31, Number 1
January/February 2004

Inside This Issue

President's Letter

Publish or Perish

As I sit curled up in front of the fire with the current print issue of *Plant Physiology,* I am thinking about publishing not from the point of view of the individual investigator, but from the point of view of a publisher.

There are many issues facing ASPB as the publishing world moves more and more toward electronic delivery of its journals. As a scholarly, not-for-profit publisher, the Society is joining together with other like-minded organizations such as the Genetics Society of America and Cold Spring Harbor Press in a new initiative to reaffirm our commitment to innovative and independent publishing practices and to wide dissemination of the information contained in our journals. Originally drafted by the American Physiological Society, The Endocrine Society, and the *New England Journal of Medicine,* the "DC Principles" has been signed by ASPB and more than 45 other not-for-profit publishers representing 109 journals. The document is scheduled for release in March.

Most of the signatories have been working for several years with Stanford University's HighWire Press to transform traditional print journals into vibrant, online journals. These publishers have invested millions of dollars in online technology and at the same time have led the charge to make the information in their journals freely available to those who cannot pay for it. Through these not-for-profit publishers, the scientific community and the public have easy online access to nearly 700,000 free full-text articles and the abstracts of over 14 million articles in more than 4,500 Medline journals.

ASPB has been publishing online since 1998, and the full text of *The Plant Cell,* back to volume 1 (1989), is freely available as searchable PDFs in the journal's archive at www.plantcell.org (as well as the National Library of Medicine's PubMedCentral). *Plant Physiology* is online back to 1993 (www.plantphysiol.org) and will soon be digitized back to volume 1 (1926). Its archive will also be free to anyone with Internet access.

The key to our ongoing success as publishers, of course, will be to continue to publish the best papers in plant biology and to keep our journals at the cutting edge with respect not only to content, but also to content delivery.

Although electronic conferences are now possible, such a gathering of electrons cannot replace the excitement of being able to hear, see, and discuss the best plant science has to offer at our annual meeting. I hope to see many of you at Plant Biology 2004, being held this year from July 24 through July 28 at Disney's Coronado Springs Resort & Convention Center, Lake Buena Vista, Florida. Your abstract is due by March 1 if you would like to have it considered for an oral presentation. The Program Committee will convene the weekend of March 5 to sort through the abstracts received and set up the minisymposia.

Mary Lou Guerinot
guerinot@dartmouth.edu

The *ASPB News* is now 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.

CONTENTS

Deadline for May/June 2004
ASPB News: April 5, 2004

NOTICE: The *ASPB News* no longer carries job ads or meeting announcements. Job ads appear online at www.aspb.org/jobbank. The list is updated every Friday. Meeting notices can be posted at www.aspb.org/meetings.

ASPB Officers & Staff

ASPB News

Headquarters Office
15501 Monona Drive
Rockville, MD 20855-2768 USA
Phone: 301-251-0560
Fax: 301-279-2996

ASPB News is distributed to all ASPB members and is published six times annually, in odd-numbered months. It is edited and prepared by ASPB staff from material provided by ASPB members and other interested parties.

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

Contact: Nancy A. Winchester, Editor, *ASPB News,* 15501 Monona Drive, Rockville, MD 20855-2768 USA; nancyw@aspb.org; 301-251-0560, ext. 117.

NEW "PARTNERS PROGRAM" MEANS DISCOUNTS FOR ASPB MEMBERS

As an added benefit of membership, the Society's new Partners Program allows ASPB members to receive discounts on products and services offered by an array of vendors.

Go to the ASPB members-only page at **http://www.aspb.org/membersonly.cfm** for discounts on products and services from

Kluwer

Sigma-Aldrich

Annual Reviews

Current Trends

Blackwell Plant Sciences Publications

STKE (Signal Transduction Knowledge Environment)

Comparative and Functional Genomics

Cartagen Molecular Systems, Inc.

SciencePresentations.com

Discounts with new companies every month!

We are adding vendors on a regular basis. If you have any suggestions for vendors you would like to see enrolled in this program, please e-mail Kelley Noone at knoone@aspb.org.

Plant Genetics 2003: Mechanisms of Genetic Variation

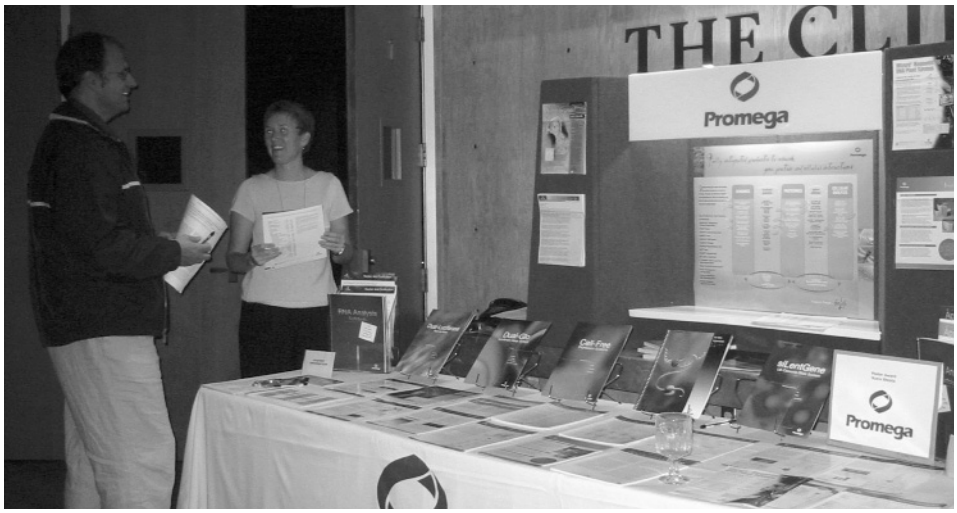
In October 2003, ASPB sponsored its first special topics meeting on plant genetics in Snowbird, Utah. The meeting's purpose was to stimulate new ideas and approaches for research focusing on mechanisms of genetic variation. The meeting included sessions on natural variation and processes of evolution, speciation and crop domestication, epigenetic mechanisms, RNA and protein movement, and genetic mechanisms influencing plant form and function. Top scientists from around the world came together to discuss the different aspects of plant genetics and a variety of species and approaches. Thanks go to organizers Venkatesan Sundaresan (University of California, Davis) and Rich Jorgensen (University of Arizona) for developing a schedule packed with excellent speakers and high-quality posters. This article presents a brief sampling of the many outstanding presentations given. Abstracts for speakers and posters can be accessed at http://www.aspb.org/meetings/pg-2003/.

In late October, Snowbird offered crystal clear mountain vistas but no snow.

QTL Analysis: Off and Running

One of the major themes to emerge from the meeting was the realization that analysis of quantitative trait loci (QTLs), coupled with the use of new genomic tools and genomewide resources in model systems, is rapidly moving to the forefront of plant functional genetics. The plant science literature is replete with QTL studies that have remained little more than unidentified and often vaguely defined genomic regions for years. QTL analysis is now progressing to rapid selection of candidate genes and identification of individual genes responsible for major QTL effects in many cases. Through his description of the isolation of a cryptochrome2 allele, which confers day-length insensitivity, Maarten Koornneef (Wageningen University, the Netherlands) demonstrated the feasibility of cloning individual QTL through map-based cloning with the use of near-isogenic introgression lines that are developed from naturally occurring populations of Arabidopsis. Richard Clark (working with John Doebley at the

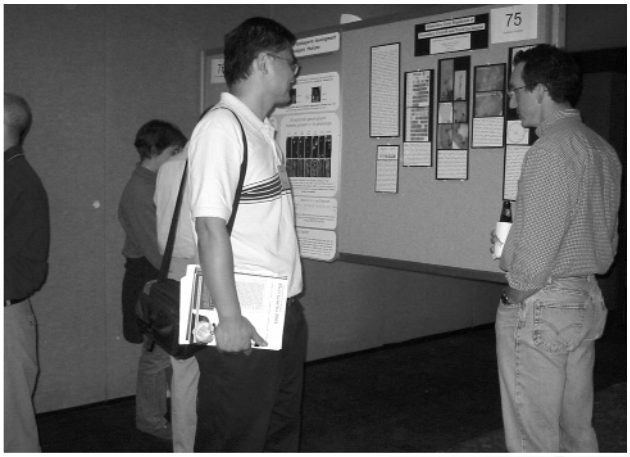
continued on page 4



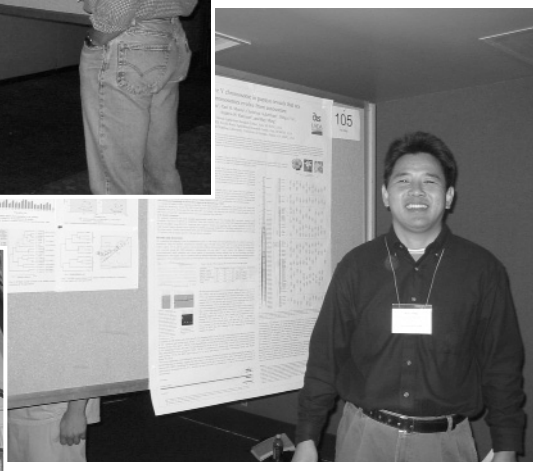
Promega was one of six exhibitors at the meeting.

continued from page 3

University of Wisconsin–Madison) discussed the use of QTL mapping to show that *teosinte branched1 (tb1)* corresponds to a major QTL that controls the difference between the long branches of teosinte and the short branches of maize. Sequence analysis of this gene region provided evidence that the *tb1* promoter but not the coding sequence underwent selection during maize domestication and suggested that changes in regulation of *tb1* expression underlie morphological evolution in maize. Kai-Yi Chen (working with Steve Tanksley at Cornell University) presented the results of high-resolution mapping of a major QTL in tomato, *Se2.1*, which controls stigma morphology associated with self-fertilization. Chen and Tanksley found that the *Se2.1* locus comprises five tightly linked genes, one controlling style length, three controlling stamen length, and the fifth affecting anther dehiscence. These were just three of numerous examples presented of QTL analyses linking phenotype to a specific gene and facilitating the functional analysis of genetic loci.



