



MSU-DOE Plant Research Laboratory Alumni Newsletter Number 10 January 2009

MICHIGAN STATE
UNIVERSITY



*Do you recognize
your fellow alumni?
(see p. 15)*

MSU is an affirmative action,
equal opportunity employer.

Greetings, Alumni!

A new year is upon us already and though it seemed to fly by, 2008 was a very good year for the PRL. Our incoming class of graduate students was five strong, and five others graduated and moved on to positions in their field of study. Our current roster of graduate students and postdoctoral research associates totals 64 highly motivated individuals who are conducting excellent research. Thirty-six publications came out of this research during the year, providing significant new insights into a number of areas, including hormone and other signaling pathways, plant pathogen and insect interactions, protein and membrane trafficking, and cell wall synthesis and function. In addition, I am delighted to tell you that Sheng Yang He is a recipient of the MSU Distinguished Faculty Award and that Jonathan Walton was elected Fellow of the American Phytopathological Society. Congratulations to both Sheng Yang and Jonathan!

A major occurrence in 2008 was the submission of our triennial proposal to the US Department of Energy for renewed funding of the PRL research and training grant. The visiting Review Committee of seven joined three DOE representatives in August to conduct the review at the Henry Center in Lansing. Each of the faculty presented an overview of their lab's research and 65 posters were displayed by our students and postdocs. I am very happy (and personally very relieved!) to report that the outcome of the review was positive and that we will be funded for an additional three years.

In regard to our future research, we are all well aware that our nation (and the world) face the challenge of developing sustainable sources of renewable energy. Meeting this challenge is



a central directive of the DOE. All of the research conducted over the years in the PRL has related to energy—including studies on photosynthesis, hydrogen metabolism, and basic plant biology—all ultimately relevant to improved yields and quality of biomass. Our current research focuses on three areas germane to energy capture, flow and deposition: organelle signaling and interactions that impact photosynthesis; determining how plants respond to environmental factors that effect energy flow and production of biomass; and understanding the synthesis of cell wall precursors and their assembly into complex polysaccharides and cell walls. However, we well recognize the urgency to develop renewable and sustainable sources of energy and are enthusiastic about the contribution of the PRL in additional ways to meet this goal. We are, therefore, exploring a number of possibilities to accomplish this, including projects devoted to developing a map of the "Plant Bioenergy Network." Over the course of the year, we will develop a web site to report on our thoughts and research projects in this area. Stay tuned!

And finally, there is the great morale and esprit de corps of the PRL community. The year 2008 was again a wonderful one for the events that have become traditions over the years. We celebrated Gutterball XIV, Putt-'n'-Go IV, the 4th year of the monthly First Friday Kaffee Klatsch, and, of course, the inimitable, annual PRL Holiday Gala!

Well, I am obviously beginning to ramble and thus will spare you by closing and wishing all of you the best for 2009!

~ Mike Thomashow

We invite you to visit the PRL website, at <http://www.prl.msu.edu/>



Visit the GLBRC Website (<http://glbrc.msu.edu/>)

2008 marked the first year of operation for the Great Lakes Bioenergy Research Center (GLBRC). The Center is funded by the Office of Biological and Environmental Research (BER) at DOE (the PRL is supported by DOE's Office of Basic Energy Sciences, BES). The University of Wisconsin-Madison and Michigan State University are the two major partners in GLBRC, with scientists from other universities, companies, and two national laboratories also participating in its operation. In this first year, we got the research programs up and running, with major focus on four areas of importance to establishing a successful biofuels industry. They are:

1. Improving plants for use in biofuel production.
2. Improving the processing of plant biomass to fermentable sugars.
3. Improving the synthesis of biofuels.
4. Evaluating and improving the economic and environmental sustainability of the entire process.

The center supports more than 60 research projects in these four areas; many of these projects require support from GLBRC facilities that provide Enabling Technologies or Informatics and Information Technology services. Finally, the GLBRC has an Education and Outreach program. The GLBRC activities involve five PRL faculty members as well as a number of PRL alumni. During 2008, the GLBRC grew to include more than 300 scientists and support staff. At a retreat in October, scientists shared the results of their activities from the first year.



Update by Ken Keegstra,
GLBRC Scientific Director

PRL Faculty in the News



Jonathan Walton Named 2008 APS Fellow

The American Phytopathological Society has named Jonathan Walton an APS Fellow. The Society grants this honor to a current APS member in recognition of distinguished contributions to plant pathology or to The APS.

Jonathan is also serving as Editor-in-Chief of *Molecular Plant-Microbe Interactions* from 2007 to 2009.

Visit the APS website
(<http://tinyurl.com/57r5yn>)

to view the announcement and a description of Jonathan's research.

Sheng Yang He Interviewed for IS-MPMI Reporter (<http://tinyurl.com/3o76ws>)

Sheng Yang He, member of the Board of Directors of the International Society for Molecular Plant-Microbe Interactions, 2007-2011, was interviewed for the organization's newsletter. In this interview, starting on page 5, Sheng Yang talks about growing up in China, his early introduction to plant pathology, what has been his inspiration in his research work, among other interesting topics.



PRL Scientists Have Identified a Gene that Helps Regulate a Plant's Response to Heat Stress

Work on a collaborative group project entitled "Membrane-Tethered Transcription Factors" has turned up some interesting information on mechanisms of heat tolerance in plants. The research group found that the gene designated bZIP28 encodes a protein that is tethered to the endoplasmic reticulum (ER) in optimal temperatures but moves to the nucleus and regulates gene expression during heat stress. This finding provides the first evidence of involvement of the ER in a plant's response to heat stress.



