BIOLOGUE

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Newsletter of the Biology Department, Washington University in St. Louis

"It Grows on You"

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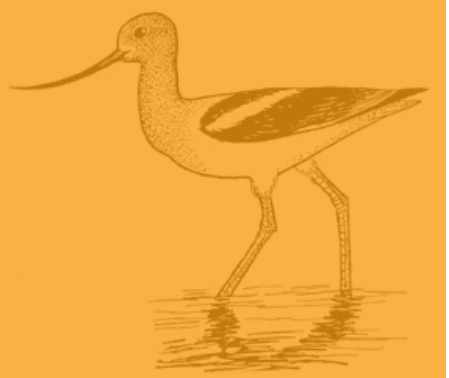


Viktor Hamburger on "Being a Zoologist" and Edgar Anderson on "Being a Botanist" *[From the Department newsletter, Zoonooz, (October 23, 1945):Vol II. No. 4]*

Editorial Note by Gar Allen: The oldest department newsletter, Zoonooz, a clever pallindrome, appears to have begun in the 1940s, and given that the selection below is from Vol II (1945) I would guess it started in 1944, though we have no copies of volume I in our department archive.

The selection here consists of two light-hearted, humorous accounts from two of the most distinguished members of the faculty at the time, zoologist/embryologist Viktor Hamburger (1900-2001) and botanist/evolutionary geneticist, Edgar Anderson (1897-1969), the Engelmann Professor of Botany with a concurrent appointment as a geneticist at the Missouri Botanical Garden.

Hamburger grew up in Silesia (eastern Germany in what is now a part of Poland) and did his graduate work on amphibian embryology in the laboratory of Hans Spemann (1869-1941) at Freiburg, winner of the 1935 Nobel Prize for his discovery (with Hilde Mangold) of the" organizer", the tissue of the dorsal lip of the blastopore that determines the development of the axial organization of the vertebrate embryo. Hamburger received a Rockefeller Fellowship in 1933 to work on chick embryos with Frank R. Lillie at the University of Chicago. He was slated to return to become Spemann's assistant at Freiburg in 1934 but the Nazi ascension to power made his position (as a Jew, employed by the state) impossible, so he eventually took a job at Washington University in 1935, becoming department chair in 1945 (for over twenty years). He retired as Malinckrodt University Professor in 1966.

Edgar Anderson was raised in upstate New York, and received his Ph.D. from Harvard University's Bussey Institution (a part of the biology complex that dealt with animal and plant breeding), under the direction of corn geneticist Edward M. East (1879-1938). Anderson's dissertation research was on the genetics of Nicotiniana (tobacco), but he soon switched to other organisms (such as Iris and maize) after moving to MoBot and WashU. He spent a

—cont'd on p. 4

New Faculty Member Richard Vierstra, George & Charmaine Mallinckrodt Professor of Biology

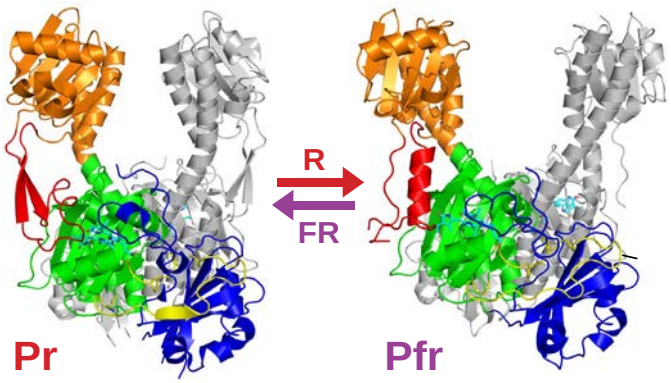
Dr. Richard (Rick) Vierstra grew up in Rhode Island where his early interest in biology and chemistry was fueled by his father's gift of a chemistry book designed for children with Do It Yourself experiments. This book, now banned from most libraries for being too dangerous, contained instructions on how to make explosives and poisonous gases! Despite the danger, these experiments cultivated his fascination with biochemistry. He studied Biology and Chemistry as an undergrad at the University of Connecticut, where his first instructors sparked an interest in botany, eventually leading to studies in plant biochemistry. Dr. Vierstra earned his Ph.D in the Department of Energy Plant Research Lab at Michigan State University. His postdoc work was completed in the lab of Dr. Peter Quail at the University of Wisconsin in Madison, where he stayed on for his first appointment in the Horticulture Department, eventually moving into Genetics.