Daily afternoon poster sessions were lively and well attended.



Ray Ming, a plant molecular geneticist at the Hawaii Agriculture Research Center, on poster duty.

Participants enjoyed the views from the Snowbird Tram.

Helianthus: Going with the Flow

In a presentation on hybridization and ecological divergence in wild sunflowers *(Helianthus spp.)*, Loren Rieseberg (Indiana University, Bloomington) observed that gene flow is underappreciated as a creative mechanism in plant evolution. Rieseberg has shown that hybridization allows colonization of extreme habitats in a number of cases. In other words, he found that a number of diploid hybrid sunflower species are specially adapted to extreme environments, such as salt marshes and desert sand dunes. He and his colleagues have also found that complementary gene action, as opposed to epistasis, appears to offer the best explanation for transgressive segregation (i.e., hybrid progeny outperforming either parent in a particular environment) in this genus.

HOTHEAD: "Hot" Locus Award

The prize for the most interesting and most unusual genetic locus was awarded to Bob Pruitt and Susan Lolle (Purdue University) for their work on a novel mechanism of genetic reversion of the *HOTHEAD (HTH)* locus in Arabidopsis. *HTH* encodes a glucose-methanol-choline oxidoreductase that is expressed in all tissues and that plays a role in regulating the proper separation and expansion of organs at the growing points of the plant. A fascinating attribute of this locus is that loss-of-function mutations are genetically unstable and undergo an apparently novel form of gene conversion to produce a heterozygous genotype (exhibiting a wild-type phenotype) in up to 15 percent of progeny from self-fertilization of numerous independent homozygous mutant lines. Pruitt convincingly and engagingly detailed a series of experiments that showed that genetic reversion at this locus cannot be explained by any known genetic or epigenetic mechanisms. He offered the intriguing hypothesis that *HTH* conversion occurs through an RNA template and further speculated that this might constitute another genetic mechanism for enhancing variability in self-fertilizing plant species.

Small Regulatory RNAs and RNA Silencing

The regulation of gene expression by small regulatory RNAs is a hot topic in genetics and development in both plants and animals. In plants, both transgene-induced, double-stranded short-interfering RNA (siRNA) and endogenous single-stranded microRNA (miRNA) activate cleavage of homologous RNA targets. Bonnie Bartel (Rice University) gave an excellent overview of this topic and described work demonstrating that similar mechanisms direct miRNA processing in plants and animals. Bartel highlighted evidence from her research and others that miRNAs represent an important genetic mechanism regulating key aspects of development in plants as well as in animals. Herve Vaucheret (Institut National de la Recherche Agronomique) presented results showing that different sets of genes are required for the production of siRNA and miRNA and that there appears to be limited connection between these two pathways in plants.

Vicki Vance (University of South Carolina, Columbia) has been investigating the suppression of RNA silencing in plants by the helper component proteinase (HC-Pro) of potyviruses for a number of years. Vance reported on new work showing that HC-Pro suppresses several classes of transgene-induced RNA silencing, in each case eliminating the accumulation of small RNAs without blocking either transgene methylation or systemic silencing. The level of endogenous microRNAs in transgenic plants overexpressing HC-Pro was greatly elevated, suggesting that HC-Pro affects multiple small regulatory RNA pathways, possibly by altering the regulation of one or more Dicer-like enzymes.

Concluding Remarks

Plant Genetics 2003 will be remembered as one of the highlights of the year for the more than 200 attendees, including many international participants. The venue, program, invited speakers, and attendees produced a meeting that stimulated new avenues of investigation for many researchers. During the conference breaks, attendees enjoyed the dramatic scenery and fresh mountain air by hiking or riding the famed Snowbird tram. Watch the *ASPB News* carefully for announcements of the fall 2005 meeting—it is sure to fill quickly.

Nan Eckardt
neckardt@aspb.org

The organizers gratefully acknowledge funding from the National Science Foundation, the U.S. Department of Agriculture, and Pioneer Hi-Bred International, a Dupont Company, which made possible the subsidies to students, postdoctoral fellows, and speakers.

And we thank the following exhibitors for their support:

Blackwell Publishing
CABI Publishing
Genteon, Inc.
LI-COR
Promega Corporation
Sigma-Aldrich

ASPB's Most Highly Cited

ASPB is pleased to publish the following list of Society members who are included on the ISIHighlyCited.com web site. ISIHighlyCited.com (part of ISI Web of Knowledge) lists the people behind the accomplishments in 21 broad subject categories in life sciences, medicine, physical sciences, engineering, and social sciences. These individuals are the most highly cited within each category for the period 1981–1999 and constitute less than a half-percent of all publishing researchers. ASPB boasts 92 names within ISIHighlyCited.com, which one ISI representative called "an outstanding number of researchers from one organization."

For more information on the Highly Cited Researcher initiative at Thomson-ISI (www.ISIHighlyCited.com), read the article "How Does ISI Identify Highly Cited Researchers?" at http://hcr3.isiknowledge. com/isi_copy/Comm_news08.htm.

Peter Albersheim
Kozi Asada
Neil R. Baker
Roger N. Beachy
Alan B. Bennett
Ton Bisseling
Olle E. Bjorkman
Thomas Boller
Kenneth J. Boote
John S. Boyer
Ray A. Bressan
Winslow R. Briggs
John A. Browse
Michel Caboche
Joanne Chory
Maarten J. Chrispeels
Nam-Hai Chua
Adrienne E. Clarke
Robert E. Cleland
Daniel J. Cosgrove
Alan G. Darvill
David A. Day
Elizabeth Salisbury Dennis
Richard A. Dixon
Roland Douce
Stephen O. Duke
Gerald E. Edwards
John R. Evans
Graham D. Farquhar
Vincent R. Franceschi
Pierre Gadal
Arthur W. Galston
Anthony D. M. Glass
Avtar K. Handa
Andrew D. Hanson
Paul Michael Hasegawa
Hans Walter Heldt
Peter K. Hepler
Tuan-Hua David Ho
Jonathan D. G. Jones
Russell L. Jones
Kenneth Keegstra
Hans Kende
Daniel F. Klessig
Leon Kochian
Maarten Koornneef
Christopher J. Lamb
Hans Lambers
Andre Lauchli
Peter J. Lea
A. Carl Leopold
Phillippe Matile
Felix C. Mauch
Lee McIntosh
Joachim Messing
Rana Ellen Munns
Norio Murata
C. Barry Osmond
Richard P. Pharis
Jack Preiss
Peter H. Quail
Natasha V. Raikhel
Ilya Raskin
J. A. Raven
James B. Reid
Heinz Rennenberg
James H. Richards
Clarence A. Ryan
Dale Sanders
Eberhard Schaefer
Julian I. Schroeder
Thomas D. Sharkey
Roger M. Spanswick
L. Andrew Staehelin
Andrew G. Stephenson
Bruce A. Stone
John E. Thompson
William F. Thompson
Anthony Trewavas
David H. Turpin
Melvin T. Tyree
Indra K. Vasil
Virginia Walbot
Graham C. Walker
Elmar W. Weiler
Engelbert Weis
Andres Wiemken
Jan A. D. Zeevaart

Future ASPB Annual Meeting Sites

2004: Orlando, Florida, July 24–28
Disney's Coronado Springs Resort & Convention Center

2005: Seattle, Washington, July 16–20
Washington State Convention & Trade Center

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

Networking Made Simple: The New MAC Database

Networking with people of color and planning research collaborations are great ways to advance and encourage minorities in plant biology. Now it is easier than ever to do these things, through a new database created by the ASPB Minority Affairs Committee (MAC). ASPB has a strong commitment to diversity, and this new database of plant biologists who are also people of color has been launched to support this commitment.