H. Gao, above
C. Benning, below

The research was conducted by Hongbo Gao (Research Associate, PRL), Federica Brandizzi (PRL, Plant Biology), Christoph Benning (Biochemistry & Molecular Biology; see alumnus update, page 9) and Rob Larkin (PRL, Biochemistry & Molecular Biology).



F. Brandizzi, above
R. Larkin, below



Their most recent findings are reported in the *Proceedings of the National Academy of Sciences*:

Gao H, Brandizzi F, Benning C, Larkin RM (2008) A membrane-tethered transcription factor defines a branch of the heat stress response in *Arabidopsis thaliana*. Proc Natl Acad Sci USA 105: 16398-16403 [Abstract](http://tinyurl.com/au353y) (<http://tinyurl.com/au353y>)



MSU Plant Genomics Summer Research Program



Summer 2008 participants, with mentors

Photo, courtesy of Linda Savage

Since 2006, students with junior or senior standing in colleges in the US have had a unique opportunity at MSU to get a taste of genomics research. In 2007, the invitation was extended to secondary school science teachers and a few faculty from Michigan colleges. These visitors come to campus to work alongside MSU faculty, postdoctoral associates, and graduate students in participating labs in the PRL, Plant Biology, Biochemistry & Molecular Biology, and Horticulture. During the ten-week summer session, guests also attend group meetings and activities. Weekly informal seminars and luncheons provide the opportunity to interact with other participants and hosts.

MSU's plant biology faculty are using genomics approaches on a wide variety of plants and microbes to delve into such areas as protecting plants from insect predation, understanding secondary metabolic pathways, and developing sustainable energy sources. Thus, guests in this summer program may be involved, for example, in cutting-edge research into how plant cell walls (for cellulosic ethanol) and oils (for biodiesel) are produced.

Each student in the ten-week program receives a stipend of \$4500 and free housing and meals on campus. At the end of the program, students present short summaries of their research projects to an assembly of the program participants.

In 2009, the session will run from May 26 to July 31, with an application deadline of March 13, 2009.

Several PRL faculty are participants in this program. They are listed below, with department affiliation and focus of research.

Gregg Howe (BMB*) Molecular genetics and biochemistry of induced plant resistance to insect pests and pathogens

Jianping Hu (PLB*) Peroxisome biogenesis, function, and signaling in plants

Kenneth Keegstra (BMB*) Biogenesis of cell wall polysaccharides, chloroplast protein targeting

Beronda Montgomery-Kaguri (BMB*) The roles of bilins and biliproteins in the physiological responses of photosynthetic organisms; photo-biological responses in plants

Mike Thomashow (CSS*) Plant and microbial responses to environmental stress

Some of our alumni who have returned to MSU have also opened their labs to students from this program. (Read updates for each, starting on page 9.)

Christoph Benning (BMB*) Biochemistry and control of metabolism in plants, algae, and photosynthetic bacteria

Robin Buell (PLB*) High throughput sequencing, functional genomics, comparative genomics, and bioinformatics

Tom Sharkey (BMB*) Biochemistry and biophysics of gas exchange reactions between plants and the atmosphere

***Departments of Affiliation:** BMB - Biochemistry & Molecular Biology; CSS - Crop & Soil Sciences; PLB - Plant Biology

For more information, visit:

[Plant Genomics](#), [Plastids](#), [Trichomes](#), [Peroxisomes](#), or [Great Lakes Bioenergy](#)

Our Students

New Additions to the PRL in 2008

Ya-Ni Chen was a Visiting Scholar in Brandizzi lab in early 2008, then decided to apply to our graduate program. She earned her BSc in Mathematics at National Tsing Hua University and her MSc in Molecular and Cellular Biology at National Taiwan University, both in Taiwan. Her thesis is entitled "Regulation of SUM1 protein stability in response to pachytene checkpoint" (in yeast). Ya-Ni is now entering our graduate program in Plant Biology to train for a career in plant molecular biology research.



Nikolas McPherson earned his BS in Biology at Hope College in Holland, MI. Growing up in diverse cultures—Canada, Germany, and the US—he has learned to see exciting potential in change rather than being intimidated by the unknown. His undergraduate experience piqued his interest in bioinformatics, synthetic biology, and biochemistry, and in exploring the interface between chemistry and biology and between biology and other disciplines. Nikolas likes to "think outside the box," an ability that will surely stand him in good stead as he proceeds toward his goal of contributing to the scientific community as both researcher and teacher.



Lalita Patel has been motivated by the need for innovative researchers who can communicate with the public, so her training has included both scientific research and education. She earned her BS in biology, with honors, along with certification in secondary education at Eastern Michigan University. Lalita participated in the REU (Research Experience for Undergraduates) Program at the Boyce Thompson Institute for Plant Biology at Cornell in 2007. In that program, Lalita worked with Dr. Haiyang Wang on a study of phosphorylation patterns in a protein in *Arabidopsis thaliana*. Lalita's outstanding academic record has earned her many awards, from the Mary Goddard

Scholarship for Scientific Research and Education to the Adella R. Jackson Scholarship for Leadership in Education.



Amancio José de Souza conducted research as a Visiting Scholar in Markus Pauly's lab early in 2008 as part of the work toward his MS degree in horticulture from the University of São Paulo, Brazil. He has now returned to begin work toward the doctorate in Genetics. Amancio's early training was in a plant virology lab at a research institution in Brazil. Later, as an undergraduate he served as an intern at the Escuela de Agricultura de la Region Tropical Humeda (EARTH) in Costa Rica. There, he studied changes in soil chemistry on an organic farm. After graduation, he worked for the Brazilian Aid Service for Small Businesses, focusing on small business development in agriculture. He then returned to school to study plant biotechnology. His research for the MS centered around the study of virus resistance in citrus plants. Ultimately, Amancio hopes to pursue active research in advanced plant biology, with such topics as the energy-converting capabilities of plants.

