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**Leon Kochian
Receives
International
Food Innovation
Prize**

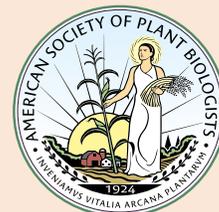


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ASPB News



THE NEWSLETTER OF THE AMERICAN SOCIETY OF PLANT BIOLOGISTS



Blake Meyers Appointed Next Editor of *The Plant Cell*

ASPB is pleased to announce the appointment of Blake C. Meyers as editor-in-chief of *The Plant Cell* beginning January 1, 2020. *The Plant Cell* publishes novel research of particular significance in plant biology, especially in the areas of cellular biology, molecular biology, genetics, development, and evolution. *The Plant Cell*, one of the top primary research journals in plant biology, was established in 1989. This year marks the journal's 30th anniversary.

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President's Letter

The Transparency Project

BY JUDY CALLIS
ASPB President, University of California, Davis

The word *transparent* has multiple meanings. For us scientists, we might first think of a solution in a tube or vial being transparent, defined by *Merriam-Webster* as “having the property of transmitting light without appreciable scattering so that bodies lying beyond are seen clearly” (<https://www.merriam-webster.com/dictionary/transparent>). As in, did your chemical dissolve? But the transparency to which I refer is the second set of definitions in the dictionary: “free from pretense or deceit,” “readily understood,” and most relevant for this letter, “characterized by visibility or accessibility of information especially concerning business practices.”

ASPB is an active and multifaceted organization with diverse activities including outreach, professional development, publishing, and advocacy, among others. Because of these various endeavors, understanding how ASPB works toward achieving its missions can seem challenging, and you may find it difficult to see how you can contribute to and benefit from ASPB's missions. Recent reorganization changes may complicate this as



well. In the fall of 2015, the main leadership committee, previously called the Executive Committee, was reorganized into two different committees—the Council and the Board of Directors (the latter affectionately abbreviated “BoD”).

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ASPB Council

Council members highlighted in blue also serve on the Board of Directors.

President	Judy Callis
Immediate Past President; Chair	Rob Last
President-elect	Maureen McCann
Secretary	Wayne Parrott
Treasurer; Chair, Board of Trustees	Kent Chapman
Elected Members	Christine Foyer Clint Chapple Laura Wayne
Chair, Membership Committee	Jose Dinneny
Chair, Minority Affairs Committee	Gustavo MacIntosh
Chair, Publications Committee	Neil E. Olszewski
Chair, Women in Plant Biology Committee	Laura Wayne
Chair, Education Committee	Erin Friedman
Chair, International Committee	Anja Geitman
Chair, Science Policy Committee	Nathan Springer
Sectional Representatives	
Mid-Atlantic Section	Mike Axtell
Midwestern Section	Gustavo MacIntosh
Northeastern Section	Carolyn Lee-Parsons
Southern Section	Ashlee McCaskill
Western Section	Kulvinder Gill
Mexico Section	Rubén Rellán Álvarez
Environmental and Ecological Plant Physiology Section	Andy VanLoocke
Primarily Undergraduate Institutions Section	Leeann Thornton
Ambassador Alliance	Sunil Kumar

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Peer review manager, The Plant Cell	Annette Kessler, akessler@aspb.org

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

Copy deadline is the 5th day of the preceding even-numbered month (for example, April 5 for May/June publication).

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PRESIDENT'S LETTER
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In the coming year, together with Past President Rob Last, President-elect Maureen McCann, the chairs of the standing committees, and the outstanding ASPB staff, we plan to inform and highlight the activities of various committees and people in ASPB who work to advance one or more of our missions. In the President's Letter, I hope to provide insights on the hard work our committees engage in throughout the year. Finding more ways to communicate ASPB activities to you, its members, is a major aim for the coming year.

In fact, let me start with our missions. In 2018, the Council articulated the following working statement on our missions:

ASPB Mission Statement

- To nurture plant scientists through leadership and learning opportunities
- To provide venues and platforms for communicating plant science research
- To promote scientific quality, innovation, and integrity
- To increase awareness of the importance of plant science
- To inform, communicate, and positively influence policy related to plant biology in the United States and internationally.

In this letter I highlight the nature and activities of the Board of Directors, which is chaired by the president-elect (last year, that was me!). The seven-member BoD is the main decision-making body of the Society for all matters not specified for other bodies by our constitution (<https://aspb.org/about/constitution/>). The BoD consists of the president-elect, president, secretary, treasurer, and

three elected members (one elected from among eligible Council members and two from the membership at large). For the list of recently elected BoD members, see page 5 of this issue.

The BoD takes action on issues brought to it directly by staff, committees, and the Council. The BoD's smaller size facilitates the frequent communication with ASPB staff and decision making that need to occur during the course of the year. The BoD balances furthering our missions with enforcing fiscal responsibility so that ASPB may be alive and well through the next 100 years.

In 2018–2019, under President Rob Last's leadership, ASPB established regular standing meetings for both the Council and the BoD; however, both committees—but the BoD especially—have additional email and phone conversations throughout the year. This additional communication is needed to discuss and craft new policies and initiatives and

to respond to membership and to national and international events in a timely manner. The evolution of high-quality conference call services has greatly facilitated these conversations (remember when there were all kinds of technical problems with conference calls? I admit they haven't gone away completely, but . . .).

Also, in the spirit of being transparent and informing our membership, summaries of Council and BoD meetings will [soon] be posted on our website. We will include as much content as legally and ethically appropriate in these summaries, but please remember that some conversations (regarding personnel, for example) will have to be redacted. We appreciate feedback on how we can do better to inform you, our membership, and we ask that you remember that this is an ongoing effort. ■

Job Board

Looking for a job, or looking to hire? Check out the ASPB job board on *Plantae* at <https://jobs.plantae.org/>. You can post jobs or your resume and also get job alerts.

ASPB History

Curious about ASPB's history, especially with our centennial approaching in 2024? Check out our early history (<https://aspb.org/about/history>), penned in 1989 by J. B. Hanson, who was professor of plant biology at the University of Illinois at Urbana–Champaign.



HISTORY OF THE
AMERICAN SOCIETY OF
PLANT PHYSIOLOGISTS

by
J. B. Hanson

American Society of Plant Physiologists

Quick Quiz

How many ASPB members were there in 1925? What was the annual membership fee in 1925? Answers next time . . .



Nominate!

The Call for Nominations for ASPB Council positions is fast approaching. Please keep an eye out for an email message that will be sent to members on January 3, 2020, and be sure to submit your nominations by Wednesday, February 12, 2020.

ASPB relies on dedicated individuals who commit their

time and energy to leading the Society. This year, members will be nominating and then voting for president-elect and secretary-elect. We need nominees to consider for these positions, so please participate in the process and let your voice be heard by submitting a nomination at <http://excom.aspb.org>. A list

of prior presidents who have served ASPB (and who are therefore ineligible to serve again in that capacity) can be viewed at <http://aspb.org/about/past-presidents/>.

The Call for Nominations will open soon, so please join your colleagues and nominate! ■

BLAKE MEYERS *continued from page 1*

Blake is a member of The Donald Danforth Plant Science Center (St. Louis). He is a professor at the University of Missouri, Division of Plant Sciences (Columbia), and an adjunct professor at the Department of Biology, Washington University in St. Louis. His current research focuses on three major areas. First, his lab analyzes small RNA, DNA methylation, and genomes of maize, rice, Arabidopsis, and other species. Blake utilizes short-read DNA sequencing technologies for these analyses. Second, his lab creates and then applies novel informatics approaches for storing, analyzing, displaying, and then publicly releasing these data. Third, his lab performs functional

and evolutionary analyses of gene families of interest.

Among his many awards and honors, Blake is an elected fellow of ASPB (2017), the winner of ASPB's Charles Albert Shull Award (2017), an ISI/Clarivate Highly Cited Researcher (recognizing the top 1% most cited researchers in a subject area, 2014–2016 and 2018), an elected fellow of the American Association for the Advancement of Science (2012), and a National Science Foundation Pre-Doctoral Fellow (1992–1995).

Blake said, "It is a profound honor, for which I am grateful, to be named editor-in-chief of *The Plant Cell*, a journal founded 30 years ago that has attained the highest level of impact and scholarship in plant biology. As

a society journal, *The Plant Cell* is a forum for the publication of the best work of members of the community of plant biologists. The editorial board members are outstanding, with their expertise encompassing the full breadth of work in plant biology. The staff at the journal and ASPB, as well as the oversight provided by Society members, is superb. I have worked with these wonderful people for many years, and I look forward to continuing those interactions in this new role. The value that *The Plant Cell* offers to authors is unmatched in terms of impact, publicity, and publication services. Therefore, it is a tremendous opportunity for me to serve the Society and community in this capacity, and to lead the journal as it continues to publish

the highest level of peer-reviewed science in the field."

"I am pleased that Blake Meyers has accepted the position of editor-in-chief of *The Plant Cell*," said ASPB President Judy Callis. "I am confident that under his stewardship, TPC will continue to innovate to best serve our community in the future as the publishing landscape evolves. Special thanks to Sabeeha Merchant for her outstanding service as editor-in-chief of TPC these past five years."

