# **Greetings!**

This is my last welcome to the PPWS newsletter as head of the Department of Plant Pathology, Physiology, and Weed Science. I would like to express my thanks to all the members of the department, both past and present, for the opportunity to serve as your department head for over nine years. I will be returning to my former role as faculty member involved in research, teaching, and Extension this fall. I am proud of all the accomplishments of our faculty, staff, and students over the past decade and I look forward to many more as we move forward.



Elizabeth Grabau Department head

Last fall we were joined by two new faculty members, Michael Flessner who has an Extension appointment in weed science, and David Haak who works in plant evolutionary genomics. Both are off to a great start. As I write this letter, we are also recruiting a new weed scientist at the Eastern Shore Agricultural Research and Extension Center and will fill the position for the fall semester.

This past academic year was also highly successful in terms of student recruitment and graduations. Last fall we reached our goal of 40 graduate students and we graduated nine students with masters and doctoral degrees. We were delighted to honor Tim Brenneman and Stacey Simon as recipients of the annual outstanding alumni awards at the College of Agriculture and Life Sciences spring awards ceremony.

One of the recent developments for the department and college is the announcement by Dean Alan Grant of the formation of a new School of Plant and Environmental Sciences next year. The school concept has generated a great deal of energy and excitement. Numerous working committees have been formed and will be meeting regularly to implement this new vision for our college. This new organizational structure should provide increased opportunities for collaboration among different programs and allow us to engage future students in exciting new academic programs, while still maintaining excellent visibility for initiatives important to our alumni and stakeholders. Stay tuned for all the good things to come!

Sincerely,

Elizabeth Grabau

# Arthur J. Webber Graduate Student of the Year Award

Doctoral student **Kristen Clermont** received the 2015 Arthur J. Webber Award for graduate student excellence from PPWS.



Kristen Clermont is accepting the Arthur J. Webber Award from Professor John McDowell.

Her advisor **Jim Westwood** noted, "Kristen is very deserving of this honor. She is an outstanding student with a strong curiosity. But beyond this she is very service-minded, and always looking for ways to help others and contribute to the department."

Note: Please update your information at the Alumni Association website at www.alumni.vt.edu/gateway (select "View and Update Your Profile").

# **PPWS Faculty and Students Around the World**

**Kathryn Fiedler**, a recent PPWS doctoral graduate ('14), has been conducting research on food safety for her Fulbright Fellowship in Bangladesh. The first phase of her research included sampling vegetables in rural markets of Mymensingh to determine shelf life, identify postharvest spoilage pathogens, and test for E. coli and Salmonella. She is now located in the University of Dhaka, in the capital of Bangladesh, to continue her surveys in markets to compare the food quality at different levels of postharvest handling in rural versus urban settings. She is also consulting with the FAO to improve the value chain for mango in Bangladesh for its first year exporting mangoes to the United Kingdom. This project is in conjunction with the Department of Agricultural Extension and includes Good Agricultural Practices, and workshops, which were a major focus of her dissertation research while at Virginia Tech.

**David Schmale III** and **Boris Vinatzer** coordinated a session on the size, chemistry, and other properties of microorganisms relative to detection of aerosols as part of an international early-career workshop "Microbes at the Interface of Land-Atmosphere Feedbacks" in St. Maxime, France, in October 2014. This event was part of an NSF-funded project.

**David Schmale III** co-organized an international workshop on the "Microphysics of ice clouds" in Vienna, Austria in April. He also gave a talk on scavenging properties of raindrops.

PPWS Senegalese graduate student **Yaya Diallo** and his advisor **Anton Baudoin** visited mango orchards in Senegal in May to set up Yaya's summer field trials and meet with collaborating growers and scientists. Yaya's research project, management of mango anthracnose, is funded by the U.S. Agency for International Development Education and Research in Agriculture program.

**Guillaume Pilot** traveled to Chile to the "PanAmerican Plant Membrane Biology Workshop" in June 2015, where he gave a presentation on his work and the work of **Sakiko Okumoto** on amino acid exporters in plants.