The database has been designed to meet two goals. First, it will provide networking opportunities for ethnic minorities working in plant science, including students, postdocs, researchers, and faculty and industry scientists. From this networking will come opportunities for mentoring and collaboration.

The second goal of the database is to make it easy for ASPB members to identify people of color with whom they may want to collaborate. Plant biologists working at smaller institutions, or in job positions that do not allow time for substantial research during the academic year, can often benefit from interaction with established laboratories. This is a benefit recognized by federal granting agencies that, as part of their grants to laboratories, often include funding for scientists to visit and work in those research labs during the summer. In the past, however, members often had difficulty identifying potential collaborators to participate in their grant and research activities. The MAC database is intended to solve that problem.

How Can I Participate in the Database?

Participation is easy and voluntary. You can sign up at http://www.aspb.org/committees/minorityaffairs/plantscimin.cfm, where you will be asked to fill in your contact information and area of research interest. Participation is not limited to ASPB members. MAC does, however, have free one-year, first-time memberships for minority researchers and would like to especially encourage those teaching plant biology at minority-serving institutions and community colleges to become members. The application for free membership can be accessed at https://www.aspb.org/secure_forms/msimbr.cfm?minority=yes.

The database is a free service provided by ASPB and is part of its larger program, developed through MAC, to increase the number of underrepresented minorities doing science and particularly the numbers of those working in the plant biology area. To learn more about MAC activities, including a special symposium and speakers at the 2004 Plant Biology annual meeting and the 2004 Travel Awards program, please visit our web page regularly at http://www.aspb.org/committees/minorityaffairs/.

THE 14TH CONGRESS OF THE FEDERATION OF EUROPEAN SOCIETIES OF PLANT BIOLOGY
CRACOW, POLAND,
23 - 27 AUGUST 2004

POLISH ACADEMY OF SCIENCES
THE FRANCISZEK GÓRSKI INSTITUTE OF PLANT PHYSIOLOGY

POLISH BOTANICAL SOCIETY
PLANT BIOCHEMISTRY AND PHYSIOLOGY SECTION

SECRETARIAT
Congress Secretariat:
The Franciszek Górski Institute of Plant Physiology
Polish Academy of Sciences
Niezapominajek 21, 30-239 Cracow
POLAND
Tel: +48 12 6395144
Fax: +48 12 6395142
E-mail: fespb.congress@zfr-pan.krakow.pl
www.zfr-pan.krakow.pl/konf/

KEY DATES

February 2003.....First Announcement
October 2003.....Second Announcement
March 31st, 2004.....Deadline for early Registration
March 31st, 2004.....Deadline for submission of Abstracts

ACCOMMODATION FEES
The approximate hotel prices per room are as follows:

Hotel	category	single	double
	***	155-165 EUR	170-190 EUR
	**	65-145 EUR	85-150 EUR
	*	65-95 EUR	70-110 EUR
Student hotel		20-25 EUR	20-35 EUR

Breakfast included in the room rate.
Full range of accommodation within the city will be listed in the second announcement.

REGISTRATION FEES

FESPB Members	350 EUR
Student FESPB members	150 EUR
Student non-members	200 EUR
Non-members	400 EUR
Accompanying persons	200 EUR

A surcharge of 20% will be levied on registrations received after 31st March 2004.

NATIONAL ORGANIZING COMMITTEE

Chairperson:
Prof. dr hab. Franciszek Dubert,
Institute of Plant Physiology,
Polish Academy of Sciences

Members:
Doc. Dr hab. Jan Białczyk
Prof. Dr hab. Ryszard Górecki
Prof. Dr hab. Alina Kacperska
Prof. Dr hab. Jan Kopcewicz
Prof. Dr hab. Stefan Malepszy
Prof. Dr hab. Zbigniew Miszalski
Prof. Dr hab. Emil Nalborczyk
Prof. Dr hab. Kazimierz Strzałka
Doc. Dr hab. Andrzej Skoczowski
Prof. Dr hab. Barbara Tomaszewska
Prof. Dr hab. Przemysław Wojtaszek

INTERNATIONAL ADVISORY BOARD

Prof. Michael B. Jackson,
Secretary General of FESPB

Members:
Prof. Juan Carbonell, Spain
Prof. Laszlo Erdei, Hungary
Prof. Wladimir Kuznetsov, Russia
Prof. Hartmut K. Lichtenthaler, Germany
Prof. Ivana Machackova, Czech Republic
Dr Richard Napier, England
Prof. Kalliopi A. Roubelakis-Angelakis, Greece Republic
Prof. Renate Scheibe, Germany

SCIENTIFIC PROGRAMME

1. Plant Cell Biology
2. Plant Development
3. Plant Growth Regulators
4. Photosynthetic Productivity & Crop Production
5. Uptake and Transport of Water and Mineral Nutrients
6. Biosynthesis of Plant Constituents
7. Biotic and Abiotic Stress
8. Metabolic Engineering for Plant Improvement
9. Genomics and Post-genomics
10. Bioinformatics
11. Plant Tissue Cultures and Biotechnology
12. Physiology and Molecular Biology in Plant Breeding

Education Foundation Director Looks at New Opportunities

Robin Lempert

Education Foundation director Robin Lempert is redirecting her talents and creativity in new directions—teaching, curriculum development, and consulting. "I've really enjoyed the past few years working with the top plant biologists in the world and the work they're doing that is so important to our world," said Robin. Under her guidance, the Foundation's board of directors has restated its mission to focus on improving people's lives through applying the knowledge of plants developed through the research of ASPB's members and developing programs based on that knowledge and understanding.

Some of the goals that Robin helped the Foundation set include developing programs that provide knowledge on the importance of plants to all aspects of life, increase the focus on plant science in the K–12 curriculum, and increase plant science activities in science museums and discovery centers.

During the past two-and-a-half years, Robin has helped the Foundation achieve some significant successes. One of her leading accomplishments was to guide the Foundation's award-winning film, *History's Harvest,* through the final stages of production to the finished product. The film is now being distributed to broadcast television networks worldwide and schools across the nation. Robin developed a complete marketing plan for the film and learned the nuts and bolts about film distribution along the way. She interviewed a range of distributors and guided the Foundation board in selecting the best group, who then provided complete coverage for the film through broadcast, online, and VHS and DVD media. She also helped the board match the film's content to the National Science Education Standards for use by educators and brought the film to hundreds of teachers at their conferences.

One of Robin's primary contributions was guiding the Foundation's board through strategic planning steps, which led to a comprehensive plan for new directions and future growth and positioned the Foundation at the center of an important effort to increase the use of plants in K–12 classrooms. The board designed the program to highlight the accomplishments of plant biologists and communicate their knowledge in a format to get children excited about plant biology and science.

Robin has also led the Foundation through an important step in its growth by working with one of the country's highest rated nonprofit fundraising consultant firms. The result was a comprehensive study that explored the ASPB members' priorities for how the Foundation can communicate with the public and with K–12 schools about plants. At the heart of the study was a case statement outlining a series of initiatives to advance plant biology and promote a general understanding of the importance of plants by the general public. In addition, the study resulted in a blueprint for a successful multi-million-dollar fundraising campaign that was based on member input and feedback.

A new web site aimed at K–12 teachers and students was also created under Robin's leadership. The prototype for the site was presented during the ASPB meeting in Hawaii in July 2003 and was met with great enthusiasm for the design and concept.

"It's been an exciting few years for the Foundation, which is now poised to take off on several significant projects greatly expanding the amount of plant science knowledge among the public and in K–12 schools," said Robin. "I really appreciate all the work the Foundation board members have done and the enthusiasm and energy they brought to the organization. I have enjoyed sharing ideas with all of them."

As of January 2004, Robin has moved on to pursue some exciting opportunities in the world of K–12 teaching, where she plans to grow her skills as a teacher and curriculum developer. She will also continue work on specific projects for nonprofit education organizations. Her contributions to the Foundation and the energy she brought with her to every project, as well as her insights and strategic thinking, have positioned the Foundation for a successful future.

The Education Committee met at ASPB headquarters December 13 to plan educational programs for ASPB members, teachers, and students for the coming year. Committee members are (from left), Larry Griffing (chair), Mary Williams, Sheila Blackman, and Richard Cyr. Not shown is David Salt.

Rumble in Rockville as Mild Earthquake Hits DC Area

A mild earthquake shook things up at ASPB headquarters on December 9, 2003. From her ground-floor office, Robin Lempert, then the Education Foundation director, reported, "I was sitting here at my desk, minding my own business, and felt the desk and floor move and the windows rattle. So I walked out to the parking lot where [two other staff members] told me they thought it was an earthquake. Sure enough, it was."