ASPB Past President Rob Last added, "Blake brings a combination of experience with the inner workings of the journal along with fresh ideas on how to keep attracting and publishing the best of plant biology relevant-research." ■

ASPB Officers and Committee Members Assume Posts for 2019–2020

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

Board of Directors

Maureen McCann (2021), *chair, president-elect*
Judy Callis (2020), *president*
Wayne Parrott (2021), *secretary*
Kent Chapman (2023), *treasurer*
Christine Foyer (2021), *elected member* [elected by ASPB membership]
Clint Chapple (2023), *elected member* [elected by ASPB membership]
Laura Wayne (2020), *elected member* [elected by ASPB Council]
Crispin Taylor, *CEO (nonvoting)*

Board of Trustees

Kent Chapman (2023), *chair, treasurer*
Kathy Osteryoung (2020)
Rick Vierstra (2020)
Julia Bailey-Serres (2021)

Constitution and Bylaws

Ken Keegstra (2021), *chair*
Peggy Lemaux (2020)
Bonnie Bartel (2021)

Council

Rob Last (2020), *chair, immediate past president*
Judy Callis (2021), *president*
Maureen McCann (2022), *president-elect*
Wayne Parrott (2021), *secretary*
Kent Chapman (2023), *treasurer; chair, board of trustees*
Christine Foyer (2021), *elected member* [elected by ASPB membership]
Clint Chapple (2023), *elected member* [elected by ASPB membership]
Laura Wayne (2020), *elected member* [elected by ASPB Council]; *chair, Women in Plant Biology Committee*

Jose Dinneney (2023), *chair, Membership Committee*
Gustavo MacIntosh (2020), *chair, Minority Affairs Committee; Midwestern Section representative*
Neil E. Olszewski (2020), *chair, Publications Committee*
Erin Friedman (2022), *chair, Education Committee*
Anja Geitman (2021), *chair, International Committee*
Nathan Springer (2020), *chair, Science Policy Committee*
Michael Axtell (2022), *Mid-Atlantic Section representative*
Carolyn Lee-Parsons (2021), *Northeastern Section representative*
Ashlee McCaskill (2020), *Southern Section representative*
Kulvinder Gill (2020), *Western Section representative*
Rubén Rellán Álvarez (2021), *Mexico Section representative*
Andy VanLoocke (2020), *Environmental and Ecological Plant Physiology Section representative*
Leeann Thornton (2020), *Primarily Undergraduate Institution Section representative*
Sunil Kumar (2020), *chair, Ambassador Alliance*
Crispin Taylor, *CEO (nonvoting)*

Education Committee

Erin Friedman (2022), *chair*
Ashley Cannon (2020), *early career representative*
Susan Bush (2021)
Estelle Hrabak (2021)
MariaElena Zavala (2021)
Joseph Jez (2022)
Tara Phelps-Durr (2022)
Jonathan Gilkerson (2023)
Valerie Haywood (2023)

International Committee

Anja Geitman (2021), *chair*
Pablo Bolaños-Villegas (2020), *early career representative*
Jurandir Magalhaes (2020)
Kranthi Mandadi (2020)
Bijay Singh (2020)
Zuhua He (2021)
Rubén Rellán Álvarez (2021)

Membership Committee

Jose Dinneney (2023), *chair*
Rishi Masalia (2020), *postdoc member*
Katy McIntyre (2021), *graduate student member*
Clayton LaRue (2023)
Erin Sparks (2024)
Kulvinder Gill (2020), *ex officio*
Gustavo MacIntosh (2020), *ex officio*
Ashlee McCaskill (2020), *ex officio*
Leeann Thornton (2020), *ex officio*
Andy VanLoocke (2020), *ex officio*
Carolyn Lee-Parsons (2021), *ex officio*
Rubén Rellán Álvarez (2021), *ex officio*
Michael Axtell (2022), *ex officio*

Minority Affairs Committee

Gustavo MacIntosh (2020), *chair*
Asia Hightower (2020), *early career representative*
Thelma Madzima (2020)
Cris Argueso (2021)
Sona Pandey (2021)
Terri Long (2022)
Miguel Vega-Sanchez (2022)

Nominating Committee

Maureen McCann (2022), *chair, president-elect*
Judy Callis (2021), *president*
Rob Last (2020), *immediate past president*

Program Committee

Wayne Parrott (2021), *chair, secretary*
Maureen McCann (2020), *president-elect*
Andrew Bent (2020), *past secretary*
Gilles Basset (2020)
Laura Klasek (2020), *early career representative*
Stacey Harmer (2021)
Phil Taylor (2021)
Shinhan Shiu (2022)

Publications Committee

Neil E. Olszewski (2020), *chair*
Craig Schenck (2020), *early career representative*
Steve Theg (2021)
Hong Ma (2022)
Pamela J. Hines (2023)
Lisa Ainsworth (2024)

Science Policy Committee

Nathan Springer (2020), *chair*
Rob Last (2020), *immediate past president*
Karen Koch (2020)
Shandrea Stallworth (2020), *early career representative*
Jeffrey Chen (2021)
Scott Jackson (2022)
Carolyn Lawrence-Dill (2022)
Rebecca Bart (2023)
Tessa Burch-Smith (2023)

Women in Plant Biology Committee

Laura Wayne (2020), *chair*
Kelly Marie Gillespie (2020)
Grace Miller (2020)
Katy Murphy (2020), *early career representative*
Eva Farre (2021)
Li Tian (2021)
Aruna Kilaru (2022)

2019–2020 Awards Committees

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

Charles Albert Shull Award

Kris Niyogi (2021), *chair*
Siobhan Brady (2020), *past winner*
Patricia Bedinger (2020)
Libo Shan (2022)

Charles F. Kettering Award

Don Ort (2020), *chair*
Manajit Hayer-Hartl (2020), *past winner*
Andreas Weber (2020)
Elizabeth (Lisa) Ainsworth (2022)

Charles Reid Barnes Life Membership Award

Tuan-hua David Ho (2022), *chair*
Bob Buchanan (2020), *past winner*
Dean DellaPenna (2020)
Deborah Delmer (2021)

Early Career Award

R. Keith Slotkin (2020), *chair*
James Schnable (2020), *past winner*
Hiroshi Maeda (2020)
Lucia Strader (2020)

Enid MacRobbie Corresponding Membership Award

Mondher Bouzayen (2021), *chair*
Alejandra Covarrubias (2020)
Wataru Sakamoto (2020)
Jian-Kang Zhu (2020)
Jaswinder Singh (2023)

Excellence in Education Award

Susan Wick (2020), *chair*
Tara Phelps-Durr (2020), *past winner*
Yan Lu (2021)
Karen Hicks (2022)

Fellow of ASPB Award

Eran Pichersky (2020), *chair*
Ed Cahoon (2020)
Neelima Sinha (2021)
Bonnie Bartel (2022)

Lawrence Bogorad Award for Excellence in Plant Biology Research

Maureen Hanson (2020), *chair*
Alice Barkan (2020), *past winner*
Maria Harrison (2020)
Eva-Mari Aro (2024)

Robert Rabson Award

Ken Keegstra (2022), *chair*
Rebecca Smith (2020), *past winner*
Diane Okamuro (2022)
John Shanklin (2024)

Stephen Hales Prize

Alex Webb (2020), *chair*
Rick Vierstra (2020), *past winner*
Rebecca Boston (2022)
Alice Cheung (2022)

Summer Undergraduate Research Fellowship

Adán Colón-Carmona (2021), *chair*
Jon Monroe (2021)
Erich Grotewold (2022)
Amy Marshall-Colon (2022)
Chris Wolverton (2022)



Plant Biololgy 2020 Travel Grants

ASPB 2020 Sharon Gray Women's Young Investigator Travel Awards

- Travel grant applications for eligible women are now being accepted.
- The submission deadline is December 11, 2019.
- All applications must be submitted electronically at <https://wyita.aspb.org>.
- Recipients will be notified by late January.

ASPB Plant Biology Travel Grants

- Travel grant applications for eligible candidates are being accepted now.
- The submission deadline is December 4, 2019.
- All applications must be submitted electronically at <https://travelgrants.aspb.org>.
- Recipients will be notified by late January.

ASPB Minority Affairs Committee Recognition Travel Awards

- Travel grant applications for eligible candidates are being accepted now.
- The submission deadline is January 29, 2020.
- All applications must be submitted electronically at <https://rta.aspb.org>.
- Recipients will be notified by late March.

Nominations Opening Soon for 2020 ASPB Awards!

The Time to Recognize and Honor Excellence Among Our Fellow Plant Scientists Is Approaching

The 2020 Call for Award Nominations will be sent to ASPB members on January 3, 2020, and nominations will be due by Wednesday, February 19. ASPB encourages you to participate in the 2020 awards program by nominating highly deserving individuals. Please watch for the Call for Nominations in your email inbox, on our website, and via social media early in the New Year. In the meantime, please visit ASPB's awards pages (<http://www.aspb.org/awards-funding/aspb-awards/>) so that you can see who among your colleagues has received these awards in the past and determine who might be most deserving in the future.

All that is required to make a nomination for ASPB's awards is a one- to two-page letter of nomination and a detailed CV of the nominee. However, nomination committees may opt to go back to the nominator to ask for additional information if they deem it necessary.

Nominations should be submitted electronically as a single PDF via <https://awards.aspb.org> beginning January 3, 2020. The names of the 2020 award recipients will be announced in mid-April via social media and email broadcast to ASPB members, and the awards themselves will be presented during Plant Biology 2020 in Washington, DC.

Awards to Be Given in 2020

Charles Albert Shull Award

This award was initiated in 1971 by the Society to honor Dr. Charles A. Shull, whose personal interest and support were largely responsible for the founding and early growth of the Society. It is a monetary award made annually for outstanding investigations in the field of plant biology by a member who is generally under 45 years of age on January 1 of the year of presentation or is fewer than 10 years from the granting of the doctoral degree. Breaks in career will be considered when addressing the age limit of this award. The recipient is invited to address the Society at the annual meeting the following year.

Charles F. Kettering Award

This award was established by an endowment from the Kettering Foundation in 1962 to recognize excellence in the field of photosynthesis. It is a monetary award to be given to an individual, whether or not a member of the Society, in even-numbered years.