Jim Westwood and postdoctoral associate Gunjune Kim travelled to Morocco in April 2015 to exchange information and coordinate research with Moroccan colleagues. Over 10 days of discussions and field visits, the group sought to connect the fundamental biology of plant genomes with the goal of improving faba bean production in Morocco. The highlight of the visit was a workshop entitled "Genomics and Bioinformatics for Agricultural Research," held in Rabat, Morocco. The visit was part of an NSF Plant Genome Program funded project led by Westwood that aims to identify the key genes associated with parasitism in plants.



Kathryn Fiedler visits local vegetable farmers in the district of Bogra that are participating in a large scale project to transition 500 conventional small farms to organic production, while establishing an entire organic value chain throughout Bangladesh. This project is funded by Mennonite Central Committee and local distributors.



US and Moroccan researchers observe a heavy infestation of Orobanche in faba bean. PPWS members are Jim Westwood (left) and Gunjune Kim (second from left)

### Michael Flessner joins PPWS as assistant professor

**Michael Flessner** joined PPWS in August 2014 as an assistant professor and Extension weed science specialist. Flessner received his B.S. in Plant Sciences from the University of Tennessee, Knoxville and M.S. and Ph.D. in Crop, Soil, and Environmental Sciences from Auburn University. Flessner's weed management research and Extension program broadly focus on best weed management practices in agronomic crops such as corn, soybean, and wheat as well as pasture and forage systems. Currently, research projects are focused on integrated weed management strategies, such as high residue cover crops for weed suppression and harvest weed seed control. In addition to combating herbicide resistant weed species, these projects have the potential to deliver novel, but practical and economical, weed management solutions. Flessner's group currently includes graduate student **Kara Pittman** and senior laboratory specialist **Tyler Hoskins**.



Michael Flessner

# CALS Alumni Awards

### Stacey Simon Slijepcevic (Ph.D., 2007)

**Stacey Simon Slijepcevic** received her Ph.D. in PPWS in 2007 under the supervision of **John McDowell**. While at Virginia Tech, she created a genetic screening system to model the impact of recombination on the evolution of disease resistance genes. After completing her degree, she secured a highly competitive Ford Foundation postdoctoral fellowship to conduct research at the University of Delaware investigating the relationship between epigenetics and plant development, stress responses, and transcriptional regulation in maize, rice, and Arabidopsis. From there, Slijepcevic embarked on a new path involving policy and management as a Science and Technology Policy Fellow through the American Association for the Advancement of Science. In her current position she serves as a program manager in science and engineering at the U.S. Department of Education.



Stacey Simon Slijepcevic, recipient of the 2015 CALS-PPWS Alumni Award.

CALS-PPWS Alumni Award winner Tim Brenneman with department head Elizabeth Grabau and CALS Dean Alan Grant.

#### Tim Brenneman (Ph.D., 1986)

**Tim Brenneman** received his Ph.D. from PPWS under the supervision of Jay Stipes. Following completion of his doctoral degree, he accepted a faculty position in plant pathology at the University of Georgia where he has been a full professor since 1998. He has published over 100 scholarly articles and book chapters, plus an additional 250 conference proceedings and abstracts. Brenneman has co-released two peanut cultivars. His cumulative grant funding total exceeds \$2 million. Numerous regional and national recognitions have been awarded to Brenneman throughout his career, including Fellow of the American Peanut Research and Education Society in 2010, President of the same society in 2013, recipient of the Dow Agrosciences Award for Excellence in Research, President of the Georgia Association of Plant Pathologists, recipient of the Georgia Peanut Commission Excellence in Research Award, Outstanding Plant Pathologist of the Southern Division of the American Phytopathological Society, to name just a few. Brenneman has also a strong record of participation in international agricultural programs.

#### Faculty Awards, Scholarships, and Recognition



Instructor Mary Ann Hansen is accepting the APS Potomac Division Distinguished Service Award from Bingyu Zhao

Assistant Professor **Jacob Barney** was honored as Outstanding Researcher at the Northeastern Weed Science Society annual conference in Lexington, Kentucky in February 2015.

Instructor **Mary Ann Hansen** received the A.P.S. Potomac Division Distinguished Service award, Rehoboth Beach, Delaware, March 2015.

Research Associate **Christopher Clarke** was the winner of the Translational Plant Sciences Entrepreneurship challenge at Virginia Tech in February 2015.