Although some people felt the quake, others seemed to take the slight vibration as among the usual idiosyncrasies of working in a 100-year-old building, where a certain amount of creaking and groaning is expected. John Long, production manager for *The Plant Cell,* with a second-story office, said, "I'm not sure what's wrong with me, but I didn't feel a thing." At the same time, one floor up on the attic level, George Kendall, managing editor of *Plant Physiology,* reported, "I was in my office on the phone discussing billing…and the earth moved, literally! The building shook and my computer monitor shook like a bobble-head doll."

The facts of the matter were announced by a press release from the U.S. Geological Survey, National Earthquake Information Center:

> A light earthquake occurred in Central Virginia about 30 miles west of Richmond at 1:59 PM MST, Dec 9, 2003 (3:59 PM EST in Virginia). This was a complex event consisting of two subevents occurring 12 seconds apart. The earthquake was also felt in parts of Maryland and North Carolina. (http://earthquake. usgs. gov/recente-qsww/Quakes/ uscdbf.htm)

Earthquakes—at least those severe enough to be felt—are rare in the Washington, DC, area, according to scientists who were interviewed for the many newspaper accounts of the quake. Articles from the *Washington Post* and local Virginia papers that covered the quake can be found through links at the Geological Survey's Earthquake Hazards Program web site: http://earthquake.usgs.gov/. Fortunately, this earthquake was more of a novelty and did not result in any injury to the staff or damage to the building.

ASPB headquarters in Rockville, Maryland.

Ties That Bind—Retirement Finds Rabson in Contact with ASPB Colleagues

Since having retired from the Department of Energy a number of years ago, ASPB member Bob Rabson has kept in touch with a number of old friends associated with plant biology. Bob and his wife Eileen regularly visit their children and grandchildren in different places around the country. When they make such visits, they always take time to see old friends.

During Christmas weekend of 2003, they not only saw their daughter and her family but while in Boston also visited their old friend Marty Gibbs and his wife Karen. Marty served as editor-in-chief of *Plant Physiology* from 1963 to 1992. Bob reports that Marty remains quite vigorous and as knowledgeable as ever.

Bob and Eileen frequently visit Madison, Wisconsin, to see their other daughter and her family. While there, they used to visit old friends Folke Skoog and Oliver Nelson. Now that both scientists have passed on, the Rabsons make time to visit their widows.

The Rabson's son and his family live in Atherton, California, which is only a short distance from the Stanford University campus. When Bob and Eileen visit California, they visit Sharon Long at Stanford and always see Chris Somerville, his wife Shauna, and others at the Carnegie Institution, which is on the Stanford campus.

Once in a while they have visitors who come to Washington, DC, or Rockville, Maryland, for meetings or other reasons. One person they have seen several times is Peter Albersheim of the University of Georgia. Bob said that maintaining connections with old friends is one of his favorite activities now that he is retired. Bob initiated and long administered the Energy Biosciences research program within DOE.

The Bioethics Imperative XV

Ethics and the Literature: Citations III

"*Mokita*": the truth we all know and **agree** not to talk about.

Scenario: Frank Lee Nayeff has just cloned his first gene. He eagerly searches *GenBank* for homologies and finds hundreds of partial matches. He is bewildered by the various functions of the genes with homology and goes home late that night discouraged. Fortunately, the next morning, his adviser shows him that if he strips off the vector sequences, the confusion is resolved. Frank trots happily to the library to search for older references on the physiology of the protein that he has cloned and, a month later, submits a manuscript on his clone and the 20-year history of the physiology of this protein. He and his adviser are both humbled by reviewers' comments that the literature on this important protein actually goes back 50 years, a body of literature that Frank missed because of changes over time in the terms used to describe the physiology involved.

How many databases do you use? Do you know if they are curated—that humans have processed each incoming file for accuracy? How is each database organized and updated? When you search several databases for the same information, do you adapt your terms and strategy to match each database's requirements; does a small or zero retrieval mean that you missed something, or was there actually little or nothing to be found?

In molecular biology, a curated database makes a difference in the quality of the information retrieved because bad data can mislead, distort, or lead to serious errors. *SwissProt* (http://www.ebi.ac.uk/swissprot/index.html) is curated, but *GenBank* (http://www.ncbi.nlm.nih.gov/Genbank/index.html) is not. In a research apprenticeship course, we had students search *GenBank* for a common vector sequence using *Sequencer.* In minutes, we found hundreds of examples of vector sequences. Obviously, the genes had not been stripped of the vectors used to clone them prior to submission, and we had a chuckle over some of the famous people who had entered vectors—some without inserts—in *GenBank.*

Another data retrieval concern is that a search term might not exist prior to a particular date. For example, until 1983, the term *AIDS* did not exist in *MEDLINE.* Informally, the disease was called "gay-related immunodeficiency syndrome," or the "gay cancer." The disease was going strong, but from 1979 to 1982, articles about it were indexed under "immunologic deficiency syndromes." Articles were reindexed under "acquired immunodeficiency syndrome" in 1983; then, if the term *AIDS* was entered, *MEDLINE* automatically mapped the acronym to the new, correct search term. Without checking on the indexing history, searching with the term *AIDS* might well make one conclude that the disease did not exist until 1983, and missing all the pre-1983 literature might look a bit foolish. How can you deal with this issue? Ask a librarian to show you how to read "scope notes" in the database thesaurus and how to read the chronology of term changes, additions, and deletions for a database of interest.

Like the science they report, reproducibility and consensus are criteria used to update databases. Until something is reproducible and, therefore, credible, a new topic is often subsumed under a broader heading. Most database producers will add a new search term or concept, drug name, and so forth only after a significant number of articles have been written on the topic. For a database such as *MEDLINE* (PubMed), the National Library of Medicine also uses the input of librarians, physicians, and researchers when deciding to add, change, or delete search terms. This method for updating search terms is probably true for *Agricola* (http://www.nal.usda.gov/ag98/ag98.html) as well.

It is good practice to read each database's published description to understand seven critical factors: (1) the journals covered; (2) the span of coverage in years; (3) whether a controlled vocabulary (specific index terms that must be used), free text, or both are used; (4) whether indexing is done by machines or people, and the first language of the indexers (if done by people); (5) the indexing priority (e.g., are articles indexed from the top-10 plant biology journals before the top-10 insect journals are indexed, implying that citations for plant biology will be more current than those for insect journals?); (6) the time lag between journal publication date and the date that articles appear online; and (7) the mechanism or procedure by which the database producer collects suggestions for new terms, new capabilities, and new journals.

In biotech pharmaceutical work, even the computers used in research have to be validated for accurate performance. Furthermore, when biotech scientists include a literature search in a U.S. Food and Drug Administration application, they must explain why certain databases were chosen and describe them using factors such as those listed above. Early on, students should be required to get in the habit of seeking out the capabilities and the limitations so they can quickly ascertain which databases match their search requirements and what search techniques are specific to each database. Again, a librarian can help set you on the fast track.

Next: A summary of citations guidelines.

Tamara Turner
Librarian and editor, Seattle

Dina Mandoli
mandoli@u.washington.edu

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 Kelley Noone, ASPB membership and marketing manager, at knoone@aspb.org.

Name: Rakesh Minocha
Title: Research biochemist
Place of work: U.S. Department of Agriculture, Forest Service, Northeastern Research Station, Durham, New Hampshire
Research area: Stress physiology of forest trees
Member since: 1990

1. **Has being a member of ASPB helped you in your career? If so how?**
   Yes. It has been particularly important in my case. For my B.S. and M.S. degrees, I majored in zoology; for my Ph.D. I focused on biochemistry of cancer in animals. My very first job, however, involved studying stress physiology in forest trees. Being a member of ASPB helped me not only to get to know people in my area of research, but also filled in the gaps in my knowledge through annual, regional and national ASPB meetings. Although basic physiological processes are not too different between plants and animals, being a part of the network of active scientists in this new area of research was crucial to my career development, and ASPB membership really helped me in this regard.
2. **Why has being a member of ASPB been important?**
   I have always enjoyed the small-sized Northeastern ASPB section meetings. One really gets to know everyone personally after attending these meetings for a few years. Also, the atmosphere is very informal and conducive to learning from each other.
3. **Was someone instrumental in getting you to join ASPB?**
   My husband, Subhash Minocha, who is a professor of plant biology at the University of New Hampshire. Because he has always been in the plant field and has been an ASPB member for more than 20 years, I asked for his guidance regarding names of plant societies that would best serve my interests.
4. **What would you tell nonmembers to encourage them to join?**
   I would especially encourage young graduate students, postdoctoral fellows, and even undergraduate students to join ASPB for an early start in career development. This would provide them a way to interact with other ASPB members and a platform to not only present their work and get feedback but also to gain confidence in public speaking. "Networking with colleagues" would be the key words to encourage them to join. I would also tell them to look at the ASPB web page (http://www.aspb.org/membership) for additional member benefits.
5. **Have you found a job using ASPB job postings or through networking at the annual meeting?**
   No. My current job is the only job that I ever applied for after I finished school, and I have been happily working in this same position for more than 15 years. However, meeting colleagues from other places has helped me find collaborators in the United States and abroad and decide the laboratories for sabbatical leaves in Norway, Japan, and New Zealand.
6. **Have you hired anyone as a result of a job posting at the meeting or on our online Job Bank?**
   No, not yet.
7. **Do you still read print journals? If so, where do you usually read them?**
   Yes, I read a combination of hard-copy and online journals. Depending on time availability, I end up reading them at home, in the office, or in the library.
8. **What do you think is the next "big thing" in plant biology?**
   "Functional genomics," I think, is the buzzword that is going to attract a lot of attention. It is important to understand the role of gene combinations in the entire metabolic pathway instead of one gene or enzyme in isolation. The most common approach to studying the effects of single-gene mutations and transformations on only its own product(s) will be replaced by its effects on the whole metabolic pathway of which a gene is a part, as well as the related pathways. Traditional biochemical approaches to delineate the functions of genes will become popular once again in the coming years.
9. **What person, living or dead, do you most admire?**
   I have more that one person that I admire. My parents, who gave me the best of everything that they could afford, top this list. I always felt their unconditional love and support even when I thought I was not doing my best in life. They will always have a special place in my heart. I also admire my husband for always standing beside me in support of whatever I decide to do or not do. His endless patience, his stamina, and his ability to relax under any kind of circum-