Xiufang Xin completed her BS degree in biological sciences at China Agricultural University in Beijing. Her work in Dr. Ligeng Ma's lab focused on epigenetic regulation, particularly histone modifications, in the development of *Arabidopsis*, and a functional analysis of two homologous ringfinger genes in *Arabidopsis*. During her undergraduate career, Xiufang won several awards for her scholarship, including three for ranking among the top percentage of students in her college and a third place showing in the national English contest for nonprofessional students in 2007. But she doesn't spend all of her time in the lab: in 2005, she took first prize in the college table tennis contest for female students!



Currently, 38 Graduate Assistants are studying toward advanced degrees in the PRL.

Half are from the US, with the others coming from Brazil, Chile, India, Korea, Myanmar, People's Republic of China, Peru, Sri Lanka, and Taiwan.

Our Students

2008 Award Winners



Julie Bordowitz (Montgomery-Kaguri lab) gave the Best Oral Presentation by a Graduate Student at the Spring Meeting of the Michigan Branch of the American Society of Microbiology, Mount Pleasant, MI. Her poster title was

“RcaE Regulates Cell and Filament Morphology in the Cyanobacterium *Fremyella diplosiphon*.”

Colleen Doherty (see photo above right; Thomashow lab) won the 2008 ASPB-Pioneer Hi-Bred International Graduate Student Prize, presented during the Plant Biology 2008 Awards Ceremony held in June in Mérida, Mexico. The prize recognizes innovation in graduate research in areas of plant biology relating to important commodity crops including corn, soybeans, rice, wheat, and canola.



Leron Katsir (Howe lab) received an “Outstanding Graduate Student Research Award” at the Annual BMB Department Banquet in April. This award is given to a Biochemistry graduate student who has excelled in scholarship, research, and teaching activities during his or her career in the department. Leron was also the recipient of the Anton Lang Award (see p. 8).



Francisco J. Uribe (He lab) won the award for Best Poster Presentation at the 19th New Phytologist Symposia held September 17-20 at the Timberline Lodge, Mount Hood, Oregon. His poster title was: “Characterization of the Structure-Function Relationship of AvrE, an Effector of the Plant Pathogen *Pseudomonas syringae*.” Francisco’s co-authors were Kinya Nomura, Christy Macey, and Sheng Yang He.

2008 Doctoral Dissertation Defenses



Colleen Doherty (Thomashow lab, PhD, Biochemistry), “Transcriptional networks involved in response to low temperature stress in *Arabidopsis thaliana*.” Colleen has moved to a postdoctoral position in Steve Kay’s lab, UC San Diego.

Leron Katsir (Howe lab, PhD, Biochemistry) “Biochemical characterization of the jasmonate receptor.” Leron is in Cambodia for six months, working to establish the first permaculture garden in that country.



Bradley J. S. C. Olson (Osteryoung lab, PhD, Biochemistry) “Biochemical analysis of the chloroplast division proteins FtsZ1 and FtsZ2.” Brad has taken a postdoctoral position at the Salk Institute for Biological Studies in La Jolla, CA.

Ritu Sharma (Thomashow lab, PhD, Cell & Molecular Biology) “Identification of eQTLs regulating expression of early low temperature responsive genes.” Ritu is a postdoctoral associate in Bryan Grenfell’s lab at Penn State University.



Bonnie St. John (Thomashow lab, MS, Plant Biology) Bonnie has taken a position as a technician at the National Jewish Hospital in Denver.

New Postdocs and Staff in 2008

Brandizzi Lab

Carmen Faso earned her PhD at the Swiss Federal Institute for Technology in Zurich. Her doctoral project, under the guidance of Prof. Dr. Wilhelm Gruissem, involved a study of the use of plants such as cassava (*Manihot esculenta*) for the production of compounds with anti-HIV properties.

Montgomery-Kaguri Lab

Bagmi Pattanaik BSc, MSc, and PhD degrees in Botany from Utkal University Bhubaneswar, Orissa, India. Her dissertation is entitled "Ecophysiological strategies of cyanobacteria in the crusts at the archaeological sites and rice field soils." Since 2003, she has held post-doctoral positions at Banaras Hindu University, Varanasi, India; University of Rostock, Germany; Leibniz Institute of Freshwater Ecology and Inland Fisheries, Stechlin-Neuglobsow, Germany; and Gothenburg University, Sweden.



Thomashow Lab

YongSig Kim earned his BA and MS in Agricultural Biology from Seoul National University in Korea, and his PhD in Plant Sciences at the University of Arizona. He studied phytopathogenic bacteria as biotic stimuli in plant pathogen interactions for his master's degree. His doctoral work, first under the direction of Dr. Jian-Kang Zhu (who moved his lab to Riverside) and then under Dr. Karen Schumaker, involved a study of the mechanisms plants use to deal with abiotic stress, and stress signaling in

plants. YongSig has served as a Research Associate at Kumbo Petrochemical Company and at U. Arizona.