Charles Reid Barnes Life Membership Award

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

membership in the Society to an individual who is at least 60 years old. Membership is a requirement for the award, and, if appropriate, every fifth award should be made to an outstanding plant biologist from outside the United States.

Early Career Award

The Society instituted the Early Career Award in 2005 to recognize outstanding research by scientists at the beginning of their career. This award is a monetary award made annually for exceptionally creative, independent contributions by an individual, whether or not a member of the Society, who is generally not more than seven years post-PhD on January 1 of the year of presentation. Breaks in career will be considered when addressing the time limit of this award.

Enid MacRobbie Corresponding Membership Award

This honor, initially given in 1932 and renamed in 2018 to recognize Dr. Enid MacRobbie's many contributions to plant science research, provides life membership and Society publications to distinguished plant biologists from outside the United States in recognition of their contributions to ASPB and to plant biology. The honor is conferred by election on the annual ballot. The committee selects no more than three candidates, and these are placed on the ballot for approval of corresponding membership by majority vote. The president notifies successful candidates of their election.

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

Excellence in Education Award

This award, initiated in 1988, recognizes outstanding teaching, mentoring, and/or educational outreach in plant biology by an individual, whether or not a member of the Society. It is a monetary award to be made annually in recognition of excellence in teaching, leadership in curricular development, or authorship of effective teaching materials in the science of plant biology.

Fellow of ASPB Award

Established in 2007, the Fellow of ASPB Award may be granted to current members in recognition of direct service to the Society and distinguished and long-term contributions to plant biology. Areas of contribution may include education, mentoring, outreach, research, and professional and public service. Examples of relevant Society service include, but are not restricted to, service on or on behalf of ASPB committees, service on editorial boards of ASPB journals, and active involvement in ASPB meetings. Current members of ASPB who have contributed to and been members of the Society

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NOMINATIONS
continued from page 7

for at least 10 years cumulative prior to their nomination are eligible for nomination. Recipients of the Fellow of ASPB honor, which may be granted to no more than 0.2% of the current membership each year, receive a certificate of distinction and a lapel pin.

Lawrence Bogorad Award for Excellence in Plant Biology Research

This award was instituted by the Society in 2006 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, whether or not a member of the Society, whose work both illuminates the present and suggests paths to enlighten the future.

Robert Rabson Award

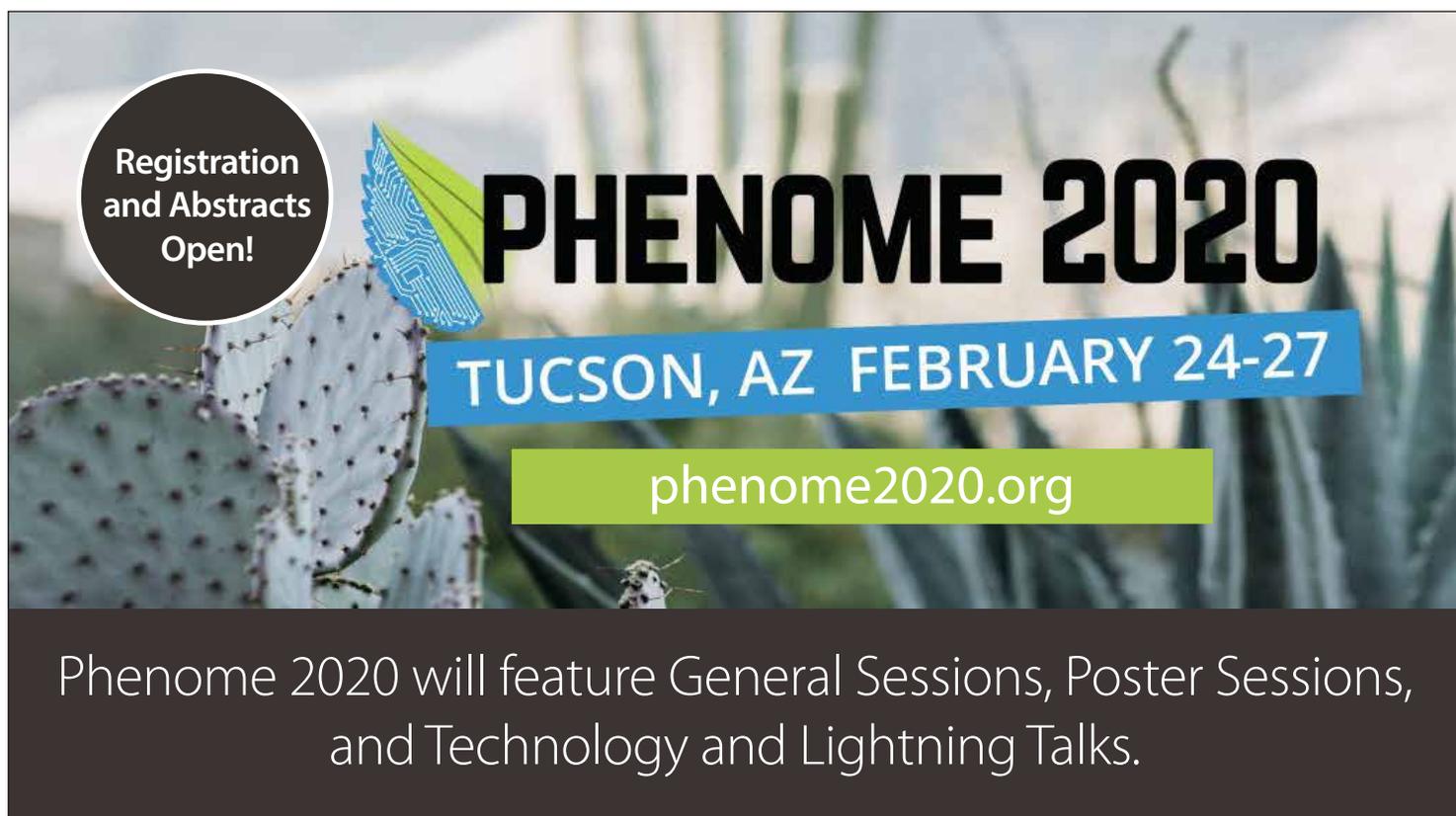
The Robert Rabson Award, first given by the Society in 2012, recognizes Dr. Rabson's steadfast

advocacy of plant biology through creation of funding programs in the Department of Energy for research in basic energy sciences. The award recognizes postdoctoral scholars and faculty-level early career scientists, whether or not members of the Society, in academic, government, and corporate research institutions who have made excellent contributions in the area of bioenergy research. The award is made biennially to a researcher who is no more than five years post-PhD on January 1 of the year of presentation, with consideration of breaks in career relative to this time frame. The

award recipient is given a monetary award and a one-year membership in the Society.

Stephen Hales Prize

This award honors the Reverend Stephen Hales for his pioneering work in plant biology published in his 1727 book *Vegetable Statics*. It is a monetary award established in 1927 for an ASPB member who has served the science of plant biology in some noteworthy manner. The award is made annually. The recipient of the award is invited to address the Society on a subject in plant biology at the next annual meeting. ■



Registration and Abstracts Open!

PHENOME 2020

TUCSON, AZ FEBRUARY 24-27

phenome2020.org

Phenome 2020 will feature General Sessions, Poster Sessions, and Technology and Lightning Talks.

Highlights from the Environmental and Ecological Plant Physiology Section Meeting in San Jose

BY FRANK G. DOHLEMAN
The Climate Corporation

The Environmental and Ecological Plant Physiology (EEPP) Section held its fifth annual meeting during Plant Biology 2019 in San Jose, California, on August 5. The mission of the EEPP, the first theme-based section of ASPB, is to advance EEPP disciplinary science and practice, integrate the community, and support and train early career members. The agenda for the meeting included three topic areas: the annual business meeting, lightning talks, and the keynote address.

Annual Business Meeting

During the annual business meeting, attendees discussed membership numbers and identified strategies to recruit new members interested in ecophysiology and to provide added value to current members. We also discussed the upcoming election for the section's outreach officer; the candidates were Courtney Leisner and Anna Locke. New committee members began their terms in October 2019: Andy VanLoocke became chair, Jennifer Robison became vice chair, and Emily Heaton will continue as secretary/treasurer. (See the meeting slides on the EEPP network on Plantae at <http://bit.ly/PlantaeEEPP>.)

We discussed ideas for helping members become more engaged as an EEPP community, including smaller satellite meetings and webinars. Members in the



Seth Murray discussing phenomic selection for improving crops.



Environmental and Ecological Plant Physiology Section officers and annual meeting speakers, left to right: Seth Murray, speaker; Emily Heaton, secretary/treasurer; Andy VanLoocke, vice chair; Jennifer Robison, outreach officer; Suxing Liu, speaker; Frank Dohleman, chair; Jessica Waite, speaker; Oded Liran, speaker.

room broadly agreed that webinars would be valuable; interest areas included research presentations, methods discussions, and career development. There was also interest in expanding the ecophysiology presence at the annual Plant Biology meetings, including concurrent sessions.

Lightning Talks

Three early career scientists presented lightning talks on their leaf, root, and reproductive phenotyping work to better understand plant mechanisms:

- Suxing Liu from the University of Georgia led off the lightning talks, discussing how automated 3D root phenotyping in the field may pave the way to increased carbon sequestration.

- Oded Liran from the Galilee Research Institute then presented on the development of tools for optimal nutrient and irrigation management based on remote sensing of chlorophyll fluorescence.
- Jessica Waite from Washington State University wrapped up the lightning talks, discussing the role of physiological changes associated with heat stress acclimation in developing apple fruit.