stances are a few of the things I look up to. Also on this list are the exceptional technical staff at the Northeastern Research Station. The hard work and team effort of these wonderful colleagues, and their cooperation and confidence in me, have made my academic achievements possible. Outside the boundaries of personal connections, it is people like Mahatma Gandhi, Martin Luther King, and Mother Teresa who attract my admiration.

10. **What are you reading these days?**
    I am not much of a reader when it comes to pleasure reading because I am a slow reader and tend to read novels as seriously as research articles. When I do read, though, I like mystery. My favorite author is Mary Higgins Clark. I prefer to read short articles in magazines.
11. **What are your hobbies?**
    Socializing, cooking, walking, and traveling.
12. **What is your most treasured possession?**
    The memories of time spent with my husband and our children during holidays, family vacations, and visits to extended family members and all the photographs and movies of the family growing together.
13. **What do you still have left to learn?**
    There is so much to learn. Everyday, new information is being published. I will be learning all my life, not only about scientific information for my own research area, but also about politics, world affairs, and environmental issues. I plan to keep learning from younger generations, especially my own kids and undergraduate students in my laboratory, about their way of looking at the world, thinking, and rationalizing. Hopefully, this will help me bridge or smooth out the phenomenon of the so-called generation gap.

Congress Increases Funding for NSF Biological Sciences, Plant Genome Research

The conference agreement reached by the U.S. House of Representatives and Senate Conference Committee for the fiscal year 2004 omnibus spending bill budgets approximately $588.5 million for the National Science Foundation's Directorate for Biological Sciences (NSF BIO). The conference agreed to provide $90 million to NSF's plant genome research program, up $5 million from fiscal year 2003 appropriations and $15 million from NSF's request for fiscal year 2004. The conference agreement was signed into law by President Bush on January 23 (Public Law 108-199).

The agreement represents an increase of 3.1 percent for NSF BIO from fiscal year 2003. The conferees bumped up the NSF BIO figure above both the House and Senate recommendations. As a result of **Senator Christopher Bond (R-MO)** and his colleagues' leadership in support of plant genome research, funding for plant genome research and NSF BIO increased significantly over both the original House and Senate recommendations in conference.


Senator Christopher Bond

A public affairs alert was sent to ASPB members in advance of the House–Senate conference, encouraging them to support the Senate recommendation of $90 million for plant genome research and accept the higher recommendation for NSF BIO. We appreciate the timely help of those who sent letters. Prior to the conference, ASPB staff met with the House and Senate Appropriations Committees' staff who manage the NSF portion of the appropriations bill to advocate for $90 million for plant genome research and higher NSF and NSF BIO funding.

Senator Bond has championed support for plant genome research each year since fiscal year 1998, and every year his efforts have been successful in Congress, providing a combined funding total of $465 million for the NSF-sponsored plant genome research program.

Conference Agreement Reached on Agricultural Research Funding

The House–Senate conference agreement for the Consolidated Appropriations Act, 2004, which includes funding for the U.S. Department of Agriculture, has allotted $165 million for competitive research grants sponsored by the National Research Initiative (NRI). The conference agreement was enacted into Public Law 108-199 on January 23.

The NRI funding level approved in the conference agreement is lower than the $180 million Senate recommendation and $1 million, or less than one percent, lower than fiscal year 2003 funding for the NRI. NRI funding in the conference agreement is about $16 million higher than the House recommendation of $149.2 million. Prior to the conference, House staff indicated that the NRI might receive less funding compared with fiscal year 2003, when the NRI received an increase sought by ASPB of $45.6 million, or 38 percent (a two-year doubling rate of increase).

Fiscal year 2004 funding for the Agricultural Research Service (ARS) is appropriated at $1,088,892,000 in the conference agreement. This is an increase of $52,113,000, or 5 percent, over fiscal year 2003 funding for ARS.

In advance of the conference, ASPB staff contacted all ASPB members in Wisconsin and Utah—states of the chair and ranking member of the Senate Appropriations Subcommittee on Agriculture—asking them to urge their Senators to support the higher Senate recommendations for the NRI and ARS in conference. ASPB also contacted members in the districts of the chair and ranking member of the House Appropriations Subcommittee on Agriculture, requesting that they urge their member of Congress to accept the higher Senate recommendations for the NRI and ARS.

DOE Basic Energy Sciences Welcomes Tathwell

Fred Tathwell, who has been with the Department of Energy Office of Congressional Affairs based in the Forrestal Building, Washington, DC, recently moved his office to Germantown, Maryland, to work for **Patricia Dehmer,** Office of Science associate director for Basic Energy Sciences.

The Office of Basic Energy Sciences can be expected to be more directly involved in outreach to congressional offices with Tathwell's move to Germantown. The Biosciences program, which supports basic plant and microbial research, is within the Chemical Sciences, Geosciences and Biosciences Division of the Office of Basic Energy Sciences. Walter Stevens is division director. James Tavares heads the Biosciences program.

The Office of Science held a holiday party December 17 in the Forrestal Building attended by ASPB public affairs staff, Tathwell, Office of Science Director **Raymond Orbach,** and a number of Office of Science officials.

Workshop Explores Journey Through Complex Wheat Genome

A number of ASPB members were among 63 scientists who participated in a workshop on wheat genome sequencing sponsored by the U.S. Department of Agriculture and National Science Foundation, November 10–11, 2003, in Crystal City, Virginia. ASPB staff also attended.

The workshop provided a forum for scientists to share findings and advice on research conducted on wheat, corn, rice, Arabidopsis, and other plants. **Bikram Gill** of Kansas State University, who coordinated the workshop, noted that advice offered at the workshop could help in developing a strategy for sequencing the wheat genome. The genome workshop on this major food crop, which feeds much of the world, generated international interest: Eighteen of the 63 participating scientists hailed from 12 foreign countries.

Participants noted that wheat constitutes 17 percent of all crop acreage and is a staple of 40 percent of the world's population, providing 20 percent of the calories consumed. To meet human demands by 2050, Gill noted that grain production needs to increase at an annual rate of 2 percent. According to Gill, this means that significant advances in the understanding of the wheat plant and grain biology must occur to increase absolute yield as well as protect the crop from 25 percent loss from biotic (e.g., pests) and abiotic stresses (e.g., heat, frost, drought, and salinity).

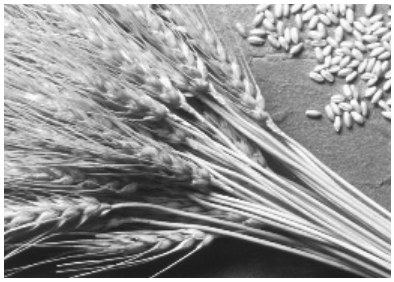


Photo by Scott Bauer, ARS/USDA

Sequencing is a widely accepted mechanism for obtaining the knowledge required to overcome significant challenges facing the growing of a crop such as wheat, because it leverages similar work from other crops and plants. Gill added that sequencing of the wheat genome is feasible because of the abundance of cytogenetic, molecular, and human resources and the successes in sequencing several other plant and animal genomes. Research indicates that the wheat genome, at 16,000 Megabase pairs (Mbp), is likely to be the largest genome ever to be sequenced and will provide a model for structure–function changes that accompany polyploidy, a phenomenon that is common among plants.

Dave Van Sanford explained that a wheat sequence would provide perfect markers for difficult traits, harness genetic diversity, enhance quality, increase yield in drought prone areas, and help design varieties for sustainable food production. Given the polyploid nature of wheat and its economic significance, the available information argues strongly for the hexaploid genome to be the main target for a wheat genome project, with supporting analyses coming from related cereals such as rice, Brachypodium, barley, and diploid and tetraploid wheat, Gill added.