Visiting Scholars

Increasingly common in PRL labs are brief visits by international students who come here for a period of two to six months to learn a new procedure or to gain experience in working with a particular organism. In 2008, seven Visiting Scholars joined us for varying lengths of time:

Brandizzi Lab

Mayte Solas (3 months), from Spain

Montgomery-Kaguri Lab

Dominik Beyer earned his MS degree in biology and biotechnology at Ruhr University Bochum, Germany, where he is continuing work toward his PhD. (3 months)

Keegstra/Pauly Labs

Xia Tao has a MSc in Food Chemistry and is working toward a PhD in Biochemistry & Molecular Biology at Huazhong Agricultural University, Wuhan, Hubei, China. (Cell wall polysaccharide biosynthesis, 3 months)

Pauly Lab

Giovanna Bezerra (2 months), from Brazil

Markus Biederman (6 weeks), from Germany

Baocai Zhang (3 months), from Beijing

Walton Lab

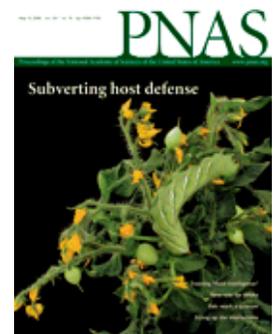
Abdul-Rahman Soliman earned his MSc in Botany at South Valley University in Egypt and his PhD in Microbiology at Friedrich Schiller University, Jena, Germany. (Research on fungal enzymes, 3 months)

Currently, 26 postdoctoral research associates are working in PRL labs, originating from the following countries: Chile, England, France, Germany, India, Israel, Italy, Japan, Korea, Macedonia, People's Republic of China, Peru, Poland, Sri Lanka, Switzerland, and the United States.

Howe Lab Makes PNAS Cover

Katsir L, Schillmiller AL, Staaswick PE, He SY, Howe GA (2008) COI1 is a critical component of a receptor for jasmonate and the bacterial virulence factor coronatine. Proc Natl Acad Sci USA 105(19): 7100-7105 [Howe Article](#)

In this publication, the Howe lab reported their findings "that COI1 is a critical component of the JA receptor and the COR exerts its virulence effects by functioning as a potent agonist of this receptor system." (photograph: Kurt Stepnitz)



Postdocs—Moving On

| RA | LAB | LOCATION AFTER LEAVING PRL |
|---------------|----------------|---|
| Bray Speth | He | MSU Division of Science & Mathematics Education |
| Canella | Thomashow | University of Lausanne, Switzerland |
| Doherty | Thomashow | University of California, San Diego |
| Gao | Larkin/Benning | |
| Hallen-Adams | Walton | Trail Lab, MSU Plant Biology |
| Lechno-Yossef | Wolk | MSU Great Lakes Bioenergy Research Center |
| van Erp | Walton | Washington State University, Pullman |

Hans Kende Award for Best Dissertation in the Plant Sciences



An endowment, established with contributions received in Hans Kende's memory, is being used to fund an annual award for the best doctoral dissertation in the plant sciences at MSU during the preceding year. The awardee is invited to return to MSU to present a seminar during the Fall PRL/Plant Biology Seminar Series, and also receives a monetary award.

Bill Underwood (left) was selected as the first recipient of this award. He earned his PhD in Sheng Yang He's lab in 2007, then moved on to a postdoctoral position in Shauna Somerville's lab, now at UC Berkeley. Bill returned to the PRL in October to present his lecture: "Regulation and localization of the PEN3 ABC transporter in Arabidopsis disease resistance."



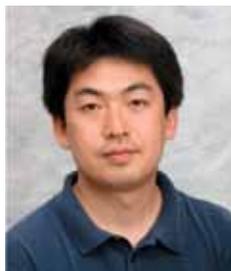
Contributions to the **Hans Kende Memorial Fund** or **Anton Lang Memorial Fund** may be sent to:
University Development Office
300 Spartan Way
East Lansing, MI 48824-1005

Please specify the fund to which you wish to contribute. All contributions are greatly appreciated.

Anton Lang Memorial Seminar and Awards

The 2009 Anton Lang Seminar will be presented on April 20 by Dr. Richard Amasino, Distinguished Professor of Biochemistry at the University of Wisconsin, Madison. The title of his seminar: "Epigenetics and vernalization: How certain plants 'remember' winter."

Awards for Outstanding Research in 2008 went to Graduate Student Leron Katsir (left, Howe lab) and Postdoc Kinya Nomura (right, He lab).



Anton Lang himself, who devoted his scientific career to the study of flower initiation and hormones involved in flowering, would have enjoyed Dr. Lucas's seminar entitled "Plasmodesmata, the phloem and control over flowering: In search of florigen."



William Lucas, Distinguished Professor, UC Davis

Notes from PRL Alumni



Charles Arntzen (Director, 1980-84; Charles.Arntzen@asu.edu; <http://sols.asu.edu/people/faculty/carntzen.php>) Dr. Arntzen was awarded an honorary doctorate from the Hebrew University in Jerusalem. The photo, above, is from the ceremony, which took place in June 2008 at the Mount Scopus campus of the Hebrew University. Dr. Arntzen stands in the center, with Menachem Magidor, President of HUJ, on the left and Haim Rabinowitch, Rector, on the right. Quoting from the award letter:

“In making its decision, the senate wishes to acknowledge your outstanding scientific achievements in the effort to develop plant-based vaccines for disease prevention in humans and in animal agriculture. Developing genetically modified fruits and vegetables that produce entigenic components of pathogenic viruses and bacteria is a cheap and sustainable means to immunize humans and livestock. Your innovative realization of protein engineering of immunogenic polypeptides from disease-causing agents, and their successful expression in plants, have opened new prospects to prevent hepatitis and diarrheal diseases such as cholera and *E. coli*. This pioneering accomplishment proves that crop plants can serve as pharmaceutical factories that could save the lives of millions of people worldwide.

“Your connections over the years with The Hebrew University through scientific collaborations with investigators and training of your scientists are evidence of your long-standing support of the University.

“The Senate recognizes your major contributions in plant biochemistry and molecular biology, commends your vision that modern plant science can improve life in the poor world, and praises your long-standing friendship with the Hebrew University and Israel.”



