



American Society of Plant Biologists

Cultivating a better future through plant biology research

Howard Hughes Medical Institute–Gordon and Betty Moore Foundation (HHMI-GBMF) Investigators

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Philip N. Benfey, *Duke University*

Philip Benfey studies how plants control the form and function of their root systems, using the *Arabidopsis* model system. In addition to identifying key genes which guide root development, his laboratory has created several technologies for tracking gene expression and root growth patterns.

Benfey is the Paul Kramer Professor of Biology at Duke University and director of the Duke Center for Systems Biology. He is a member of the National Academy of Sciences and a fellow of the American Association for the Advancement of Science (AAAS). He served ASPB as monitoring editor and associate editor for *Plant Physiology*.

Dominique Bergmann, *Stanford University*

Dominique Bergmann studies the plant stomata as a way of asking questions about development and stem cells that would be difficult—if not impossible—to ask in animals. She is especially interested in asymmetric cell division since plants use a different mechanism than animals. She looks forward to studying stomata development in a variety of organisms, especially grasses.

Bergmann is assistant professor of biology at Stanford University and an associate of the Stanford Institute for Stem Cell Biology and Regenerative Medicine. This past year, she received a Presidential Early Career Award in Science and Engineering (see January/February 2011 issue of *ASPB News*). Bergmann received ASPB's Charles Albert Shull Award in 2010, which recognizes young researchers, and will deliver her award lecture at Plant Biology 2011 in Minneapolis. She has also served as a mentor for ASPB's Summer Undergraduate Research Fellowship (SURF) program.

Simon Chan, *University of California, Davis*

Simon Chan studies chromosomal inheritance and only began working on plants as a postdoc. His work on the centromere identified an easy way to create *Arabidopsis* plants that contain genetic materials from only one of their parents. The next step is to extend this work to crop plants such as tomato, cabbage, and canola. He has also been working to understand the DNA sequences at the centromere and their potential role in speciation.

Chan is assistant professor of plant biology at the University of California, Davis. He received ASPB's Early Career Award in 2006 and has served as a mentor for the Society's SURF program.

Xuemei Chen, *University of California, Riverside*

Xuemei Chen studies the stem cells that give rise to flowers and how undifferentiated cells acquire their fates. She discovered that floral development is controlled not only at the level of gene transcription, but also by regulation of protein production. Her lab also works on microRNAs, especially focusing on their inhibitory effect on translation.

Chen is professor of plant cell and molecular biology at the University of California, Riverside. She received ASPB's Charles Albert Shull Award in 2006 and has served as a monitoring editor for *Plant Physiology*.

Jeffery Dangl, *University of North Carolina at Chapel Hill*

Jeff Dangl is a leader in studying plant immunity and helped developed Arabidopsis into a model for studying plant-pathogen defense. He identified plant receptors that guard key host proteins and mount an immune attack when damaged. Similar such receptors have been identified across living systems from sea urchins to humans. In addition to continuing this work on pathogen defense, Dangl will also explore how plants influence the microbial community that lives in association with its roots.

Dangl is John N. Couch Professor of Biology at the University of North Carolina at Chapel Hill, a member of the National Academy of Sciences, a foreign member of the German Academy of Science, and a fellow of AAAS. He received ASPB's Stephen Hales Prize in 2009 and has served as a mentor for the Society's SURF program.

Xinnian Dong, *Duke University*

Xinnian Dong works to understand plant immunity and uncover the detailed mechanisms of plant-pathogen defense. She identified a signaling gene that helps promulgate an immune response throughout the plant, even if infection is localized to one region of the plant. Her lab also found that the Arabidopsis immune response varies by the plant's circadian clock. She plans to further her work in understanding the relationship between DNA damage repair and plant defense.

Dong is an Arts & Sciences Professor at Duke University. She is a co-editor for *The Plant Cell* and previously served as a monitoring editor for *Plant Physiology*.

Jorge Dubcovsky, *University of California, Davis*

Jorge Dubcovsky has worked to improve wheat, especially by boosting the grain's protein, zinc, and iron content to make it more nutritious; this is especially important since 20% of what every person around the world eats is wheat. His work is helping to understand critical stages of wheat plant development, such as flowering time, which can help breed varieties that are matched to the climate and the local environment.

Dubcovsky is professor of plant sciences at the University of California, Davis. He is a fellow of AAAS and received ASPB's Dennis R. Hoagland Award in 2009 for outstanding plant research in support of agriculture.

Joseph R. Ecker, *Salk Institute for Biological Studies*

Joseph Ecker was an early leader in the effort to sequence the Arabidopsis genome and in 2008, he helped launch the 1001 Genomes project, which will sequence 1,001 natural strains of Arabidopsis around the world. He has more recently been trying to decipher the epigenome that controls gene activity and has found similar methylation patterns in humans and plants.

Ecker is professor in the Plant Molecular and Cellular Biology Laboratory at the Salk Institute for Biological Studies. He is a member of the National Academy of Sciences and received ASPB's Martin Gibbs Medal in 2005. He also served as a monitoring editor for *Plant Physiology*.