ASPB members **Jeff Bennetzen, Cathy Whitelaw,** and **Joachim Messing** provided detailed assessments of the shotgun sequencing of the maize genome. The sequencing of products from methyl filtration (MF) and high Cot (HC) fractionation procedures are providing gene sequences that are being integrated into two Mb BAC assemblies compiled for the maize genome. The assembly of the maize genome uses the rice genome as a template for confirming mega-contigs, as well as using detailed genetic maps.

Lincoln Stein and ASPB members **Takuji Sasaki** and **Robin Buell** emphasized the importance of detailed genetic maps to guard against false assemblies of BAC contigs that are based only on fingerprinting procedures

continued on page 14

continued from page 13

(even if these use high-resolution analytical procedures).

Bennetzen and **Dick McCombie** noted that shotgun sequencing could produce a draft sequence but that this draft could be completed only by the further analysis of a BAC contig assembly across the entire genome. Buell emphasized the importance of determining full-length complementary DNA (cDNA) sequences soon to help interpret drafts of the genome sequence. Work on full-length cDNA sequences in wheat in Japan and China was reported by ASPB member **Yasunari Ogihara** and **Jizeng Jia,** respectively.

A number of countries and their scientific representatives (**Rudi Appels,** Australia; **Daryl Somers** and ASPB member **Bill Crosby,** Canada; Jizeng Jia, China; **Jaroslav Dolezel,** Czech Republic; **Boulos Chalhoub** and **Francis Quetier,** France; **Nils Stein,** Germany; **S. Nagarajan,** India; **Albino Maggio,** Italy; Yasunari Ogihara, Japan; ASPB member **Anna-Maria Botha-Oberholster,** South Africa; ASPB member **Beat Keller,** Switzerland; and **Ian Bancroft,** United Kingdom) at the workshop indicated their commitment to focusing on certain regions of the genome, with the aim of joining their sequencing efforts into a larger wheat genome–sequencing project, according to Gill.

This staged approach would build on the resources already established by large investments in the United States and other countries and contribute to specific new pilot projects established in the United States. Gill noted that leadership in the wheat genome project is crucial, because contributions from large projects also must integrate contributions from smaller projects to establish an international effort and ensure that accurate sequencing–interpretation is provided to extend the sequence of a particular region of the genome.

Gill said there was a strong consensus among the workshop participants for a sequencing project in hexaploid wheat because of its economic importance, its historic role as a polyploid genetic model, the availability of extensive genetic and molecular resources, and a large and vibrant global wheat genetics community.

The wheat genome workshop evolved from an earlier stakeholders' workshop sponsored by USDA and coordinated by ASPB that was held November 14, 2002, on plants and pest biology. Gill was one of the 45 participants at the stakeholders' workshop, where he advocated sequencing of the wheat genome.

Arabidopsis Gene Expression Map Charts Course to Understanding Plant Development—Could Lead to New Ways to Enhance Crops

A new "gene expression" map is helping scientists track how a complex tissue ultimately arises from the blueprint of thousands of genes, the National Science Foundation (NSF) reported in a news release December 11.

Focusing on the root of a small flowering mustard plant, *Arabidopsis thaliana,* a research team led by Duke University biologist **Philip Benfey,** a member of ASPB, created a detailed mosaic of cells showing where and when about 22,000 of the plant's roughly 28,000 genes are activated within growing root tissue.

The results, announced in the December 12 issue of the journal *Science,* are the first to demonstrate "this level of resolution of gene expression on a global basis for any organism," said Benfey. The work, he noted, serves as "a proof of principle" that similar approaches can be applied to other plant organs and other organisms.

It also marks the first time researchers have tracked the vast majority of an organism's genes as they are switched on and off as cells grow, continually divide, and ultimately differentiate to build specialized tissue.

The ability to track gene expression on this scale (with each cellular division along a comprehensive front) is critical to answering one of biology's basic, yet most puzzling, questions: How do distinct, yet coordinated organs and specialized cells arise from the endless division of cells that initially seemed quite similar? For example, how does this complex process with a simple name, development, begin with a single, fertilized cell and ultimately yield a plant with roots, leaves, buds, and blooms?

The researchers also found that different types of root cells tended to express particular sets of genes that were clustered together on the plant chromosomes. Understanding these patterns of cell types and gene clusters, Benfey said, could help biologists decipher the genetic machinery of development and eventually lead to new ways to enhance crops.

Three years ago following an international effort, Arabidopsis became the first plant to have its genome sequence completed. NSF, a key funder of the sequencing effort, then launched "Arabidopsis 2010," a program to determine the function of all the plant's genes in this decade. (It, too, is part of a multinational effort.)

The gene expression map announced in *Science* resulted from a $2.2 million 2010 project to apply "genomics approaches to finding transcriptional networks." The research was funded by NSF.

Using a gene's DNA as the template, the transcription process creates strands of RNA, molecules that control the building of proteins and serve as catalysts. A network of var-

ious biochemical factors, such as signaling hormones, can affect this process.

According to **Joanne Tornow,** a program director in NSF's Division of Molecular and Cellular Biosciences, "the creation of the root map is a terrific advance forward."

"The process should work with other plant tissues, although beyond the root it may be more difficult to observe changes in gene expression over developmental time," said Tornow. "But this lays the groundwork for looking at how various biological pathways interlink in transcriptional networks," she said. "There are still thousands of genes in Arabidopsis, and we know almost nothing about their function. By knowing when a gene is expressed and where it is expressed, we get clues about the processes it is involved with and potentially its function as well."

To develop the map, Benfey worked with colleagues at Duke, New York University, and the University of Arizona. In *Science,* they report, "High throughput techniques allowed the harvesting, protoplasting (breaking down of cell walls by enzymes), and sorting of approximately 10 million cells in about 1.5 hours."

To track gene expression over time, they relied on the fact that a root cell's advancing stages of development correlate to its distance from the root tip's growing point.

To track the lineage of individual cells as they developed into specific tissue, they attached marker genes to genes characteristic of each of five different cell types or tissues. The marker genes produce a telltale, and therefore traceable, green fluorescent protein when the gene they're attached to is activated.

Then, using methods invented by ASPB member **David Galbraith** at the University of Arizona, researchers moved quickly to sort, isolate, and identify the fluorescence-activated genes, which glow under ultraviolet light when the gene they've marked is being expressed. They conducted the process during three successive stages synchronously across five zones of cells and tissues in the root.

To generate a visual map of 15 "subgrids," the massive amount of data was "digitally reconstructed" with the intensity of gene expression illustrated along a color scale.

According to Benfey, "other genomic studies, in which whole tissues were ground up and their global gene expression profiles determined, certainly generated much useful information. However, critical information on the mechanisms of development was lost. Development occurs at the single cell level, and there's a dramatic difference from one cell to the next, in terms of its gene expression."

European Panel Finds Roundup™-Ready Maize as Safe as Conventional Maize

The European Food Safety Authority's (EFSA's) scientific panel on genetically modified organisms reported December 4, 2003, its conclusion that Monsanto's herbicide-tolerant, genetically modified maize NK 603 is as safe as conventional maize. The panel also concluded that placing this genetically modified maize on the market, to import for processing and for food or feed use, is unlikely to have an adverse effect on human or animal health or, in this context, on the environment. A comprehensive environmental assessment was not conducted because the applications for GM maize NK 603 concern only import and processing, not cultivation of the maize. "These opinions have been requested as the first of a series of risk assessments of different GM plant varieties," said **Harry Kuiper,** chair of the Scientific Panel on Genetically Modified Organisms (GMO).

NK 603 maize has been genetically modified to provide tolerance to the herbicide glyphosate (commonly formulated as Roundup™). The stated purpose of this modification is to allow farmers to manage weeds more effectively in maize fields during cultivation. To conduct the risk assessment process, EFSA used the 2003 European Union's "Guidance Document for the Risk Assessment of Genetically Modified Plants and Derived Food and Feed" (http://europa.eu.int/comm/food/fs/sc/ssc/out328_en.pdf).

Photo by Ken Hammond, ARS/USDA

The following includes an excerpt from a news release issued by the Rockefeller Foundation.

Gordon Conway, President of the Rockefeller Foundation, to Retire at End of 2004

December 9, 2003 (New York)—**Gordon Conway,** president of the Rockefeller Foundation, has announced that he will retire at the end of 2004, after having led the foundation for more than six-and-a-half years. Mr. Conway, 65, will return with his family to his home in London.

"Serving as president of the Rockefeller Foundation is a special honor and privilege," Conway said. "I am proud of the role the Foundation has played in addressing a range of critical issues faced by the world's poor, from its work to increase food production and tackle critical diseases, improve access to employment and affordable housing, and sustain the cultural and creative energies of artists and communities throughout the world."