Christoph Benning (GA, 1986-91; RA, 1992-93; CR Somerville) was recently named the next Editor-in-Chief of *The Plant Journal*. Christoph will take over from Harry Klee, the current EIC, in January 2010. Recently, Christoph co-edited with Eran Pichersky

(University of Michigan) a special issue of *The Plant Journal* on “Harnessing plant biomass for biofuels and biomaterials” (<http://www3.interscience.wiley.com/journal/120090038/issue>). Hear a related podcast interview with Christoph: (<http://www.gabcast.com/casts/1696/episodes/1210588423.mp3>).

After receiving his PhD in Genetics in 1991, and a brief postdoc at MSU, Christoph went to the Institute for Gene Biological Research Berlin GmbH in Germany and worked five years as an independent group leader. He then returned to MSU, where he is currently Professor of Biochemistry and Molecular Biology and a faculty member of the Michigan Agricultural Experiment Station. “His basic research focuses on lipid metabolism in photosynthetic organisms. His group discovered genes and studies proteins involved in the biosynthesis and transport of lipid building blocks of the photosynthetic membrane. This basic work is funded by grants from the US National Science Foundation and the US Department of Energy.”

“Christoph Benning is also contributing to future solutions toward sustainable energy production. As part of the Great Lakes Bioenergy Research Center, funded by the US Department of Energy, he leads a team of scientists pursuing the engineering of novel agricultural crops for the production of biofuels. As part of this effort, the team is altering rutabaga storage organ composition by redirecting the partitioning of carbon from starch into oil. Rutabaga (*Brassica napus var. napobrassica*) is closely related to the model plant *Arabidopsis*. Christoph Benning’s team discovered in *Arabidopsis* a gene switch (transcription factor) that is crucial for the conversion of sugars into oil in developing embryos. Activating this gene switch in the rutabaga storage organ while at the same time blocking

starch biosynthesis, the team predicts that rutabagas will accumulate oil. Preliminary results with transgenic rutabaga roots look promising. It is expected that the humble but prolific rutabaga is capable of producing a lot more oil in its storage organ than its relative canola can produce in its seed, and that it might become an alternative cash crop for Michigan's sugar beet industry.

"A second line of biofuel research in Christoph Benning's lab is aimed at uncovering the mechanism by which microalgae accumulate oil. Microalgae have great potential for the scrubbing of carbon-dioxide from power plant flue gases, the removal of polluting micronutrients from sewage treatment plant effluents, and the production of biofuels using nothing more than sunlight, seawater, carbon dioxide, and mineral nutrients. Christoph Benning's group is using 'omics' and genetic approaches to find gene switches and enzymes involved in oil biosynthesis in the model algae *Chlamydomonas reinhardtii*. The team as well as the US Airforce Office of Scientific Research, who is funding this research, is hoping to develop microalgal production strains that one day can provide sustainable feed stocks for the production of liquid transportation fuels, including jet fuels."

C. Robin Buell (RA, S. Somerville, 1992-95; buell@msu.edu) Robin returned last year to MSU as a faculty member in the Department of Plant Biology. This year, she was named a fellow by the AAAS. She was recognized for distinguished contributions to the fields of plant and microbial genomics and genome biology, particularly in areas combining genome sequencing and computational biology.



Hyung-Taeg Cho (RA, Kende, 1995-98; htcho@snu.ac.kr) "Last September I moved to a new position (Associate professor) at Seoul National University in Seoul, Korea, which is my alma mater. ... Now it is not very cold in Seoul, unlike 30 years ago. Often I and my family miss big snow in Michigan. In our first winter in Michigan, my

daughter and I made a huge snow dragon in front of our Cherry Lane Apartment."

Graham Farquhar (RA, 1973-76, Raschke; graham.farquhar@anu.edu.au) "From 1973-76 I was a post-doc for two years, and then a Research Specialist [do they still exist?], with Klaus Raschke, who turned 80 on Jan 29 this year [2008]. I then returned to the Australian National University where I have been ever since.



I'm now Biological Secretary and Vice-President of the Australian Academy of Science, and a Fellow of the Royal Society. I've worked on stomata, photosynthesis, water use and stable isotopes, and, using our techniques, two new water-use efficient wheat varieties have been released by CSIRO here in Australia. I'm interested in climate change, and was a delegate and science advisor at Kyoto. My partner Josette Masle & I have identical twin daughters at universities in Paris, and a son still at home, plus a Labrador puppy and 40 acres of bush, kangaroos, wombats and weeds. All PRL associates are welcome here."



Kentaro Inoue (RA, 1999-2002, Keegstra; kinoue@ucdavis.edu; <http://pom.ucdavis.edu/kinoue>) "There are three pieces of good news from Davis in 2008. First, our department welcomed Li Tian (a graduate from Dean DellaPenna's lab) as a new professor. It is very nice, and

fortunate for us, to have Li and her husband Uwe, who used to take care of PRL's IT business, here in Davis. Second, I got a grant from US Department of Energy, entitled 'Mechanism and Significance of Protein Maturation and Targeting in the Biogenesis of Photosynthetic Compartments,' for three years starting on July 1st. This project evolved from one of questions I was trying to address in Ken's lab. I have been very fortunate to enjoy this 'evolution' of the research direction. Third, thanks to lots of people, I was promoted to Associate Professor, effective on the same day as the DOE grant started, July 1st. So, I will be staying here for a while.

"Outside the department, I started bike-racing again (first time since I moved to Davis). I did a 100-miler (mountain bike) near Sierra in September. Although I finished in the last half of the pack, I had a nice time. I also bought a new cyclocross bike, and have

raced with it several times in October. Unfortunately, I hurt my knee so I need to take some break. But I am feeling good. I am not as competitive as I remember I used to be when I was in East Lansing, but started enjoying trainings and these competitions again.”