Keynote Address

The meeting wrapped up with Seth Murray from Texas A&M University presenting on the future of plant phenotyping and use of phenomic selection for crop improvement. He described how

emerging tools in plant phenomics and high-throughput field phenotyping are redefining possibilities for decision making in plant breeding and agronomy and discoveries in plant biology and the plant sciences. He also discussed the challenges in turning images into useful data and the need for transdisciplinary approaches to the plant sciences, requiring engineers, computer scientists, statisticians, and others to collaborate toward shared goals.

The EEPP Executive Committee thanks all the presenters and the ASPB staff for an engaging and enlightening meeting. The committee also gratefully acknowledges the support of the ASPB Membership Committee and EEPP member dues. ■

Plant Biology 2019 "By the Numbers"

1,454 PB19 Attendees



366

Faculty/group leaders,
post-tenure



28

Government
scientists



281

Graduate students



84

Industry scientists



216

Post-docs



100

Other



26

Research assistants



223

Unspecified



82

Undergraduates



48

Primarily undergraduate
institution attendees



Posters

154

E-Posters

867

Physical Posters
(numbered and unnumbered)



202 Talks

23

Major Symposia Talks
(including three award winner
talks from the awards scientific
symposium)

179

Concurrent Talks
(including 29 two-minute
lightning talks)

Save the Date!

PB20

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Join 1,500 plant scientists from 50 countries at Plant Biology 2020 in Washington, DC, to learn about the latest trends in plant science, science policy, and more!

Halfway to Establishing the New Primarily Undergraduate Institution Section

BY ANDREAS MADLUNG
University of Puget Sound

For as long as I can remember, I wanted to be a teacher. I wanted to focus my career on working with students; designing curricula, lesson plans, and lab activities; and passing on my excitement about living things to anyone who might share this interest. While in graduate school, my research adviser took me to my first ASPB conference. Since then, I have felt that this conference and this Society are the places where I can expand my horizon and learn about the latest in plant research, and also where I can meet plant biologists who share my passion for teaching.

The primarily undergraduate institution (PUI) networking group's annual gathering was always on my agenda when I went to an ASPB conference. There, I heard about what it was like to work at a small teaching institution and connected with veteran teachers from PUIs across the country. The enthusiasm for teaching was always palpable at these meetings. Attendees were equally eager to exchange tips and ideas on how to create and maintain a vigorous research program suitable for undergraduates in institutions with fewer resources than typical for larger research universities.

When I finally landed my own position at a small liberal arts

college, I felt I had achieved what I had worked for so hard during my graduate and postdoc years. But soon, I also started to feel the constraints and frustrations that came with being the only plant geneticist at my institution. Although the PUI networking group gatherings were still a highlight for me at ASPB meetings, back at my home institution I felt academically isolated. The feeling of being part of a large network of PUI plant biologists that seemed so vibrant during the annual meetings was hard to maintain once I was back at home.

As it turns out, I was never alone in feeling this way. In 2017, a group of dedicated scientists from both private and public PUIs decided to take the networking group to the next level. A proposal was written to the ASPB Council to create a full-fledged PUI section with the intent to grow the network of colleagues working at smaller institutions and, importantly, to work on ways to extend the network's activities beyond the annual meeting. The proposal recommended that the section intensify its efforts to develop workshops for the annual meetings including career counseling for students and postdocs interested in a PUI career, the creation of a PUI database, a program to provide mentorship for PUI

faculty at all stages of their career, and leveraging of Plantae.org for more efficient communication and information sharing among PUI plant scientists.

Now, 18 months into the three-year probationary phase of becoming a recognized ASPB section, PUI Section membership stands at 111 dues-paying members (from a total of roughly 2,900 ASPB members). In August we completed another successful ASPB conference workshop with a panel discussion on publishing research done at PUIs. The separate PUI career panel drew another 70 participants. We had a lively business meeting with excellent ideas and questions about the efforts of our section. We discussed both short-term goals and long-term initiatives to promote the integration of PUI plant biologists into the broader ASPB community. The section was also successful in procuring an NSF-funded conference grant that provided travel funds for Plant Biology 2019 to 27 PUI faculty who otherwise might not have been able to attend.

The PUI Section is already hard at work organizing and designing a workshop for Plant Biology 2020 in Washington, DC, applying for conference funding to be able to provide travel grants, and making progress on

our ideas to create a mentoring and networking platform through Plantae.org. But there is more to be done before we can become a full ASPB section. Over the next 18 months, we will complete work on a section constitution and finalize a permanent leadership structure.

There are plenty of opportunities to get involved in growing and establishing our new section. We are working on the development and dissemination of plant-centered teaching tools and plant growth information and on greenhouse or growth chamber management tips. We are also seeking to integrate the section with the aims of ASPB in general, coordinate goals with other societies that foster undergraduate research, and work with regional sections to encourage greater PUI faculty participation in broader ASPB activities. There is more on our plates than the PUI steering committee can do. If you are interested in getting involved, please contact section chair Maryann Herman (mherman@sjfc.edu). We appreciate all contributions to our effort to expand support for PUI plant scientists through ASPB. ■



ASPB/AAAS 2020 Mass Media Science & Engineering Fellows Program

Are you interested in science writing?

Do you want to help people understand
complex scientific issues?

Apply for the ASPB/AAAS Mass Media Science & Engineering Fellows Program and learn how to increase public understanding of science and technology. Fellows in the 10-week 2020 summer program will work as reporters in mass media organizations nationwide. **Application window opened October 1, 2019, and closes January 1, 2020.**

Visit <https://www.aaas.org/programs/mass-media-fellowship> for more details, or email mmfellowship@aaas.org for more information.



2019 host sites

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PBS NewsHour
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WIRED

This article first appeared on the Global Institute for Food Security website on October 8, 2019 (<http://bit.ly/LeonKochian>) and is adapted here with permission.

Leon Kochian Receives International Food Innovation Prize

Leon Kochian, Canada Excellence Research Chair at the University of Saskatchewan (USask), has won the 2019 Arrell Global Food Innovation Award. Adjudicated by internationally recognized scientists, this award, from the Arrell Food Institute at the University of Guelph, recognizes global research leaders who have made exceptionally significant contributions to scientific understanding that will improve food security for the planet. The award carries a \$100,000 cash prize.

Leon is associate director of the USask Global Institute for Food Security (GIFS) and a faculty member in the USask plant sciences and soil science departments of the College of Agriculture and Bioresources. He is internationally recognized for cutting-edge plant root systems research that aims to improve crop yields (see a video describing his research at <http://bit.ly/KochianFoodPrize>). His goal is to breed crops with healthier, more efficient root systems that can grow successfully in less fertile soils.

According to USask Vice President Research Karen Chad, “This award recognizes the kind of scientific excellence that is needed more than ever to overcome the daunting global challenge of feeding 9.7 billion

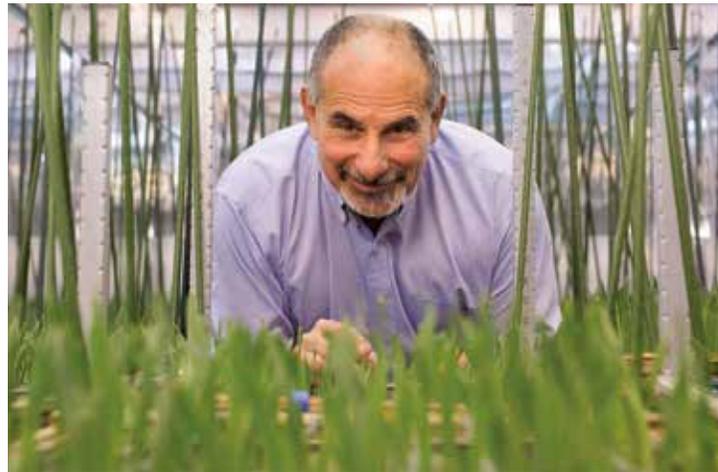


PHOTO BY DAVE STOBBE FOR THE UNIVERSITY OF SASKATCHEWAN

people by 2050. With Leon Kochian’s research preeminence and leadership, supported by the Global Institute for Food Security and our dynamic food security research cluster, we are poised to provide transformative and sustainable research solutions to help feed a growing world.”

Leon joined USask in 2016 from Cornell University and USDA. As lead for the roots–soil–microbiome research area at GIFS, Leon works to improve crop yields by understanding the interactions among roots, the soil they live in, and the microorganisms in the soil. Leon’s team uses the Canadian Light Source, a national research facility of USask; state-of-the-art imaging

tools; and the latest computer technology to digitize desired crop traits (phenotypes) and link them to specific genes in a searchable database. This innovative approach enables tailored design and breeding of root systems for specific agroenvironments for crops including wheat, barley, lentils, and canola.

“Saskatchewan is attracting global attention in food security research at its world-class institutes, helping to solve the challenge of feeding a growing world,” Leon noted. “I appreciate this award from the Arrell Food Institute and recognize the support and contributions of my colleagues to this work.” One of the world’s most highly cited

scientific researchers, Leon has been elected to the Agricultural Research Service Hall of Fame and was included on the Thomson Reuters 2018 list of the World’s Most Influential Scientific Minds.

“Leon’s expertise and leadership in roots and soil research is increasingly valuable in a world with a growing population threatened by critical issues of soil quality and fertility,” said Steven Webb, executive director and chief executive officer of GIFS. “This well-deserved award will help shine more light on the important work he does to help improve crop yields for developed and developing nations.”

As Evan Fraser, director of the Arrell Food Institute, expressed, “Dr. Kochian is the kind of scientific innovator the world needs to meet the great challenges of the 21st century to insure a safe, sustainable and healthy food system for everyone. We hope his leadership in the research space inspires many others to take on these food security problems.” During the award ceremony in December at the Arrell Food Summit in Toronto, Leon will participate in a panel discussing strategies to develop food systems to feed the world’s growing population in a sustainable, healthy, and equitable way. ■

This article is adapted with permission from articles that appeared on the Australian National University newsroom website on August 29, 2019 (<http://bit.ly/BarryPogsonSeedsSuccess>), and September 12, 2019 (<http://bit.ly/PogsonLaureateFellow>).