"Gordon has been a superb president, charting a solid course for the Rockefeller Foundation for many, many years to come," said **James F. Orr, III,** chairman of the board of trustees. "I speak for my fellow board members and the foundation staff in saying that we owe a debt of gratitude to Gordon for his outstanding leadership, vision, and compassion. I look forward to working with him on a productive year ahead."

In an article from the *ASPP News* (volume 27, number 5, September/October 2000) Conway noted, after being presented the Leadership Award during Plant Biology 2000, the important role scientists play in addressing the needs of the world's hungry. He mentioned the need for a new Double Green Revolution that would meet the nutritional requirements of people in the developing world. Sophisticated approaches [are] needed in plant genetics; more effective and environmentally benign agricultural practices, improved distribution systems, and efforts to better tap the talents of poor farmers themselves are all essential.

During the ASPB Plant Biology 2000 meeting in San Diego, Gordon Conway received the ASPB Leadership in Science Public Service Award and presented the perspectives of science leaders talk.

http://www.rockfound.org/display.asp?context=1&Collection=1&DocID=636&Preview=0&ARCurrent=1

Compiled and edited by Sheila Blackman, Grand Valley State University, Biology, One Campus Drive, Allendale, MI 49401, blackmas@gvsu.edu

Education Posters Presented at 2003 ASPB Annual Meeting

Posters are always an exciting and informative part of the ASPB annual meeting. Although ASPB members are allowed to present only one research poster, they may present a second poster in the education category. This year, many interesting education posters highlighted the development of new educational resources or the incorporation of genomics and bioinformatics into the undergraduate curriculum. For abstracts of all the education posters presented at ASPB 2003, see http://abstracts.aspb.org/pb2003/public/P25/.

The education posters at the ASPB meeting in Honolulu had an interesting new addition this year—posters presented by high school students about a course they took at the University of Rhode Island (URI). The course was organized by a new not-for-profit organization called "Lifeedu" (http://www.lifeedu.org/) that is developing educational resources (see the November/December 2003 issue of the *ASPB News*). The high school students who participated in the course "Modern Techniques in Genetic Engineering" at URI made posters and presented them at the ASPB meeting.

Several posters were presented that highlighted how genomic approaches are being incorporated into the undergraduate curriculum. In her poster "Connecting the Classroom With Primary Research: Molecular Analysis of Red Clover Genes," ASPB member Sharon Thoma described how students in an upper-level cell and molecular biology class used a red clover complementary DNA library as a source for clones, which they analyzed through a variety of approaches. Thoma, an assistant professor of biology at Edgewood College, in Madison, Wisconsin, wrote:

> Students carried out BLAST searches of DNA and protein databases to determine possible identities of their clones. Three clones, corresponding to a psaH protein, ferredoxin 1, and an early light-induced protein were chosen for further analysis. For each clone, the entire sequence was determined and the expression pattern was analyzed via RNA blot analysis. Because red clover is not widely studied on the molecular level, these data are unique and provide an opportunity for undergraduate students to publish data in electronic DNA databases and/or in peer-reviewed publications.

Richard Mercier, a research assistant professor in plant science at the University of Connecticut, presented a poster titled "Undergraduate Student Involvement in Bioinformatics: Genetic Analysis of T-DNA Insertional Mutant Plants as an Educational Tool." Mercier explained how undergraduates learned bioinformatics and molecular biological techniques as they studied transferred DNA insertion knockout lines in cyclic nucleotide gated channels. Students analyzed these genes using tools available from the National Center for Biotechnology Information (http://www.ncbi.nlm.nih.gov), the Munich Information Center for Protein Sequences (http://mips.gsf.de), The Arabidopsis Information Resource (http://www.arabidopsis.org) and PlantsP (http://plantsp.sdsc.edu), and molecular techniques including polymerase chain reaction and Southern analysis.

Nicholas Ewing, an assistant professor from the California State University at Sacramento, presented a poster titled "Integration of Microarray Analysis of Gene Expression Into Undergraduate Laboratory Courses." Using databases of raw data generated by the Genome Consortium for Active Teaching (GCAT; http://www.bio.davidson.edu/biology/gcat), Ewing developed exercises to help students learn the tricks and tools of analyzing the large data sets generated by microarray technology. For those interested in incorporating microarray experiments and analysis into research with undergraduates and undergraduate courses, GCAT offers a variety of resources ranging from inexpensive access to microarray chips to clustering and analysis tools.

Paul Twigg, associate professor of biology at the University of Nebraska–Kearny, presented a poster on "Use of Glutamine Synthetase Gene Sequences as a Tool for Learning About Plant Phylogeny at the Molecular Level." Twigg and his students are obtaining glutamine synthetase sequence information from many species and using this molecular information to determine the correct phyogenetic placement of species within the Fabaceae. This project has been the focus of undergraduate research projects and used in undergraduate and graduate plant taxonomy courses.

Other posters presented pedagogical innovations in undergraduate plant biology education, including peer evaluation of oral presentations, textbook reviewing as an educational experience, and web-based learning modules in introductory biology and for using the *Digital Plant Biology Compendium* (http://www.photobiology.info). A variety of laboratory exercises were presented, including those involving medicinal plants, *C-Fern,* and horticultural plants.

These posters represent a small sampling of the many innovative and creative ways ASPB members are developing and implementing novel approaches to plant biology education. The education posters are a great way to disseminate ideas. Look for the Call for Abstracts for Plant Biology 2004 (see the November/December 2003 issue of the *ASPB News* or visit http://www.aspb.org/abstract) and consider presenting a poster highlighting your accomplishments in the area of education. And remember to include the education posters as a stop on your itinerary. You will walk away inspired and impressed by the efforts of your fellow ASPB members.

Mary E. Williams
mwilliams@thuban.ac.hmc.edu

Revised ASPB Education Web Page

ASPB's education web page was recently given a major overhaul, thanks to the efforts of Education Committee Chair Larry Griffing and ASPB webmaster Wendy Sahli. The purpose of the new format is to provide ASPB members, educators, and students easier access to resources for teaching and learning science using plants and plant science.

Lawrence Bogorad

Lawrence Bogorad, Marie Moors Cabot Professor of Biology Emeritus at Harvard University and former president of the American Society of Plant Biologists, died from a stroke December 28, 2003, at the age of 82, while vacationing with his family in Puerto Vallarta, Mexico.

Dr. Bogorad was an influential leader in the movement to bring the techniques of molecular biology to bear on problems in plant biology. He will be remembered for his groundbreaking contributions to the understanding of the biogenesis of chloroplasts and the photosynthetic apparatus in plants, algae, and cyanobacteria. He also will be remembered for and honored by five decades of graduate students, postdoctoral fellows, and visiting scientists who trained in his lab and whom he mentored, through example and unfailing support, into productive careers of their own.

Bogorad grew up in Chicago, earned his bachelor's degree in 1942 and, after a stint in the U.S. Army, received his Ph.D. degree in botany in 1949 from the University of Chicago. He taught as an instructor there before beginning a postdoctoral fellowship in Sam Granick's lab at the Rockefeller Institute for Medical Research in 1951. The work that he began in Granick's lab, the interactive and wide-ranging academic community that he encountered at Rockefeller, and his own personal enthusiasm and energy formed the stable base from which he launched his extremely productive and influential career.

In Granick's lab, Bogorad began using a combination of biochemical genetics (pigment-deficient mutants of Chlorella and porphyric mutants of humans and cows) and biochemistry to characterize the pathway of porphyrin biosynthesis. When he returned to the University of Chicago as an assistant professor in 1953, he continued this work, leading to the identification of two enzymes in uroporphyrin II synthesis. As his research attracted more and more students anxious to work with him, Bogorad's boundless curiosity pushed a diversification of his group's research scope. They studied biosynthesis of bilipigments and phycobiliproteins in cyanobacteria and in Cyanidium. They undertook studies of the physiology of complementary chromatic adaptation in Fremyella and the greening process in etiolated seedlings. In the latter case, they used George Beadle's favorite organism at the time, maize, which was readily available in the greenhouse.

In 1962, when Hans Ris and Walter Plaut published histochemical evidence for the presence of DNA in chloroplasts, Bogorad immediately understood the importance of determining the role of this DNA in chloroplast biogenesis. Primed initially by a fruitful collaboration with Hewson Swift, they and their students began more detailed studies of chloroplast DNA, ribosomes, and RNA synthesis. This shift in research emphasis also fueled Bogorad's personal fascination with the evolutionary pathway that connects modern-day chloroplasts with their cyanobacterium-related endosymbiont ancestors.