After many years at UW-Madison, Dr. Vierstra decided it was time for a change. He came to Wash U in fall 2015 because of the university's reputation for having a strong biology department, especially in plant science. In addition, Wash U's partner institutes, the Donald Danforth Plant Science Center and Monsanto Corporation, have a lot to offer in the field of agricultural research. He was officially installed as the George & Charmaine Mallinckrodt Professor of Biology, an endowed professorship, in March 2016.

The Vierstra Lab's research is focused on understanding how plants detect and respond to light through the phytochrome family of photoreceptors and then using this body of knowledge toward more efficient agricultural growth. The lab also studies how cells break down proteins through the ubiquitin/26S proteasome and autophagy systems, and how they work together to promote growth and development and maintain cell health, as well as how a relative of ubiquitin called SUMO helps plants survive stress. This research has larger implications in understanding and treating neurological disorders and diseases such as Parkinson's, ALS and MS as well as certain cancers in addition to improving plant nutrition and stress tolerance (see lab description below).

Alongside teaching and lab research, Dr. Vierstra serves on several international committees including the Board of Trustees of the American Society of Plant Biologists, International Society of Plant Molecular Biology, and the North American Steering Committee on Arabidopsis Research. In his free time, he enjoys carpentry projects, watching and playing sports. *—Erin Gerrity*

Vierstra Lab Research Description



3-D structure of the photosensing module of a bacterial phytochrome showing the nanometer-scale conformational changes that occur during photoconversion between the inactive Pr and the active Pfr states.

Light is essential to plants, providing both the necessary energy for growth and signals to entrain their life cycle to the daily and seasonal rhythms. To perceive this signal, plants employ a family of red/far-red light-absorbing photoreceptors called phytochromes. The Vierstra lab is attempting to understand how phytochromes work at the atomic level, using a variety of structure-based approaches such as X-ray crystallography and single particle electron microscopy with both plant and microbial versions. An emerging model is that light excitation triggers an isomerization of the bilin chromophore, which induce dramatic changes within the protein that alter signaling. Based on this model, the lab is now trying to reengineer phytochromes as a novel strategy to improve agricultural yield and sustainability.

All cells have catabolic mechanisms designed to maintain proper homeostasis and influence the levels of key regulators

—cont'd on page 9

Danny Kohl, Professor Emeritus of Biology, 87, Obituary

Danny Howard Kohl, a professor emeritus of biology in Arts & Sciences at Washington University in St. Louis, died Saturday, March 12, 2016, in St. Louis. He was 87.

Kohl, who earned a bachelor's degree in physics, with honors, from the University of California, Berkeley, in 1960 and a doctorate in molecular biology from Washington University in 1965, served as a scientist and teacher for 38 years, becoming professor emeritus in 2003.

Together with Georgia Shearer, his longtime collaborator in the Department of Biology, he made seminal contributions to the understanding of nitrogen fixation in crop plants, the all-important process by which some plants convert atmospheric nitrogen to a form they and other organisms can use to build proteins.

He was proudest, however, of work that combined his passions for science and social justice, such as groundbreaking research on water pollution caused by industrialized agriculture and a much-cited article that debunked attempts to link race and IQ.

Kohl ran Washington University's undergraduate research program for many years and was known for his commitment to mentoring nontraditional students.

"He really got to know each student as an individual," said Alan R. Templeton, the Charles Rebstock Professor Emeritus of Biology. "Even after they were in a lab, he would periodically check up on them. Sometimes the mentoring did not work out, and Danny always took this very seriously and went out of his way to help the student."

Ed Wise, a former student and 1975 graduate, later wrote, "There are few people in life who are capable of leaving a mark on another's soul, not to mention on a community of souls, and Danny Kohl is one of those few, gifted men."

A lifelong political activist, Kohl participated in the anti-war, nuclear freeze, environmental and civil rights movements.