Hyder Ali Khoja (RA, 2004-06, Keegstra; hyder.khoja@cehmm.org) “I have finally settled down in Carlsbad, New Mexico “a city of cavemen and caverns” and glad to inform about expecting arrival of our first child, due in March. I and my wife are looking very forward for this big day. I left

UW, in Wyoming and have joined a non-profit organization, The Center of Excellence for Hazardous Materials Management (CEHMM) as a Senior Environmental Research Scientist on Algae Biodiesel project. My primary responsibilities are to conduct research in the fields of biodiesel production and biodiesel feedstock, to develop and manage viable research programs to evaluate the effects of hazardous materials on public health and the environment, and to implement methods to reduce hazardous waste streams.

“CEHMM, established in May 2004, ... is dedicated to reducing the impact of hazardous materials on the environment. Since its inception, CEHMM has identified and pursued applied research projects that have nation-wide impact.... Energy security has become a national priority due to current world events and the instability of imported petroleum supply and cost. Cheam’s biodiesel research and development can help address this issue by developing new, non-food feedstock for use in biodiesel production. ...

“As part of this organization we are leading collaboration in southeastern New Mexico to produce biodiesel from microalgae. This collaboration includes: the City of Carlsbad, New Mexico State University, and Los Alamos National Laboratory. The project’s innovative approach, coupled with New Mexico’s natural resources, make this an ideal and unique opportunity to create jobs in rural areas and develop a strong new industry for the state and ultimately the nation.

“The use of microalgae as a biodiesel feedstock has the potential to make biodiesel a viable replacement for significant quantities of petro diesel, thereby supporting state initiatives and state laws, reducing American dependence on foreign oil, and reducing net global CO₂ emissions. The “biodiesel” is the name of a clean burning alternative fuel produced from domestic, renewable resources and is the only fuel to have fully completed the health testing requirements of the clean air.”



Anita Klein (GA, 1975-81, Delmer; pearlandboots@comcast.net) In 2008, “I was invited to serve on the review of EvolTree, an EU project. The review site was in Brussels. Through the efforts of Jan Zeveaart and Fernand Lamblin, I was fortunate enough to catch up with **Ludo Van Rompuy** (RA, Zeevaart, 1974-76). He served as my host and my tour guide for 36 hours. We had no problem recognizing each other after more than 30 years!

“Returning from the US, Ludo did his required military service, spent a few years with Marc Van Montague, and then several decades at AFGA. Ludo now works on patents in Antwerp. [ludo.van.rompuy@telenet.be; +32 485 71 52 23]

“Ludo took me to a fine French restaurant on Saturday night. On Sunday Ludo showed me the high points of Brussels: The Grand Platz, the Atomium (at the site of the World Fair in 1958, which inspired our friend to become a scientist), and NATO headquarters, then gave me a tour of Brugges (canal boat), and Ghent (along the river near the University). By the way, Ludo’s hobby is to serve as a tour guide.” (See photo above.)



Aaron Liepman (RA, Keegstra, 2002-06; aliepman@emich.edu) “Claire, Owen and I welcomed Mason Phoenix to our family in March 2008. Based on the Halloween photo one might assume a rivalry exists between Owen (3 yrs old & dressed as a cat in the photo) and Mason (dressed as a dog in

the photo), but actually the boys get along great! At work I have been keeping busy teaching a laboratory/writing course in cellular & molecular biology and mentoring an excellent group of student researchers

tackling projects relating to plant cell wall biosynthesis and function. Things are going great and I send my best wishes for a fantastic 2009!"



John Pitkin (RA, Walton Lab, 1992-97) "After 11 years at Monsanto, I remain in the Biotechnology organization. I currently lead a project working on plant pathogen interactions. My daughter Sarah started at the University of Missouri in the fall. Although Sarah is a comfortable 100 miles away, Kevin (born at Sparrow Hospital in beautiful downtown Lansing) is a

sophomore in high school and still lurks in the basement of our home. Joan and I look forward to an empty nest in 2 years, but we recently moved Joan's parents from LA (1800 miles away) to St. Louis (0.8 miles from our house), so we will not be "lonely". I include a photo of my visit to a disease-infected field in 2005 (which, in part, explains the plastic pants and rubber boots)."



Robyn Perrin (GA, 1996-2001, Keegstra; rperrin@gmail.com) "I am still located in Madison, WI, having moved here for postdoctoral research after graduating from MSU. I completed a postdoc in Patrick Masson's laboratory, followed by a postdoc in Nancy Keller's laboratory. I followed this up with an internship in intellectual property at the Wisconsin Alumni Research Foundation (the technology transfer office of UW), and then spent about a year as a technical writer for a biotechnology company (the Novagen brand of EMD Chemicals). Three months ago I returned to intellectual property and am now a Technical Specialist at the law firm of Casimir Jones, S.C. (<http://www.casimirjones.com/>). Patent law is fascinating! I'm enjoying preparing patent applications, preparing argumentative responses to the US

Patent and Trade Office, and conducting patentability or freedom-to-operate opinions. Our firm focuses 100% on intellectual property, specializing in the life sciences, and we do both patent prosecution and litigation so it is a great learning environment. I try to keep up my general-audience writing skills by blogging about science and intellectual property-related topics on <http://www.perrinhome.com/>. Feel free to look me up on linkedin.com and facebook - it's always great to reconnect!"



Silvia Rossbach (RA, 1990-95, deBruijn) "In 1995, I joined the faculty of the Department of Biological Sciences at Western Michigan University in Kalamazoo, where I was recently promoted to professor. My research includes topics in plant-microbe interactions and microbial ecology aspects of petroleum bioremediation."

Tom Sharkey (Tech, 1974-1976; GA, 1976-1979, Raschke; tsharkey@msu.edu) "After 28 years away from the PRL, Paulette and I have moved back to MSU where I am now chair of the department of Biochemistry and Molecular Biology. I was a Professor of Botany at the University of Wisconsin Madison for 20 years and before that was at the Desert Research Institute in Reno, Nevada as a research professor, and the Australian National University as a post-doc. I am excited to be back at MSU, it remains among the best places in the world for plant biology research."