Barry Pogson Awarded Two Australian Science Prizes

Barry Pogson, head of plant sciences at the Australian National University (ANU) Research School of Biology, has won the 2019 Eureka Prize for Outstanding Mentor of Young Researchers, awarded by the Australian Museum, and an Australian Research Council (ARC) Laureate Fellowship.

Eureka Prize

Presented annually, the Australian Museum Eureka Prizes reward excellence in the fields of research and innovation, leadership, science engagement, and school science. The Eureka Prize for Outstanding Mentor of Young Researchers, sponsored by the University of Technology Sydney, is awarded to an individual who has helped develop the next generation of Australia's scientific researchers.

Barry's vision is to create strong links among researchers, industry leaders, and policy makers to collectively shape agriculture for the benefit of global food security. Using a dynamic and sustainable multitiered mentoring approach, he has had a profound impact on the personal development, career prospects, and learning experiences of students at all tertiary levels. "I believe better leadership across disciplines and enduring change toward gender equity and diversity require a new generation of empowered leaders," he said.



PHOTO BY LANNON HARLEY, AUSTRALIAN NATIONAL UNIVERSITY

ANU deputy vice chancellor (Research and Innovation) Keith Nugent observed that "Research has the power to transform our society, our lives and our economy for the better. [The Eureka Prizes] are a well-earned recognition of this important work, and demonstrate the extraordinary depth and breadth of research taking place day in and day out across the ANU campus."

Australian Laureate Fellowship

Australian Laureate Fellowships are awarded by the ARC to support world-class researchers to conduct groundbreaking, internationally competitive basic and applied research in Australia. Preference is given to researchers who play a

significant, sustained leadership and mentoring role in increasing Australia's research capacity.

Barry was awarded AU\$2.9 million to create higher yielding and more resilient "smart plants" for good and bad seasons. "We know drought can drastically reduce yield for our crops, and this threatens food security across the globe," he said. "I aim to produce higher yielding, more resilient wheat and rice, which together provide much of humanity's dietary energy and protein. These smart plants will be able to switch on a resilience that will help chart the future of Australian agriculture."

As Barry noted, "Australia, indeed the world, faces an unprecedented set of challenges,

many of which will impact food security. My proposal aims to contribute to providing some solutions. But given the scale and breadth of challenges facing our rural communities, we need a nationwide, integrated, large scale mission to produce better crops and communities."

In congratulating Barry, acting ANU vice chancellor Mike Calford noted that "ARC Laureates are extremely competitive and prestigious. They recognize Australian researchers at the pinnacle of their game, as well as research of the highest quality and impact... [that] makes a major difference to Australia and Australians every day." ■

This announcement first appeared on the Howard Hughes Medical Institute website on September 12, 2019 (<http://bit.ly/HHMI-HannaGrayFellows>), and is adapted here with permission.

ASPB Members Receive HHMI Hanna H. Gray Fellowships

Kevin Cox and Pablo Martinez are among the 2019 Hanna H. Gray Fellows announced by the Howard Hughes Medical Institute (HHMI). The fellows are all outstanding scientists early in their careers, from gender, racial, ethnic, and other groups underrepresented in the life sciences. They will have the freedom to follow their curiosity and pursue challenging scientific questions at the forefront of their fields.

Kevin Cox, Jr. (Donald Danforth Plant Science Center, mentored by Blake Meyers), is seeking a cellular-level view of the battles between plants and microbes. He's analyzing gene activity cell by cell to better understand how plants resist or

succumb to microbial invaders. Pinpointing where in the plant specific genes are active can help him determine how plant cells and microbes communicate. Kevin hopes that decoding those cellular signals will lead to novel ways of improving crop yields and ultimately to feeding more people.

In nature, form is linked to function. A leaf's flat surface, for example, is well suited to capturing sunlight for photosynthesis. Pablo Martinez (University of California, Los Angeles, mentored by Siobhan Braybrook) is untangling the complex mechanisms by which plants take on different shapes. He's watching developing maize leaves up close, hoping to reveal how plants respond to physical and mechanical strain



Kevin Cox, Jr., PhD
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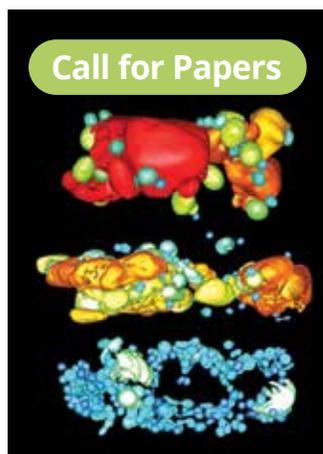
caused by dividing and expanding cells. Answering this fundamental question will help scientists understand how crops—and potentially even animals and bacteria—grow and develop.

HHMI will support these young scientists as they transi-



Pablo Martinez, PhD
©2019 HHMI

tion from postdocs to principal investigators and begin to set up labs of their own. The Hanna H. Gray Fellows Program is named for Hanna Holborn Gray, former chair of the HHMI trustees and former president of the University of Chicago. ■



Plant Physiology

2021 Focus Issue on Dynamic Membranes

Edited by Teun Munnik, Sébastien Mongrand, Viktor Zársky, and Mike Blatt

Submission Deadline: May 4, 2020, Publication Date: January 2021

The Focus Issue on Dynamic Membranes will capture up-to-date views and perspectives on developments at the forefront of membrane research, and it will highlight the most important gaps in understanding that will be the focus for future studies. Invited Updates will provide reviews on areas that continue to add transformative insights pertinent to existing knowledge and on nascent but important areas of future development. We seek submissions of research articles on all aspects that make plant membranes dynamic, including signaling, endocytosis, exocytosis, vesicular transport, membrane barriers, protein and lipid binding, and the mechanics of these processes.

For more information go to <https://aspb.org/ppfocus/>.

This article first appeared on the MacArthur Foundation website on September 25, 2019 (<https://www.macfound.org/fellows/1042/>), and is adapted here with permission.

Zachary Lippman Named 2019 MacArthur Fellow

Zachary Lippman, Jacob Goldfield Professor of Genetics at Cold Spring Harbor Laboratory (CSHL), has received a MacArthur Fellowship, awarded to talented individuals who have shown extraordinary originality and dedication in their creative pursuits and a marked capacity for self-direction. The John D. and Catherine T. MacArthur Foundation “supports creative people, effective institutions, and influential networks building a more just, verdant, and peaceful world.”

Zachary is investigating the genetic networks underpinning plant development and growth and creating new breeds of harder, higher yielding crops. A key element in a plant’s fruit-bearing capacity and robustness is an appropriate balance between two competing functions: the production of shoots and leaves (needed for nutrition) and the production of inflorescences (flowering branches), which make fruits and seeds. Using the tomato as a model system, Zachary combines traditional plant breeding methods with genomic tools to optimize the agricultural balance of plant inflorescence and leaf production.

He has demonstrated the ability to create allelic variants (or mutations) that can sidestep the painstaking process of



PHOTO BY JOHN D. & CATHERINE T. MACARTHUR FOUNDATION

breeding for qualities that take many generations to produce while maintaining beneficial elements of the original plant. Zachary identified several genes that regulate and respond to the tomato’s hormone system governing leaf and flower production, and through targeted editing of these genes using CRISPR, he was able to customize and optimize the balance of the two for different agricultural needs. He has also made genetic changes to inflorescence branch architecture in order to support increased flower production, resulting in plants that have increased yields. Zachary has since used these methods to create and characterize large numbers of de novo genetic variations in tomatoes.

By making targeted changes in a few critical genes, Zachary’s group has taken major steps toward domesticating the groundcherry, a previously wild species, while retaining the resilience of this berry-producing plant to grow in suboptimal conditions. Increasing the genetic diversity of our crops and domesticated plants will be critical to safeguarding food security in the face of growing challenges from climate change, population growth and movement, and water shortages. Zachary’s research, which is generalizable to many other crops, indicates the possibility of identifying genomic targets, accelerating quantitative genetic variation of those targets, and breeding for beneficial traits such

as drought, heat, pathogen resistance, and increased yield much faster than occurs in nature.

Zachary received a BS from Cornell University in 2000 and a PhD from the Watson School of Biological Sciences at CSHL in 2004. He held a Human Frontiers postdoctoral research fellowship at the Hebrew University of Jerusalem in Israel for three years before starting his own research program at CSHL in 2008. In 2018, he was named a Howard Hughes Medical Institute Investigator. His articles have appeared in journals including *Cell*, *Nature Genetics*, *Nature Plants*, and *Genome Research*.

The MacArthur Fellows Program is intended to encourage people of outstanding talent to pursue their own creative, intellectual, and professional inclinations. In keeping with this purpose, the foundation awards fellowships directly to individuals rather than through institutions. Recipients may be writers, scientists, artists, social scientists, humanists, teachers, entrepreneurs, or those in other fields, with or without institutional affiliations. They may use their fellowship to advance their expertise, engage in bold new work, or, if they wish, to change fields or alter the direction of their careers. ■

As the years churn on, many esteemed members of ASPB have passed the torch to their younger colleagues and stepped out of the limelight to allow others to bask in its glory. Yet, many continue their good works to the benefit of plant biology and the world. Edited by Rebecca Dickstein, University of North Texas, "Where Are They Now?" is part of the *ASPB News* suite of columns focused on the personal and scientific life and insights of ASPB members at all stages of their career. This column offers a look into the current activities of influential members of ASPB who continue to make a positive mark on our Society. We hope you all enjoy this addition to your newsletter.