#### A Selection of Other Student Awards

**Benjamin Adducci** - Gold Award, Virginia Tech Graduate Student Assembly Research Symposium, March 2015.

**Anna Benton** - Kriton K. Hatzios Crop Protection Scholarship, Fall 2014; Celeste W. Reynolds Graduate Scholarship, Fall 2014; Phyllis G. and Reginald H. Nelson IV Graduate Scholarship, Spring 2015.

**Julien Besnard** - Translational Plant Sciences Mini-symposium Student Oral Paper Competition winner, February 2015.

**Shelton Boyd** - PPWS Graduate Student Organization Research Symposium & Translational Plant Sciences Mini-symposium poster awards, February 2015.

**John Brewer** - First place - Graduate Individual, 2014 Northeastern Weed Science Society Collegiate Weed Contest, State College, Pennsylvania, July 2014.

**Norm Dart** - Bruce W. Perry Scholarship, Spring 2015.

**Mike Fulcher** - First place in the undergraduate poster contest at the APS Potomac Division Meeting in Rehoboth Beach, Delaware, March 2015.

**Kasia Dinkeloo** - PPWS- Graduate Student Organization Research Symposium poster award winner, February 2015.

**Hailey Larose** - Weed Science Society of America poster contest, second place, February 2015; PPWS- Graduate Student Organization Research symposium poster contest winner, February 2015.

**Sandeep Rana** - Graduate first place poster presentation, PPWS Research Symposium and graduate student poster contest, February; First place poster presentation in the Ph.D. section during the annual meeting of the Weed Science Society America, Lexington, Kentucky, February; First place - Individual, Herbicide Symptomology, Northeastern Weed Science Society Weed Contest, 2014; Virginia State Golf Association Graduate Student Scholarship, 2014; Louis and Ginger Brooking Turf Graduate Student Scholarship, 2014.

**Andrew Schneider** - Phyllis G. and Reginald H. Nelson IV Graduate Scholarship, Spring 2015.

**Larissa Smith** - (Ph.D. Alumna, 2015) - Awarded the Robert D. Sweet Outstanding Graduate Student Award at the Northeastern Weed Science Society annual conference, Lexington, Kentucky, February 2015.

**Daniel Tekiela** - Third Place - Paper Presentation Northeastern Weed Science Society, Williamsburg VA, 2014; Third Place - Graduate Individual, 2014 NEWSS Collegiate Weed Science Contest, State College, PA, July 2014.

**Virginia Tech Weed Team A** - First place at the 2014 NEWSS Collegiate Weed Science Contest, State College, Pennsylvania. Members of Team A included **Sandeep Rana**, **Daniel Tekiela**, and **Katelyn Venner**, July 2014.

# Theses and dissertations

**Benjamin Adducci**, Alexandria, Virginia (M.S. '15) "Detection of a Surrogate Biological Threat Agent (*Bacillus globigii*) with a Portable Surface Plasmon Resonance Biosensor."

**Elise Benhase**, Fredericksburg, Virginia (M.S. '15) "Investigations into the anatomy and physiology of poison ivy."

**Jacqueline Hawkins**, Camp Lejeune, North Carolina (M.S. '14) "The effects of soil moisture and vapor pressure deficit on field grown peanut."

**Gunjune Kim**, Long Grove, Illinois (Ph.D. '14) "Massive exchange of mRNA between a parasitic plant and its hosts."

**Charlotte Oliver**, Crewe, Virginia (M.S. '15) "Investigation of wine grape cultivar and cluster developmental stage susceptibility to grape ripe rot caused by two fungal complexes, *Colletotrichum acutatum*, and C. *gloeosporioides*, and evaluation of potential controls."

**Wei Ma, Wuhan**, China (M.S. '14) "Resistance in tobacco to the root-knot nematode *meloidogyne javanica*."

**Kurt Vollmer**, Pounding Mill, Virginia (Ph.D. '14) "Biology and Control of Eastern Black Nightshade (*Solanum ptycanthum*), Palmer Amaranth (*Amaranthus palmeri*), and Common Pokeweed (*Phytolacca Americana*), in No-Till Systems on the Eastern Shores of Virginia and Maryland."

Xiao Yang, Yangzhou, China (Ph.D. '14) "New species phylogeny of the genus Phytophthora."