By the time Bogorad moved to Harvard University in 1967, the tools of molecular biology were beginning to become sufficiently sharp to make central contributions to the study of chloroplast biogenesis and function. Pushed by a focal desire to understand the molecular mechanisms of transcription and its control in chloroplasts, Bogorad's group led the charge into plant molecular biology with key contributions in a number of areas. In 1971, they were among the first to provide strong evidence that genes encoding proteins localized in the chloroplast were distributed between the nuclear and chloroplast genomes. They constructed the first restriction map of chloroplast DNA (maize, in 1976) and determined the first complete DNA sequence of a chloroplast gene for a known protein (rbcL, in 1980). They were also the first to identify a key component of the photosynthetic apparatus via its DNA sequence before it had been recognized by biochemical means (psaA or psaB—only one of these proteins had been identified at the time). This latter finding was particularly important for studies of photosynthesis because it provided the first definitive evidence that Photosystem I was composed of a heterodimeric core, analogous to the structure of PS II and bacterial photosynthetic reaction center complexes. Bogorad's group was also in the vanguard of using molecular techniques to identify and characterize nuclear genes involved in chloroplast biogenesis and function. They made effective early use of transgenic methods for dissecting the *cis*-acting elements essential to the regulation of both chloroplast and nuclear genes.

At critical junctures in the development of the fields that excited him, Bogorad helped to organize influential symposia. At Strasbourg in 1976, he and Jaques-Henry Weil organized an advanced workshop and symposium on nucleic acids and protein synthesis in plants (Bogorad and Weil, 1977). At Cold Spring Harbor Laboratory in 1984, he helped to organize a symposium on the molecular biology of the photosynthetic apparatus (Steinback et al., 1985). In both cases, the discussions helped to galvanize the efforts of the assembled international community of investigators just at a time when technical advances had opened broad new horizons. In retrospect, the published proceedings are really beginning words rather than final words on their subjects. Bogorad had a unique gift for seeing ahead.

Bogorad took seriously the leadership responsibilities that his scientific successes thrust on him. He served as president of the American Society of Plant Physiologists from 1968 to 1969, the Society for Developmental Biology in 1983, and the American Association for the Advancement of Science in 1987. He was elected to the American Philosophical Society in 1985, the American Academy of Arts and Sciences in 1968, and the National Academy of Sciences (NAS) in 1971. At NAS, he served on the editorial board of the *Proceedings of the National Academy of Sciences,* constantly seeking and

promoting publication of work on the leading edge of plant molecular biology. As chairman of the editorial board from 1991 to 1995, he initiated many changes in the review process designed to increase its rigor and also effected change in the cover design from plain gray to the present, more colorful format. He served on the NAS Committee on Science, Engineering, and Public Policy and on the Space Studies Board.

Bogorad was one of the first scientists to recognize the power of molecular biology to generate improvements in agriculture and pushed for accelerated investments in the necessary basic research by federal agencies. After gaining experience as a valued member of National Science Foundation review panels, he played an important role in advocating high standards of scientific review as the USDA competitive grants program was in its critical early years. He understood the importance of capitalizing on the vested interests of agribusiness to stimulate its support of research that would escalate the rate of scientific discovery. He played an important role in the founding of Advanced Genetic Systems, Inc., one of the first publicly traded agricultural biotechnology companies, and served on its science advisory board during its early growth phase. As befit his global view of science, he also served on the science advisory board of Plant Genetic Systems n.v. in Belgium. He served as an adviser to the Rockefeller Foundation and more recently on the board of directors of the Boyce Thompson Institute at Cornell. His experience and broad perspective in these advisory roles will be missed.

As a mentor for young scientists, Bogorad had a style that earned him their devotion. He was continually upbeat and supportive of their work and pushed them to develop projects of their own. There were several direct consequences. Because of his encouragement of both effort and independence, the students felt vested in their projects and were generally happy and productive, but collectively they ended up working on a very wide variety of topics and study organisms. The activity on so many different projects contributed immensely to the academic excitement of the lab. The sense of independence and adventure that Bogorad nurtured in his students contributed to a remarkable progression of reinvention within the lab as it kept at the forefront of a field that was undergoing continual technical change. He even treated the tragic fire that destroyed much of the lab in 1984 as an opportunity for renewal, encouraging people to think about the great experiments they were going to do in the new and improved facility. Bogorad himself actively sought out technical advances, embraced them, and then pushed their limits. He would frequently return from a scientific meeting (preferably one in some exotic locale) flush with excitement over an idea for a new strategy that would achieve dramatic progress in the lab. He occasionally stepped into the lab himself to show the way. Late one night in 1971, he could be seen excitedly preparing purified rubisco protein to raise the antibodies that he knew could be used for isolating the genes that encode its subunits. This simple but important start led to the cloning of the first plant gene some five years later.

Teaching and writing were twin passions for Bogorad. In spite of preparation through experience as an instructor at the University of Chicago, he viewed the challenge of teaching while beginning his independent research career with trepidation (Bogorad, 2001). With characteristic energy, he focused on the challenge and succeeded, earning one of the university's highest honors, the Quantrell Award for Excellence in undergraduate education, in 1959. The receipt of this award stood as one of his most cherished honors throughout his career. A continual effort to find and define the broader context of his laboratory research through both teaching and writing was a distinctive component of his scholarship.

Bogorad was a warm, gregarious, and generous person, equally at ease in conversation with influential scientists, politicians, or movie stars as with his long-time dishwasher, Olga Mili, or with the janitors who came to suppress the occasional insect infestations in the lab. In each case, he commanded respect and admiration as quickly as he gained friendship. He loved exploration of the places, peoples, and gastronomy of the world almost as much as he loved exploration of new frontiers in science. A favorite pasttime was sitting at table with a group of his colleagues and regaling them with some epic story with an always clever but often obscure punch line. These gatherings often included mixtures of the eminent and the aspiring, and Bogorad always took care to make sure that the former knew the accomplishments of the latter, which he would describe with fatherly pride. Always supportive of his students and his family, always inquisitive, Bogorad embraced science and life together as a combined adventure. In his own words, "my worst career error was to be born too early! I will miss the next exciting chapter in biology. This one has been wonderful to behold!" (Bogorad, 2001).

Bogorad is survived by his wife of 60 years, Rosalyn, who suffers from Alzheimer's disease; by his daughter, Kiki Bogorad-Gross of Newton, Massachusetts; by his son Leonard of Bethesda, Maryland; by four grandchildren; and by his partner Kathleen Mullinix. A memorial service in his honor will be held Friday, May 7, 2004, at Harvard University.

In lieu of flowers, the family requests that tax-deductible contributions be made to ASPB to endow the Lawrence Bogorad Award for Research Excellence in Plant Biology. This will be a triennial award for investigators who have continued the Bogorad tradition of tackling and solving the critical biological questions of their time.

Laurie Mets
mets@uchicago.edu

References

Bogorad, L., and Weil, J. H. (eds.). (1977). *Nucleic Acids and Protein Synthesis in Plants.* New York: Plenum Press.

Bogorad, L. (2001). Samples from Fifty Years of Career Decisions. Plant Physiology **126,** 1345–1346.

Steinback, K. E., Bontiz, S., Arntzen, C. J., Bogorad, L. (eds.). (1985). *Molecular Biology of the Photosynthetic Apparatus.* New York: Cold Spring Harbor Laboratory Press.

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

	Susan Rosenberry / ext. 111 chambers@aspb.org	Stefanie Shamer / ext. 144 shamer@aspb.org	Stephanie Liu-Kuan / ext. 143 sliu@aspb.org	Kelley Noone / ext. 142 knoone@aspb.org	Suzanne Moore Cholwek / ext. 141 smoore@aspb.org	Brian Hyps / ext. 114 bhyps@aspb.org	Nancy Winchester / ext. 117 nancyw@aspb.org	Beth Staehle / ext. 121 beths@aspb.org	John Long / ext. 119 jlong@aspb.org	George Kendall / ext. 118 gkendall@aspb.org	Lisa Pergolizzi lisa@aspb.org	Annette Kessler / ext. 120 akessler@aspb.org	Leslie (Ash) Csikos / ext. 125 lcsikos@aspb.org	Wendy Sahli / ext.123 wendys@aspb.org
Missing journal issues, books				●										
Subscriptions, individual				●										
Subscriptions, institutional					●									
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							●							
Address changes				●										
Membership applications				●										
Membership problems				●										
Accounts payable		●												
Accounts receivable			●											
Accounts payable/receivable problems	●													
Annual meeting	●													
Public affairs /government relations						●								
Education						●								
Society governance	●													
ASPB Education Foundation						●								
International issues	●													
Awards	●													
Biochemistry & Molecular Biology of Plants							●							
Web site														●

ASPB News

American Society of Plant Biologists
15501 Monona Drive
Rockville, MD 20855-2768 USA

ASPB News (ISSN 1535-5489; Online ISSN 1544-9149) is published bimonthly by the American Society of Plant Biologists, 15501 Monona Drive, Rockville, MD 20855-2768 USA, telephone 301-251-0560, fax 301-279-2996. Members' dues include a subscription price of $2 per year to *ASPB News.* Subscription price to nonmembers is $30 per year. Periodicals postage paid at Rockville, MD, and at additional mailing offices. Postmaster: Please send address changes to *ASPB News,* 15501 Monona Drive, Rockville, MD 20855-2768 USA.