Please feel free to submit your own article to "Luminaries," "Membership Corner," or "Where Are They Now?" For details, contact José Dinneny at dinneny@stanford.edu. As always, we are open to suggestions for articles or features of interest to readers of the *ASPB News*.

Jane Shen-Miller

Center for the Study of Evolution and the Origin of Life, Department of Earth, Planetary, and Space Sciences, University of California, Los Angeles

When I was eight years old, a story my father told me sent me on my way to becoming a "farmer." The story was about my Wellesley- and Cornell-educated aunt, Shen Liying 沈骊英, China's "Sage of Wheat," who experimented for 10 years on wheat breeding and successfully developed nine stress-resistant cultivars that increased yield and helped solve China's food problem during World War II. I was fascinated by the arduous plant breeding, and proud of my aunt's success. Besides, I loved wheat dumplings! From then on, farming became my passion. Invariably, I would write this notion into my school reports on "My Goal."

This interest followed me from grade school to college. When applying to schools in the United States, I declared that horticulture would be my major. I was informed by the Utah State College (now University) that they had no women horticulture students. So I entered Colorado A&M (now Colorado State University) and had my dad's colleague, U.S.



Bureau of Reclamation's dam chief engineer John Savage, as my Aggie guardian. During my sophomore year, a vegetable crop professor at Washington State College (now University) informed me, "No farmer would listen to a girl county agent!" On the advice of my

dad's United Nations colleague and Aunt Shen's agricultural economist colleague J. Lossing Buck (husband of Pearl Buck), I went on to obtain a PhD in 1959 at Michigan State University, where my mentor Fred Teubner introduced me to the American Society of Plant Physiologists (ASPP).

Career

My postdoctoral training was at the U.S. Atomic Energy Commission's Argonne National Laboratory (ANL), near Chicago. Under the guidance of NASA's very first principal investigator, plant physiologist Solon Gordon, in 1963 we selected the short-life-cycle, low-chromosome-number, little-known weed *Arabidopsis* (Shen-Miller and Sharp, 1966), with Fritz Went's cultivation help, as our first

test object for a study of weightlessness. The ANL Biomedical Division was equipped with a one-of-a-kind walk-in spectrograph, splitting a tungsten light source into a rainbow with a linear dispersion of 0.1 m μ /mm, enabling our study of action spectra of plant growth and phototropism (Elliot and Shen-Miller, 1976; Shen-Miller et al., 1968; light deterrence of basipetal auxin transport continues to be sorted).

While working as associate program director of the NSF Metabolic Biology Program, I was selected as one of a 10-member Botanical Society of America delegation to the People's Republic of China (Shen-Miller, 1979). This invitation from China's "Spring Time of Science," brokered by Arthur Galston and led by Lawrence Bogorad, came in 1978, before the normalization of diplomacy. The Academia Sinica and Beijing Institute of Botany later presented me a gift of seven Asian lotus fruits that were claimed to have long viability.

continued on page 18

WHERE ARE THEY NOW?
continued from page 17

**Science Without Borders:
The Three X-X-X**

A second find from the China visit was my future spouse, fellow delegate J. William Schopf, a University of California, Los Angeles, professor of geology and paleobiology. Schopf emphasized and convinced me that “nature is not compartmentalized,” and from him I acquired knowledge of his research: Apollo 11 and 12 moon rocks, multidisciplinary Precambrian research, Earth’s earliest CO₂ biosphere, the Great Oxidation Event, geologic fieldtrips, stromatolites, Earth’s earliest microfossils verified by geochronology, isotopic fractionation, Raman spectroscopy, and secondary ion mass spectrometry. This convinced me of the value of interdisciplinary science. Rob Last’s July/August President’s Letter, “Big Challenges Require Broad Thinking” (<http://bit.ly/BroadThinking>), wisely promoted what I call the Three X-X-X: cross-discipline, cross-conversation, cross-cutting collaboration.

Current Activity

Coincidentally, the ASPP inaugural president, big thinker Charles A. Shull (who endowed the Society’s Charles Reid Barnes Life Membership Award, which I received in 2018), was knowledgeable about my fruit gift from China. He called it the “Manchurian lotus” (Shull, 1955) and compared it to ASPP as sitting in an ancient peat bed, waiting for germination. ASPP had become ASPB, which in 2024 will celebrate its centennial! Hooray! And 40 years later, a quiescent Manchurian lotus from this very

ancient bed germinated at UCLA and was directly ¹⁴C-dated to 1,300 years old (Shen-Miller, 2002; Shen-Miller et al., 1995, 2002, 2013a). This finding on the Manchurian lotus has occupied my research attention after my retirement until now.

Manchurian Lotus

Nelumbo nucifera (aquatic Asian lotus, Manchurian lotus) is propagated by underground rhizomes. Should a population be wiped out by a natural disaster, its fruits, with viability of hundreds to over a thousand years, can sprout and give rise to a new crop when conditions again become favorable, a wonderful example of Darwinian natural selection. The very lakebed known to Shull for having been planted with Manchurian lotus by Buddhist monks was drained dry centuries ago by a series of large earthquakes. The dried bed eventually became farmland, and the buried lotus fruits sprouted (Shen-Miller, 2002; Shen-Miller et al., 1995, 2002, 2013a).

Sequencing of the draft genome of the Manchurian lotus var. China Antique was led by Ray Ming, and a whole genome was elaborated (Huang et al., 2018; Ming et al., 2013). This plant, a crop of Asia for 4,000 years and a basal eudicot extant ~140 million years ago (MYA) of the order Proteales, has members of the Banksias/proteas and sycamores as tree relatives. It became adapted to aquatic habitats ~70 MYA. Its genome, deemed a “universal survival kit for all biota,” codes for exceptionally long postharvest maturation, healthy aging, stress abatement, repair, and longevity.

We visited the Manchurian lotus lakebed in northeast China’s Pulandian District, Liaoning



Province, on six occasions, each time acquiring fruits tilled by farmers at Xipaozi Village. In 2002, the film production company Télé Images Nature of Paris sponsored one of our trips to the Xipaozi Village and produced an informative video, *Des Graines d’Éternité*, available on YouTube (Frapat, 2003). It shows aspects of the *Nelumbo* work in China, the United States, and Germany and the work of Japanese botanist Ichiro Ohga (cited by Shull, 1955), who in the 1920s discovered the dried Manchurian lotus lakebed.

Offer: In Search of Collaborators

We have a collection of old and new Manchurian lotus fruits we wish to share with you (shen-miller@lifesci.ucla.edu) to help us shed light on the inner workings of its genetic novelties, including the following:

- centuries-long viability (Shen-Miller, 2002; Shen-Miller et al., 1995, 2002, 2013a)
- decades-long postharvest seed

maturation (longevity preparation? Shen-Miller, 2002; Shen-Miller et al., 1995, 2002, 2013a)

- land-to-water adaptation (Huang et al., 2018; Ming et al., 2013)
- centuries-long shelf life of disease- and pest-resistant fruits (Shen-Miller, 2002; Shen-Miller et al., 1995, 2002, 2013a)
- green embryogenesis (Shen-Miller, 2002; Shen-Miller et al., 1995, 2002, 2013a)
- chloroplast-containing embryo tissues (Ushimaru et al., 2003; Zuo et al., 1992)
- abundant cryptochromes (blue-light receptors; Huang et al., 2018; Ming et al., 2013)
- bHLH transcription factors (Huang et al., 2018; Ming et al., 2013)
- redox (Zhang et al., 2013) and RNA-editing proteins (pentatricopeptide repeats; Huang et al., 2018; Ming et al., 2013)
- transposon distribution (Huang et al., 2018; Ming et al., 2013)

- shoot-before-root germination (Shen-Miller, 2002; Shen-Miller et al., 1995, 2002, 2013a)
- auxin/cytokinin and brassinosteroid signals (Huang et al., 2018; Ming et al., 2013)
- 85°C full germination (Shen-Miller et al., 2013b; Shen-Miller and Vu, in preparation)
- 110°C thermo-stable proteins (Shen-Miller et al., 2013b; Shen-Miller and Vu, in preparation)
- applications awaiting isolation and development of medicinal constituents (Menéndez-Perdomo and Facchini, 2018; Mukherjee et al., 2009)
- green technology development based on the anatomy and chemistry of the whole plant, leaf, and/or stem, such as Lotusan paint (Barthlott and Neinhuis, 1997; Space Tango, 2019; Sto Corp., 2019), drinking straws (Clark, 2014), and lotus fiber textiles (Myint et al., 2018; Pan et al., 2011).

With keen hope, I encourage you to adopt this unique plant in your own research for the promotion of the Three X-X-X.

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Ode to *Nelumbo*

*Wondrous flowers, magnificent blooms,
different colors, multiple perfumes!*

*You enlighten the spirit, you please the eyes,
you clothe the body, you sustain our lives!*

*You harmonize the Earth, you guard our CLIME!
On this land you've formed a HA'VEN!*

*P.S. Prescient Princess of embryo emerald,
your genial genetics we heartily herald!*

—Paraphrased from Guo Moruo 郭沫若
(Shen-Miller, 1979)



Research Experiences for Undergraduates (REU) program students filming an episode about a day in the life of a summer intern for 'Science IRL with Molly Edwards' (<https://youtu.be/rCRqGvAcyNo>).

Plant Science Internships for Undergraduates

The Plant Science Research Network curates resources to help undergraduate students find and apply to summer research opportunities. More than 150 undergraduate research internship programs focus on plant science research, including computational biology, crop genetics, ecology, evolution, plant biology, plant pathology, and other research topics.