**Shi Yu**, Wuhan, China (Ph.D. '15) "Characterization of the Arabidopsis glutamine dumper1 mutant reveals connections between amino acid homeostasis and plant stress responses."

#### David Haak joined PPWS as assistant professor



David Haak

**David Haak** joined PPWS in August 2014 as an Assistant Professor in Genomics. Haak received his B.S. and M.S. degrees from North Carolina State University. He completed his Ph.D. training at the University of Washington in Biology with a focus on ecological and evolutionary genomics, working on drought resistance in wild chili peppers. After his graduate training, he accepted a post-doctoral fellowship at Indiana University where he worked on identifying the genomic basis for defense traits among wild tomato species. His current interests include the identifying the genetic architecture of adaptive physiological traits in wild crop relatives, the genomic basis of plant-microbe interactions, and identifying genomic markers associated with herbicide and fungicide resistance. Haak's group currently includes graduate students **Chenming Cui** and **Haijie Liu** and Laboratory Manager **Qian Zhang**.

# A selection of publications by PPWS faculty, staff, and students



**Colcol JF, Baudoin A** (2015) Sensitivity of *Erysiphe necator* and *Plasmopara viticola* in Virginia to Qol Fungicides, Boscalid, Quinoxyfen, Thiophanate Methyl, and Mefenoxam. *Plant Disease* DOI: 10.1094/PDIS-01-15-0012-RE.

**Hu J, Telenko DEP, Phipps PM**, Hills H, **Grabau EA** (2015) Quantifying transgene flow rate in transgenic sclerotinia-resistant peanut lines. *Field Crops Res.* 178: 69-76

Park SY, Vaghchhipawala Z, Vasudevan B, Lee LY, Shen Y, Singer K, Waterworth WM, Zhang ZJ, West CE, Mysore KS, Gelvin SB (2015) Agrobacterium T-DNA integration into the plant genome can occur without the activity of key non-homologous end-joining proteins. *The Plant Journal* 81 (6):934-46.

Pietsch RB, David RF, Marr LC, **Vinatzer BA**, and **Schmale DG** (2015) Aerosolization of two strains of Pseudomonas syringae in a Collison nebulizer at different temperatures. *Journal of Aerosol Science and Technology* 49:159–166.

**Prussin AJ,** Marr LC, **Schmale DG**, and Ross SD (2015) Experimental validation of a long-distance transport model for plant pathogens: Application to Fusarium graminearum. *Agricultural and Forest Meteorology* 203:118-130.

Clarke CR, Studholme DJ, Weisberg AJ, Hayes B, Runde B, Cai R, Wroblewski T, Daunay MC, Castillo J, Wicker E, Vinatzer BA (2015) Genome-enabled phylogeographic investigation of the quarantine pathogen Ralstonia solanacearum race 3 biovar 2 and screening for sources of resistance against its core effectors. *Phytopathology* DOI: 10.1094/PHYTO-12-14-0373-R

Diaz A, Wang X (2014) Bromovirus-induced remodeling of host membranes during viral RNA replication. *Current Opinion in Virology* 9:104-110. doi:10.1016/j. coviro.2014.09.018

Zhang J, Li J, Garcia-Ruiz H, Bates P, Mirkov T, and Wang X (2014) A stearoylacyl carrier protein desaturase, NbSACPD-C, is critical for ovule development in Nicotiana benthamiana. *The Plant Journal* 80: 489-502. doi: 10.1111/tpj.12649

**Westwood JH** (2015) RNA transport: Delivering the message. *Nature Plants* 1: 15038. DOI: 10.1038/nplants.2015.38.

Kim G, LeBlanc ML, Wafula EK, dePamphilis CW, Westwood JH (2014) Genomic-scale exchange of mRNA between a parasitic plant and its hosts. *Science* 345(6198):808-811.

# Faculty and staff Updates

**Daniel Atwater** joined as postdoctoral associate in Jacob Barney's lab in June 2014.

Herve Avenot joined as research associate in the labs of Anton Baudoin and Chuan Hong at Hampton Roads in April 2015.