Pat Tranel (GA, 1993-96, Keegstra; tranel@illinois.edu) "I am still enjoying my research and teaching responsibilities in weed science at the University of Illinois. Hard to believe I've been here 11 years! This year has been eventful with a new addition to the family

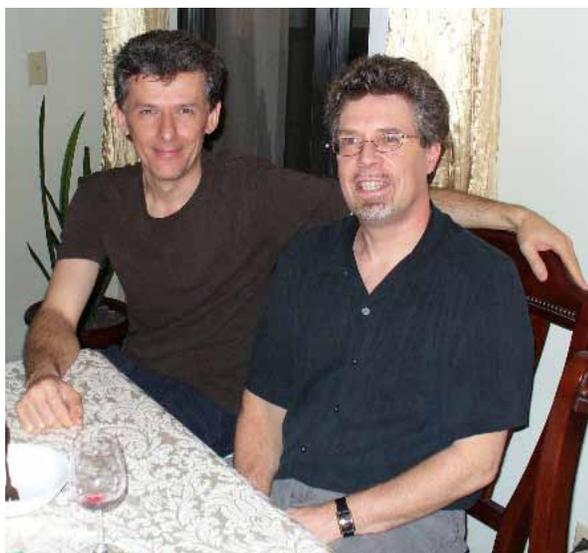
(Luke - our third child, born Dec. 31, '07, shown proudly displaying his pumpkin), building a new house, and completing paperwork for promotion to Professor (anticipated in '09). Yes, I realize these events took place in the wrong order, but it is working out anyway."

Fond Memories of the PRL

“Some of my favourite memories are dancing on Friday nights with Debbie Delmer, Ludo van Rompuy, Ursula Heiniger, and others from the PRL, Christmas parties at the Lang’s place, as well as the intellectual stimulation from Klaus, Norm Good, et al.” (Graham Farquhar)

“Ken’s lab used to share a coffee room with Natasha Raikhel’s group. Having chats with various good friends in that room was one of great memories. It was also memorable that John F and Lynda F were playing the Fight Song very loudly in the lab during the season. Finally, I still remember that the people in the office kindly gave me a green T-shirt as a token for farewell...” (Kentaro Inoue)

One of my fondest memories of the PRL (aside from donut Wednesdays) was the infamous April Fool’s joke played on JW by a former grad student. While Jonathan was on sabbatical in California, the student emailed JW and stated that she wanted to drop out, in part due to my statement that “she could not clone her way out of a paper bag”. The statement and her intention to quit were not true, but JW took the bait and was worried about the student. After the “joke” percolated several days beyond April 1, John Scott-Craig helped JW realize the date of the request. (John Pitkin)



Many of our fondest PRL memories have to do with the people we met and worked with in East Lansing. And although keeping in touch with those people may be easier now than ever (cf. cell phones, email, LinkedIn, Facebook, etc), actually getting to SEE one another can be quite a challenge – particularly for those of us whose careers have evolved “non-traditionally”. So, Vladimir Orbovic (above, left; Poff, 1993) and Crispin Taylor (above, right; Green, ditto) were delighted to

take advantage of the opportunity afforded by Taylor’s recent trip to Orlando (where he was exhibiting for ASPB at the Annual Biomedical Research Conference for Minority Students) to get together for dinner. Conversation flowed freely but focused on family and friends – particularly PRL friends. And as you can tell from our grins, although we are both older and greyer than we were as graduate students, our memories of the PRL still elicit the happiest of recollections! (Crispin Taylor)

Favorite memories from my years in East Lansing: (There were many!!). Hearing about the pranks that Hans routinely played on students, colleagues, and friends. Shortly after Mike Sussman’s thesis defense, Mike received a letter from Fred Shirley, the head of Botany. Mike was in a hurry to pack up and move to a postdoc position with Mary Helen Goldsmith at Yale. The letter said that Mike had failed to publicize his thesis defense two weeks in advance; therefore Mike’s defense was invalid and would have to be repeated... Mike went crazy, and started for Anton Lang’s office. Mike was going to entreat Anton’s help to overturn this cruel injustice. Hans got to Mike just before Mike reached Anton’s office. Of course the letter was classic Kende hoax!” (Anita Klein)

“Oh, the memories. It was such an honor to do my graduate work at the PRL; every day brought another insightful interaction with a colleague, and every week another visit and seminar by an internationally-recognized researcher in the field. The plenary sessions at the ASPB (then ASPP) annual meetings were often “reviews” for us, because often the speakers had already come to East Lansing in previous months. I hope that the tradition of graduate students and postdocs discussing their research directly with visiting speakers continues. Many departments unwittingly restrict those sorts of invaluable, informal discussions to principal investigators only - to the detriment of training efforts, because often it is only when a grad student presents the big-picture view of their project to someone outside of their lab group that a weak logical or technical aspect becomes recognizable - and therefore ready for improvement!

“I remember my first PRL retreat well. The days were filled with faculty presentations and fascinating discussions; I think it may have been a DOE block grant renewal year, so we had several external reviewers join us at Kellogg Biological Station (and I was blissfully ignorant of any heightened tension that the review process may have brought). There was a break in the seriousness on Saturday night, however, when an elementary-aged child of an attendee grabbed me by the arm and said, “Come on, come on, there’s something you have to see”. Mystified, I followed him to some

very loud music emanating from a room in the main KBS lodge. Inside was a live band and a pack of partying plant biologists. I seem to recall Maor Bar-Peled and Sridhar Venkataraman independently dancing with wild abandon.