Mark Estelle, *University of California, San Diego*

Mark Estelle has been working to understand the role of the plant hormone auxin, which helps plants respond to their environment. He discovered that auxin leads to the degradation of regulatory proteins that prevent DNA transcription and identified the auxin receptor and its mechanism. He plans to study the pathways activated by auxin, starting with the growth of cotyledons.

Estelle is distinguished professor and chair of the Department of Cell and Developmental Biology at the University of California, San Diego, a fellow of AAAS, and a member of the National Academy of Sciences. He has served as monitoring editor for *Plant Physiology* and as co-editor for *The Plant Cell*.

Sheng Yang He, *Michigan State University*

Sheng Yang He studies what makes plants susceptible to disease. He first learned that bacteria actually deliver proteins into the plant cell by needle-like structures and determined that some of the proteins suppress the plant's immune response; similar suppression has been shown by some human pathogens including the bacterium which causes bubonic plague. He plans to continue his work on pathogenesis mechanisms, the stomata defense system, and the role of toxins and hormones in plant disease. He also hopes to find natural inhibitors of a major bacterial pathogenesis pathway.

He is professor of plant biology at Michigan State University and the MSU–Department of Energy Plant Research Laboratory.

Robert Martienssen, *Cold Spring Harbor Laboratory*

Robert Martienssen began studying maize transposons in the mid-1980s, discovering that they regulate genes through methylation. These methylated transposons also lose their ability to move, so methylation provides a host defense mechanism. He has also studied the role of small RNAs in gene regulation, linking RNA interference to the inactive form of chromosomal DNA, and the role of regulatory RNAs in reinstating transposon silencing during reproduction; he speculates that it may be possible to grow a plant from egg cells without fertilization.

Martienssen is a professor at Cold Spring Harbor Laboratory, a fellow of the Royal Society and an associate member of the European Molecular Biology Organization.

Elliot Meyerowitz, *California Institute of Technology*

Elliot Meyerowitz was one of the first to identify a plant hormone receptor and helped discover how plants create their characteristic pattern of leaves and flowers. He is using a variety of tools, including live imaging and mathematical modeling, to understand how plant cells use auxin to communicate and how the growing tip of the plant, the apical meristem, differentiates into different tissues. His lab found that plant regeneration is enabled by a population of adult stem cells.

Meyerowitz is the George W. Beadle Professor of Biology at the California Institute of Technology but is currently serving as the inaugural director of the Sainsbury Laboratory at the University of Cambridge (see Members in the News, p. XXX). He is a fellow of AAAS, a member of the National Academy of Sciences and a foreign member of the Royal Society. He received ASPB's Martin Gibbs Medal in 1995 and was named a fellow of ASPB in 2010. Meyerowitz was also cofounder of *The Arabidopsis Book* and received a grant from the ASPB Education Foundation in 2007 to help create a teacher-training program in using plants as a model system to address state biology education standards.

Krishna K. Niyogi, *University of California, Berkeley, and Lawrence Berkeley National Laboratory*

Krishna Niyogi has been studying photosynthesis for more than a decade and how plants thrive with an unsteady supply of sunlight. Using both *Arabidopsis* and the green alga *Chlamydomonas*, he has focused on nonphotochemical quenching, in which plants release heat as a line of defense when they absorb too much light; greater understanding of this process could help develop more efficient biofuels and food crops.

Niyogi is a professor in the Department of Plant and Microbial Biology at the University of California, Berkeley, and a faculty scientist in the Physical Biosciences Division at Lawrence Berkeley National Laboratory. He received ASPB's Charles Albert Shull Award in 2005 and a Presidential Early Career Award for Scientists and Engineers. He served as co-editor for *The Plant Cell* and as a member and chair of ASPB's Publications Committee.

Craig Pikaard, *Indiana University Bloomington*

Craig Pikaard has been investigating how plant cells silence gene expression, focusing on epigenetics, which are inherited changes not affecting the DNA sequence. He looked at nucleolar dominance, when ribosomal RNA is only expressed from one parent in a genetic hybrid. He will further his research on gene silencing, including through the use of single atom cryoelectron microscopy, to understand how the cell chooses which genome to suppress.

Pikaard is the Carlos O. Miller Professor of Plant Growth and Development at Indiana University Bloomington and a fellow of AAAS.

Keiko U. Torii, *University of Washington*

Keiko Torii was among the first to discover receptor kinases in plants, proteins which span the cell membrane to transmit chemical signals from other cells. Knocking out these kinases had an effect on the pattern of pores known as stomata; further investigation revealed that several genes which led to stomatal stem cells were in the same class as master regulatory proteins for neuron

and muscle development in animals. She is now working across disciplines to understand the regulatory dynamics and signaling pathways that create stomatal patterns. Greater understanding of this process can help predict how plants will cope with changing climates, including droughts and other environmental challenges.

Torii is professor of biology at the University of Washington. She currently serves as a monitoring editor for *Plant Physiology*, a member of the editorial board for *The Arabidopsis Book*, and a mentor for ASPB's SURF program.

Additional information about the HHMI-GBMF Investigators is available from HHMI at http://www.hhmi.org/news/plantscience20110616_list.html.