**Eva Collakova** was promoted to associate professor in May 2015.

**Michael Flessner** joined PPWS as assistant professor of weed Extension in August 2014.

**David Haak** joined PPWS as assistant professor of plant genomics in August 2014.

**Regina Hanlon** joined as research associate in David Schmale's lab in November 2014.

**Tyler Hoskins** joined as senior research specialist in Michael Flessner's lab in November 2014.

**Xiaoyan Jia** joined as postdoctoral associate in Jim Westwood's lab in November 2014.

**Gunjune Kim** joined as postdoctoral associate in Jim Westwood's lab in November 2014.

**Sakiko Okumoto** was promoted to associate professor in May 2015.

**Paulo Reis Vieira** joined as postdoctoral associate with Jon Eisenback in February 2015.



# **Annual AREC-**Ag Industry Tour

Twenty-one students and faculty participated in the annual Virginia Agricultural Research and Extension Center-Ag Industry Tour in August 2014. The tour began with a stop at the Cyrus McCormick Farm near Steele's Tavern where the first practical mechanical grain reaper was developed. The group toured Bowman Orchard in Timberville in the Shenandoah Valley, visited the apple production and storage at Turkey Knob Apples' distribution plant, and visited vineyards growing on steep terrain at Glen Manor Vineyard near Front Royal.

On the second day, Mizuho Nita and Keith Yoder at the Alson H. Smith Jr. Agricultural Research and Extension Center in Winchester led an overview of current research on tree fruit and grapes. The tour then proceeded to a Philip Morris tobacco processing plant near Chester to tour an engineered wetland that treats effluent from the plant before it enters the James River. In northern Chesterfield, Professor Emeritus Gary Griffin led a tour of declining black walnut trees infected with thousand cankers disease. The group ended the second day of the trip with an evening tour of Pamplin Historical Park near Petersburg.

The final day of the tour began at Virginia State University's Randolph Farm near Petersburg, where local extension faculty and personnel welcomed the group to a demonstration of intensive small-scale vegetable farming. En route back to Blacksburg, **Chuck Johnson** hosted a tour of the Southern Piedmont Agricultural Research and Extension Center, with an overview of tobacco disease diagnosis in the lab and field. The final tour stop was at the Orchid House nursery hosted by owners Thomas and Robyn Voytilla in Green Bay. Thank you to all the growers and AREC staff who hosted the tour and helped make it a success.

#### Third Annual PPWS-GSO Research Symposium

The PPWS Graduate Student Organization held the third annual research symposium on the Blacksburg campus on Feb. 19, 2015. The research symposium provided a great opportunity for faculty and graduate students to interact with each other and familiarize themselves with the diversity of ongoing research in the department. The event included a graduate student poster session followed by a keynote presentation by a guest speaker. In the poster session, a total of 15 students presented their M.S. or Ph.D. research for evaluation by the panel judges. The poster competition winners were Sandeep Singh Rana, Kasia Dinkeloo, and Hailey Larose. Each winner received a travel award to attend a professional research conference.

#### Sixth Annual **Translational Plant** Sciences

#### **Mini-Symposium**

The 2015 Translational Plant Sciences Mini-symposium was organized by Boris Vinatzer and held on Feb. 13, 2015. More than 80 registered participants enjoyed a full day of exciting research seminars, graduate student talks, and a poster session. Julien Besnard, graduate student with Sakiko Okumoto won the graduate student oral paper competition. The title of his presentation was "Is UMAMIT14 the first uni-directional amino acid exporter characterized in plants?" **Shelton Boyd**, an undergraduate student researcher with Guillaume **Pilot** won the poster competition. The title of his poster was "Functional characterization of variants of the Arabidopsis amino acid transporter AAP1."

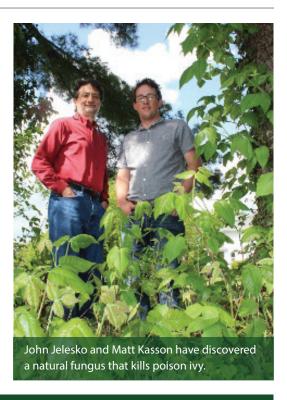
**Christopher Clarke**, a postdoctoral researcher in Jim Westwood's lab, won the first Translational Plant Sciences Entrepreneurship challenge. The title of his winning entrepreneurship idea was "Engineering an endogenous plant detector of pathogen RNAs."