Discover plant science internships at
[Plantae.org/internships](https://plantae.org/internships)



Reimagining the potential of plants for a healthy future

Policy Update

BY MICHAEL BUSE
Lewis-Burke Associates, LLC

NIFA Relocation Update

Employees of the National Institute of Food and Agriculture (NIFA) and Economic Research Service (ERS) have begun work in Kansas City, with the first report-to-work date occurring on September 30. Although the agencies have begun to hire new employees in Kansas City, staff attrition levels have slowed the release of funds for competitive research grants at NIFA and stalled the release of at least 38 publications by ERS.

To mitigate staff losses, USDA has announced that it will push back the report dates for many employees to December 9, 2019, for ERS and March 30, 2020, for NIFA “to better support the missions of the agencies.” These later report dates delay the timeline over which some employees who have chosen to leave the agency will see their contracts end, a stopgap measure that is intended to slow staff attrition. This change presents several complications for employees who have decided not to relocate, in terms of both how long they will continue to work for their agencies and how their Voluntary Separation Incentive Payments (VSIPs) are distributed. In short, if employees opt to leave before their revised report dates, their VSIPs may not be awarded.

The NIFA and ERS relocation will continue to be a subject of the appropriations debate because the current House and the Senate fiscal year (FY) 2020 funding bills include competing provisions

on the relocation—the House has prohibited it, and the Senate provided \$9.5 million in support.

Sources and Additional Information

- Coverage on this issue from Federal News Network can be found at <https://tinyurl.com/y3gckmhb>.
- The recent *Washington Post* article can be found at <https://tinyurl.com/yy33b35b>.
- An article from Politico on the delayed release of ERS reports can be found at <https://tinyurl.com/y4fe2f9a>.

Sen. Durbin Introduces the America Grows Act

On September 10, Sen. Dick Durbin (D-IL) introduced S. 2458, the America Grows Act. The bill, inspired by the 21st Century Cures Act, would authorize a 5% inflation-adjusted annual increase for the next five years across the research, education, and extension agencies in USDA. Specifically, the bill would authorize increases to NIFA, ARS, ERS, and the National Agricultural Statistics Service. A large stakeholder consortium, including ASPB, signed onto a community support letter endorsing the legislation.

Sources and Additional Information

- More information on the America Grows Act can be found at <https://tinyurl.com/y5yx82e7>.
- The letter of support can be found at <https://tinyurl.com/y6ylvat3>.

Senate Appropriations Committee Moves Bills and Congress Agrees to Continuing Resolution

Congress and the White House reached a new budget deal on August 2 that increased discretionary funding and cleared the way for the Senate to move forward with FY2020 appropriations. The Senate Appropriations Committee advanced several key appropriations bills in mid-September, including bills on Energy and Water Development; Defense; Agriculture; Labor, Health and Human Services, and Education; and Commerce, Justice, and Science (CJS), among others.

Agriculture

NIFA would receive \$1.48 billion, a 0.9% increase over the FY2019 enacted level, of \$1.47 billion. ARS would receive \$1.73 billion, an increase of \$45.3 million compared with the FY2019 enacted level, and the proposed closure of ARS labs would be rejected. Within NIFA, the Agriculture and Food Research Initiative would receive \$425 million, a \$10 million increase over the FY2019 enacted level of \$415 million.

- The Senate’s Agriculture report and bill can be found at <https://tinyurl.com/yyodek7m>.
- Lewis-Burke’s analysis of the bill can be found at <https://tinyurl.com/y4cp6g24>.

Energy and Water

Within the DOE Office of Science, Basic Energy Sciences

would receive more than \$2.3 billion, a \$159 million or 7.3% increase from the FY2019 enacted level. The Biological and Environmental Research program would receive \$770 million, a 9.2% increase from FY2019 levels, and the Advanced Research Projects Agency–Energy would receive \$428 million, a \$62 million (16%) increase compared with FY2019.

- The Senate’s Energy and Water report and bill can be found at <https://tinyurl.com/y5kvwppr>.
- Lewis-Burke’s analysis of the bill can be found at <https://tinyurl.com/y3w6bog9>.

Commerce, Justice, Science

NSF would receive \$8.32 billion, \$242 million or 3% above the FY2019 enacted level, and \$1.2 billion above the president’s FY2019 budget request. Of particular interest to the U.S. plant science community, the Senate CJS report provides explicit language on the NSF Rules of Life program:

“Rules of Life.—One of the research gaps in biological knowledge is the inability to look at an organism’s genetics and environment and predict its observable characteristics. Research in this area will open new doors to answer fundamental questions in life sciences. To that end, the Committee supports NSF’s funding for research in plant genomics and directs NSF to continue to advance the ongoing plant

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POLICY UPDATE
continued from page 21

genomics research program, further its work in crop-based genomics research, and to maintain a focus on research related to crops of economic importance. These activities directly address the Rules of Life research question that is a focus of NSF”

Additionally, language included in the CJS report directs NSF to “maintain its core research at levels not less than those provided in fiscal year 2017.”

- The Senate’s CJS report and bill can be found at <https://tinyurl.com/yxshve29>.
- Lewis-Burke’s analysis of the bill can be found at <https://tinyurl.com/y4re9hn7>.

Labor, Health and Human Services, and Education

The Committee’s bill would provide total funding of \$42.08 billion to NIH, an increase of \$3 billion above the FY2019 level.

- The Senate’s Labor, Health and Human Services, and Education report and bill can be found at <https://tinyurl.com/y3ht3sf6>.

Continuing Resolution

On September 27, President Trump signed a continuing resolution (CR) that extended FY2019 funding levels for all federal agencies through November 21. Because Congress has not yet passed any of the 12 FY2020 appropriations bills, the CR was necessary to avoid a government shutdown after the start of the new fiscal year on October 1. Notably, the CR included language that would allow USDA to waive the matching requirement for grants awarded under the Specialty Crop Research Initiative.

Although a government shutdown was averted for the beginning of the fiscal year, there is no clear path to resolving key issues needed to pass final appropriations bills, including partisan fights over funding levels for government agencies, immigration and abortion policies, and funding for the border wall. The House and Senate Appropriations Committees were set to tackle funding allocations for each of the 12 appropriations bills in October. Even if the committees make progress on funding allocations, Congress may still need to pass additional CRs past November 21. A full-year CR for all or most federal agencies is also still a possibility.

Sources and Additional Information

- The continuing resolution (HR 4378) can be found at <https://tinyurl.com/y63nf4nr>.
- FY2020 appropriations bills can be found at <https://tinyurl.com/yxq2qsdq>.

House Select Committee on the Climate Crisis Releases RFI

The House Select Committee on the Climate Crisis recently released a Request for Information (RFI) seeking responses to inform the development of policy recommendations. The Select Committee is tasked with recommending “policies, strategies, and innovations to achieve substantial and permanent reductions in pollution and other activities that contribute to the climate crisis.” The committee will use the RFI responses as they work to submit legislative recommendations to Congress this coming March, with a final report to follow in December 2020. The Select Committee will work with standing congressional committees to advance their legislative recommendations.

The Select Committee is empowered to consider cross-cutting recommendations involving multiple agencies and does not have the jurisdictional limitations of congressional standing committees. The RFI, while making clear that responses are not limited to specified topics, states interest areas including innovation, decarbonization, agriculture, non-CO2 greenhouse gases, carbon removal, and resilience and adaptation. Regarding innovation, the Select Committee seeks feedback on “specific areas for federal investment” and the “scale of federal investment needed to achieve results in research, development, and deployment.”

This RFI is an opportunity to offer strategic feedback to help enable climate efforts. The Select Committee welcomes comments from a variety of stakeholders. Responses to the RFI are due November 22, 2019, and should be submitted by email to ClimateCrisisRFI@mail.house.gov. Recommendations should be formatted as both a Word and a PDF document.

Sources and Additional Information

- The RFI can be found at <https://tinyurl.com/yxvag5ep>.
- More information on the House Select Committee on the Climate Crisis can be found at <https://tinyurl.com/y2pcrkon>.

OSTP Solicits Stakeholder Input on the Bioeconomy

In September, the White House Office of Science and Technology Policy (OSTP) released a call for feedback from stakeholders to better understand vulnerabilities, funding gaps, and areas to promote and protect in the U.S. bioeconomy. According to the

RFI, the bioeconomy includes “infrastructure, innovation, products, technology, and data derived from biologically related processes and science that drive economic growth, promote health, and increase public benefit.” OSTP is interested in feedback that would inform government action to support and advance scientific discovery and technological advances and “increase the impact of a vibrant bioeconomy on the nation’s vitality and our citizens’ lives.” To steer this feedback, the RFI includes four guiding questions:

1. What specific actions could the U.S. government take to reinforce a values-based ecosystem that will guide the transformation and expansion of the U.S. bioeconomy, in both the short and long term?
2. In what ways can the U.S. government partner with the private sector, industry, professional organizations, and academia to ensure the training and continued development of a skilled workforce to support the growth of the bioeconomy?
3. In what ways can the U.S. government partner with the private sector, industry, professional organizations, and academia to establish a more robust and efficient bioeconomy infrastructure?
4. Across the spectrum, from basic discovery to practical application, what data policies, information-sharing mechanisms, and safeguards will be necessary for a prosperous U.S. bioeconomy?

The bioeconomy has become a major focus for the Trump administration. It is one of the new areas

of emphasis in OSTP's memo "Fiscal Year 2021 Administration Research and Development Budget Priorities," which called on agencies to prioritize "evidence-based standards and research to rapidly establish microorganism, plant, and animal safety and efficacy for products developed using gene editing, to better accelerate biotechnology product adoption and socially responsible use." This RFI is one of many activities that will inform the actions taken by agencies under the jurisdiction of OSTP, making this a valuable opportunity for the stakeholder

community to shape priorities and steer investment.

Sources and Additional Information

- The RFI and submission information can be found at <https://tinyurl.com/y6huydt5>.
- The OSTP "Fiscal Year 2021 Administration Research and Development Budget Priorities" memo can be found at <https://tinyurl.com/y3ogaopv>.