"As the years went by, they were filled with late nights at the lab, the elation/frustration moments inherent to research, and landmark moments in the field such as the completion of the Arabidopsis genome sequencing project. There was a palpable sense of excitement about not only the research project I was working on but also those of other students and postdocs. There was a sense of community and a feeling that we were involved in something bigger than ourselves. Studying molecular plant biology in the late '90s-early 2000s also meant there was much discussion about the public controversy surrounding genetically modified plants and what this meant for the future of agricultural biotechnology.

"Ken Keegstra's lab had a few traditions, such as a holiday party held at Ken and Sue's house that always included Feuerzangenbowle, a German mulled wine prepared with a rum-soaked sugar cone that is set aflame. Thankfully, we managed to not set Sue and Ken's kitchen on fire. A few scorch marks occurred, perhaps, but no outright fires. Ken also surprised us one beautiful summer day by insisting that we all set down our pipets and spend the day canoeing and having a picnic lunch. This "work hard, play hard, and always ask the hard questions" philosophy is a really effective way to approach research – and life. Many thanks to all of the PRL colleagues circa 1996-2001 for sharing all of your energy and talent." (Robyn Perrin)

"I have many fond memories from my days at the PRL, but probably my proudest achievement is beating Dr. John Froehlich's team in one of the annual Hack-N-Go golf outings. I still have the trophy, and I hope that tradition, as well as the annual bowling outings, are still being continued!" (Pat Tranel)



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Please visit our website (<http://www.prl.msu.edu/>) to keep abreast of current research in each of our labs. You are also invited to visit the websites of our affiliated departments/programs:

Plant Sciences:

www.msu.edu/user/gradschl/plantsci.htm

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Cell & Mol. Biology: www.ns.msu.edu/cmb/
Crop & Soil Sciences: www.css.msu.edu/home/
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Microbiology & Molecular Genetics:
www.msu.edu/unit/mic/www-mic.html
Plant Biology: www.plantbiology.msu.edu/
Plant Pathology: www.plantpathology.msu.edu/

Steve Lorch (RA, Wolk, 1972-73) and grandson

Susan Fujimoto (GA, de Bruijn, 1990-97)

Erik Nielsen (GA, Keegstra, 1992-97)

Susannah Gal (RA, Raikhel, 1991-94)

Klaus Rasachke (Faculty, 1967-79)

Richard Firm (RA, Kende, 1971-73)

David Silver (GA, de Bruijn, 1991-96)

Pam Weathers (RA, Jost, 1969-74)

Ursula Heiniger (RA, Delmer, 1974-75)

Diane Bassham (RA, Raikhel, 1994-2001)

Anna Halinska (RA, Zeevaart, 1987-88)

Scott Diehn (GA, Green, 1992-98)

Gustavo Macintosh (RA, Green, 1997-2002)

Jinsong Zhu (RA, Wolk, 1995-97)

Ulrich Melcher (GA, Varner, 1965-70)

Idah Sithole-Niang (RA, McIntosh, 1990-92)

Charles Arntzen (Director, 1980-84)

Prudy (RA, Chelm, 1988) and Rich Hall

Hong Zhang (GA, CR Somerville, 1984-89)

Jianping Yu (RA, McIntosh, 1997-2005)

Beate Drechsler-Köhler (RA, McIntosh, 1991-93)

Son of Jonathan Vogel (GA, Thomashow, 2001-05)

Margaret Sauter (RA, Kende, 1989-94)

Ursula Hecht Klaschka (RA, C. Somerville, 1992)

Katrina Cornish (RA, Zeevaart, 1982-85)

Mark Johnson (GA, Green, 1995-99)

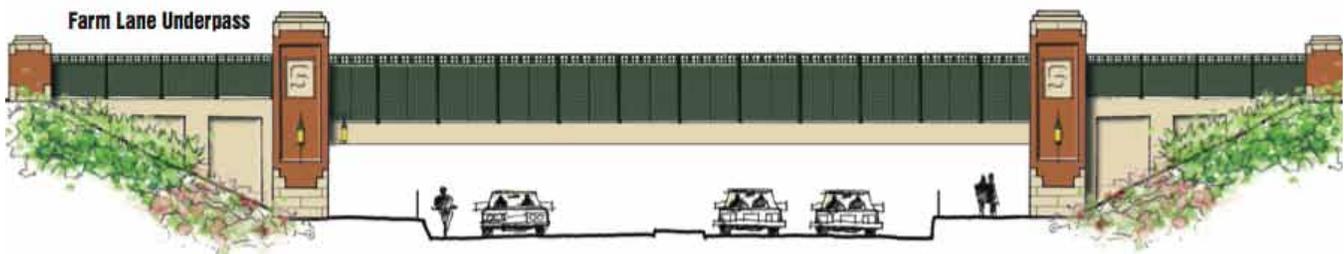
Jun Tsuji (GA, S. Somerville, 1987-92)

Children of Jenifer Murphy Görlach (GA, Walton, 1992-97)

Hui Chen (RA, Howe, 2001-2006)

Qing Fan (RA, Wolk, 2001-04)

*Alumni map
(See page 1)*



Farm Lane Underpass Becoming a Reality

The next time you visit MSU campus, you may find an attractive new entry from the south on Farm Lane. In spring 2008, construction crews began lowering the roadway under the two railroad crossings between Wilson Road and Mount Hope. Scheduled for completion in summer 2009, the new underpass will include five traffic lanes, pedestrian walkways, and bicycle lanes. Frequent rail traffic across the south end of campus has at times meant delays of up to thirty minutes for traffic on Farm Lane. The project is funded by MSU, the Federal Highway Administration, State of Michigan Jobs Today Program, and the CN and CSX Railroads. (Michigan Dept. of Transportation image)