Adriana Bernal, a molecular plant scientist and associate professor from the Universidad de Los Andes in Bogotá, Colombia, gave the opening lecture with the title "Using genomic" tools to manage Cassava bacterial blight." Eric Ward, CEO of AgBiome Inc. in Durham, North Carolina gave the keynote lecture on "An integrated approach to discovering useful traits and biologicals." The day ended with a banquet dinner accompanied by the local folk music band Cotton Hills. Support for the event was provided by Virginia Tech Fralin Institute of Life Sciences, PPWS, and Virginia Tech Interdisciplinary Graduate Education Programs.

# A Fungus that Kills Poison Ivy Discovered by John Jelesko and Colleagues

Poison ivy is an aggressive noxious weed that grows across most of the eastern United States. Most people who come into direct contact with poison ivy will manifest swollen, itching, blistering, and oozing skin rashes that last for several weeks. There are currently two methods for poison ivy weed control: physical removal and herbicide application. Both are effective at controlling existing plant infestations, but do not afford control of subsequent introduced poison ivy plants. John Jelesko in collaboration with Senior Research Associate Matt **Kasson** discovered and characterized a fungus, Colletotrichum fioriniae, that kills poison ivy and was previously only known as a lethal entomopathogen of certain invasive scale insects. In contrast to current poison ivy control measures that only effect existing plants, the advantage of using C. fioriniae as a biocontrol agent would be that once deployed, the fungus could persist to infect and kill subsequent poison ivy seedlings. To this end, a utility patent application was filed to the US Patent Office by VT Intellectual Properties to encourage the development of this fungus for durable control for both poison ivy and certain scale insects.

These results were also published in the journal Plant Disease. You can read more about the poison ivy fungus in this <u>Virginia Tech News</u> story.



# The Westwood Lab Publishes its Findings in Science Magazine



The parasitic plant dodder attacking Arabidopsis

Jim Westwood, former students Gunjune Kim and Megan LeBlanc, and their collaborators at Pennsylvania State University have discovered that the interaction between parasitic plants and their hosts goes far beyond obtaining nutrients and water by the parasite from the host plant. The parasitic plant dodder and its host plants tomato and Arabidopsis exchange vast amounts of information through the movement of messenger RNA from the host plant to the parasite and vice versa. Through this exchange, the parasitic plants may be dictating the host plant what to do, such as lowering host defenses so that the parasitic plant can more easily attack it. Westwood's next project is aimed at dissecting what the exchanged mRNA molecules are saying.

This work was sponsored by the National Science Foundation. Using this new information, scientists can now examine whether other organisms, such as bacteria and fungi, also exchange information in a similar fashion. Moreover, it may be possible in the future to interfere with the exchange between host plant and parasitic plant to control parasitic plants in the field and increase agricultural productivity.

Westwood's findings were published on August 15, 2014, in the prestigious journal SCIENCE. You can read more about plant communication in this <u>Virginia Tech News</u> story.

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VT/0815/PPWS-64NP



Department of Plant Pathology, Physiology and Weed Science Virginia Tech (0331), Blacksburg, VA 24061



### **Stay connected with PPWS**

We are updating our alumni contact list as we consider future paperless newsletter distribution, which would go directly to your email inbox and improve communication between PPWS and alumni. Please take a moment to complete the survey below or online at: http://tinyurl.com/q2cka75

What is your last name?	What is your first name?		
Mailing address			
City	State/Province	Zip Code	Country
VT PPWS Degree ☐ M.S. ☐ Ph.D. ☐	Did not graduate from Virginia Tech		Year graduated
Employer and employer city address			
Job title	What is your email address?		
May we add you to our alumni email lis	t? 🔲 Yes 🖫 No		
Which of the following accounts do you have? (Check all that apply)			
How would you like to receive future n	ewsletters and announcements?   Mail	☐ Email/electronically ☐	Both □ Do not wish to receive future announcements
If located in Virginia, would you or your industry tour held in August?		ormative tour of your fac	ility to our students as part of the annual agriculture
Would you be interested in being a professional mentor or networking contact for current PPWS students and recent graduates? 🔲 Yes 🕒 No			
If you are an alumnus, would you be willing to be a "featured alumnus" on our alumni web page? (currently under development) 🔲 Yes 🕒 No			
	gard to your personal and professional life.	•	iage or new family member?