NSF Holds First Reintegrating Biology Town Halls

Throughout September, the University Corporation for Atmospheric Research (UCAR)

hosted two town halls as part of the NSF Directorate for Biological Sciences Reintegrating Biology initiative. These town halls convened stakeholders to discuss how NSF should proceed with their vision of building more cross-disciplinary approaches. Following these meetings, UCAR will work to "create synthesis" from the community input before hosting four virtual 90-minute "micro-labs" on four different themes in November and three in-person "jumpstart meetings" to be held December 4–6 in Atlanta, Austin, and San Diego, as well as one

virtual meeting. ASPB staff and leadership participated in these town halls, and Lewis-Burke will continue to monitor this initiative and provide updates as they emerge.

Sources and Additional Information

- More information on the Reintegrating Biology initiative can be found at <https://tinyurl.com/y3va257b>.
- The list of questions submitted by the community before the town halls can be found at <https://tinyurl.com/y6h5oxmr>. ■

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ASPB Cohosts Capitol Hill Briefing on Innovation in Agriculture

BRIDGET KRIEGER

Lewis-Burke Associates, LLC

On July 16, ASPB cosponsored a Capitol Hill briefing entitled “Innovation in Agriculture: What Does Gene Editing Mean for the Future?” The briefing, presented in conjunction with the bipartisan Congressional Agriculture Research Caucus, also featured speakers from the other sponsoring organizations, the American Society of Agronomy, the Crop Science Society of America, the Soil Science Society of America, the American Seed Trade Association, and the Biotechnology Innovation Organization.

The purpose of the briefing was to educate and inform congressional staff about gene editing technology and its applications in agriculture. John Sedbrook from Illinois State University represented ASPB and offered a glimpse into his team’s work using gene editing to improve pennycress and make it into a viable cash cover crop. The audience of congressional staff had many questions about the use of gene editing, but the overall reaction was positive and the speakers were well received.

While on Capitol Hill, ASPB arranged for John to meet with Congressional Agriculture Research Caucus cochair Rep. Rodney Davis (R-IL). Rep. Davis was intrigued by John’s work and later visited his Illinois State University laboratory to see the work on pennycress firsthand.

In addition to meeting with Rep. Davis, John and ASPB representatives met with staff from the Illinois congressional delegation as well as House and Senate Agriculture Committee staff.

As gene editing becomes more prominent in the agriculture sector, ASPB will continue to participate in ventures that foster healthy and productive conversation on the promise of gene editing technology. ■



Rep. Rodney Davis (left) and John Sedbrook discussing pennycress in the congressman’s DC office. PHOTO BY BRIDGET KRIEGER



Rep. Rodney Davis (R-IL) and Illinois state representatives Dan Brady and Bill Brady meeting students working to develop pennycress as a winter cover crop in the Midwest. Left to right: Maliheh Esfahanian (PhD student), State of Illinois Rep. Dan Brady, Danny Marchiafava (master’s student), Meghan Freund (undergraduate student), Cameron De la Mora (undergraduate student), Liza Gautham (PhD student), Taylor Suo (master’s student), Dalton Williams (master’s student), Matt Maynard (undergraduate student), Congressman Rodney Davis, State of Illinois Senate minority leader Bill Brady. PHOTO BY LYNDIE SCHLINK

Joachim Messing

1946–2019

BY THE MESSING LAB

Yin Li, Jennifer Ayer, Paul Fourounjian, Jiaqiang Dong, Zhiyong Zhang, Chenxu Liu, and Fan Feng

Beloved and respected mentor, colleague, and friend Joachim (Jo) Messing passed away unexpectedly on September 13, 2019. He was a university distinguished professor and director of the Waksman Institute of Microbiology at Rutgers, The State University of New Jersey, and he held the Selman A. Waksman Chair of Molecular Genetics.

Jo was born in 1946 to a working-class family in postwar Germany. The food insecurity he experienced during his childhood sowed a seed in his mind that grew into the ambition to ensure food security and end world hunger.

Jo earned an MS in pharmacy in 1971, then turned to microbiology. Working on the replication of plasmid DNA, he achieved a doctorate at the Ludwig Maximilian University of Munich and the Max Planck Institute of Biochemistry in 1975. He came to the United States in 1978, landing a position as a research associate at the University of California, Davis, just as modern molecular biology and molecular cloning were coming into full bloom. After working at the University of Minnesota Twin Cities as assistant professor and then full professor of biochemistry from 1980 to 1985, Jo moved to Rutgers University as research professor of the Waksman Institute and became its director in 1988.



Jo is most recognized for several groundbreaking innovations that helped crack the genetic code of humans and plants and advanced a revolution in medicine and agriculture. He developed the M13mp/pUC/JM molecular cloning kits and the blue-white screening system that have been used worldwide for several decades, empowering modern molecular biology and genetics. Taking advantage of the molecular cloning systems he developed, Jo conceptualized massive parallel genomic sequencing and demonstrated it by sequencing the double-stranded DNA of the cauliflower mosaic virus with the collaboration of Bob Shepherd's team at UC Davis. This dramati-

cally more efficient strategy is now known as “shotgun” DNA sequencing. These inventions directly facilitated the advancement of the genomic era of biology, forming the conceptual basis of next-generation and third-generation DNA sequencing.

With these technologies in hand, Jo turned his research focus to plant genomics and crop genetic engineering. Jo was one of the organizers of the International Rice Genome Sequencing Project and the initiator of the Maize Genome Sequencing Project. He was one of the major organizers in sequencing the first reference genomes of sorghum, a stress-tolerant major cereal crop for food, feed, and fuel, and

duckweed, an aquatic monocot important for environmental and bioenergy purposes.

The seed sown early in Jo's mind to eradicate world hunger blossomed in his research. His work in maize and sorghum contributed to improvement in nutritional, agronomic, and bioenergy traits. Most recently, Jo made major contributions to the understanding of maize seed development, notably genetically manipulating storage proteins and the regulators coordinating the synthesis of storage proteins and starch to improve nutritional quality and yield.

Jo's contributions received worldwide recognition. He was the “world's most cited scientist” of the 1980s. He won the 2013 Wolf Prize in Agriculture and the 2014 Promega Biotechnology Research Award. In 2007, he was elected as a member of the German National Academy of Sciences Leopoldina. In 2015, he became a member of the U.S. National Academy of Sciences. He was also a fellow of the American Academy of Microbiology (2015), the American Academy of Arts and Sciences (2016), and the National Academy of Inventors (2018).

In addition to his professional achievements, Jo was gracious and giving to the scientific community. Instead of patenting his work, he offered it for free. “I thought it was important to be generous and make this freely

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JOACHIM MESSING
continued from page 25

available without restrictions so biotechnological innovations could move forward," he said. Jo was enthusiastic about scientific findings, and that excitement

fostered a positive and creative environment at his lab. Messing was also encouraging and inspiring, mentoring several generations of young scientists, many now established scientists in the United States and countries around the world including

China, Germany, Kenya, Mexico, Philippines, Romania, and Switzerland.

Jo's death is a tremendous loss to the plant biology community. He will always be remembered as an excellent scientist, inspiring mentor, great collaborator, loving

husband, and gracious gentleman. He is survived by his wife Rita, son Simon, daughter-in-law Lisa, and grandchildren Daniel, Lukas, and Henry. He is also survived by his sister Angelika, a devoted staff, and many colleagues and friends. ■



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The image shows two views of a black t-shirt. On the left, a mannequin wears a t-shirt with a large graphic on the front featuring nine small images of plants and the text 'THE PLANT CELL' at the top. A circular inset labeled 'Sleeve' shows a close-up of the sleeve with a 'PB19' logo and the text 'PLANT BIOLOGY 1989-2019'. On the right, a women's fit t-shirt is shown with a similar graphic. Below the images, the text 'The Plant Cell Anniversary T-Shirt' is displayed on a black background, followed by a green box containing the price '\$22'.

The Plant Cell Anniversary T-Shirt **\$22**



The image shows the cover of a 2020 academic calendar. The top half features a close-up of green succulent-like plants with the text 'THE PLANT CELL' overlaid. The bottom half is a dark blue/black background with the text '2020 Calendar' and 'plantcell.org' below it. Below the image, the text '16 Month Academic Calendar' is displayed on a black background, followed by a green box containing the price '\$12'.

16 Month Academic Calendar **\$12**



The image shows a pair of black athletic knee-high socks with orange heels and toes. Each sock has a green patch on the upper calf with the text '30 THE PLANT CELL' and a small plant icon. Below the image, the text 'Athletic Knee High Socks' is displayed on a black background, followed by a green box containing the price '\$11'.

Athletic Knee High Socks **\$11**



The image shows a pair of black dress socks with green heels and toes. Each sock has a green patch on the upper calf with the text '30 THE PLANT CELL' and a small plant icon. Below the image, the text 'Dress Socks' is displayed on a black background, followed by a green box containing the price '\$12'.

Dress Socks **\$12**



The image shows a yellow journal notebook with a black spine. The cover has the text '#ThePlantCell@arden30' printed on it. Below the image, the text '5" x 7" Journal Notebook' is displayed on a black background, followed by a green box containing the price '\$8'.

5" x 7" Journal Notebook **\$8**

Call for Papers



Plant Physiology

2020 Focus Issue on Parasitic Plants

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This Focus Issue will showcase Updates and Research Articles in the field of parasitic plants on topics such as the parasitic plant life cycle and lifestyle (and how this compares to other pathogens), germination stimulants/strigolactones and the strigolactone receptor in parasitic plants, haustorium formation, the transfer of information between parasitic plants and their hosts, host manipulation by parasites, and the evolution of plant parasitism.

For more information go to <https://aspb.org/ppfocus/>.



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