In 1961, Kohl and a group of civically active St. Louisans formed the Freedom of Residence, Greater St. Louis Committee to promote fair housing for all. An interracial couple sought the committee's support after being denied the opportunity to buy a suburban house. The case, Jones v. Mayer, ultimately went to the U.S. Supreme Court, ending in a monumental victory for equal rights.

Templeton also recalled Kohl's advocacy for the people of Times Beach, who learned in 1982 that their town had been contaminated with dioxin. The town was evacuated and demolished.

"I don't think many people know what a critical and central role Danny played in the Times Beach episode and its resolution," Templeton said. "He never talked much about himself. He just went on to the next problem and did what he saw as his duty as a citizen."

Kohl also served as a board member of Prison Performing Arts, acting as a friend, advocate and mentor for several inmates involved in the program, in addition to promoting and raising funds for the organization.

In 2007, Kohl received the Gerry and Bob Virgil Ethic of Service Award from the university's Gephardt Institute for Civic and Community Engagement.

"During the 40 years Daniel has been part of the WUSTL community, he has gone above and beyond his professional responsibilities to engage and help students, friends, neighbors, family members and complete strangers struggling around him," the award citation read.

Kohl was preceded in death by his son Benjamin H. Kohl. He is survived by Seena B. Kohl, his wife of 66 years; his children, George, Paul, and Martha Kohl; eleven grandchildren; and seven great-grandchildren.

The university has set up a fund in honor of Danny and his work with undergraduate students interested in research. Contributions to the Danny Kohl Fellowship fund will support stipends for students doing research with faculty at Wash U. Contact Brian Lewis in Alumni and Development for information: *brian_lewis@wustl.edu*.

Hamburger and Anderson cont'd—

year working with Ronald A. Fisher, C.D. Darlington and J.B.S. Haldane at the John Innes Horticultural Institute in England in 1929-1930, and became particularly known for his theory of "introgressive hybridization" as a mechanism for speciation in plants. He shared the 1928 Jessup Lecture with Ernst Mayr at the American Museum of Natural History with a presentation on "Speciation from the Point of View of the Botanist" (Mayr's talk was from the point of view of the zoologist). Anderson went on to become one of the major investigators into the genetics of maize. When once introduced as an authority on what was known about the genetics of maize, he replied that he was really an authority on what was NOT known about maize genetics!

The following articles have been excerpted and some of the language modified a bit to make them more terse. Hamburger also wrote his essay in the third person, which I have converted to first-person in parallel with Anderson's.

—Gar Allen

"On Being A Zoologist" —by Viktor Hamburger

"Before 'being' a zoologist, you have to become one. It is therefore appropriate to start this discourse –which was not prompted by an irrepressible literary urge but by the compulsion of the compelling editor of Zoonooz who, in her unerring sense for propriety, symmetry and equilibrium decided that if the left column would carry a treatment of the botanist, . . . the right column should be balanced by a confession of a zoologist . . . on becoming a zoologist, which is a topic becoming for a developmentalist. The answer to the question of why I became a zoologist is: largely by exclusion.

"It was not a matter of family tradition, unless you call an aunt [Clara Hamburger, his father's sister] who was a zoologist . . . and a very good one at that, and who lured [me] to Heidelberg, a family tradition. I did not become a zoologist on account of the many pet animals in my family, because there were none . . . Nor did I collect butterflies at the tender age of 3, but I did collect plants at 6 and did know most of the native botany when I was 16 . . . and I almost did become a botanist (imagine the competition, Edgar!) were it not for the famous botanist at the University of Breslau who was as dry as the specimen in his herbarium . . . Next, he almost became a geologist, but even the superb eloquence of his teacher in Heidelberg did not convince him that there was life in rocks.

"But there was a strange-looking zoologist in Heidelberg named [Curt] Herbst and his friend 'that philosopher' Hans Driesch (1867-1941), so my undetermined zoologist-geologist self fell under the spell of this 'philosopher' . . . Driesch told me of the strange things animal eggs are capable of, namely that they are willing to give up their individuality for the sake of science and become twins if desired [a reference to the ability of sea urchin eggs to produce two full organisms if split apart at the two-cell stage]. Herbst confirmed this tall tale, which so impressed me that I decided to associate myself with the most famous 'egg-splitter' at the time, Hans Spemann, at Freiburg.. So much for this phase of my 'detrmination' in becoming a zoologist.

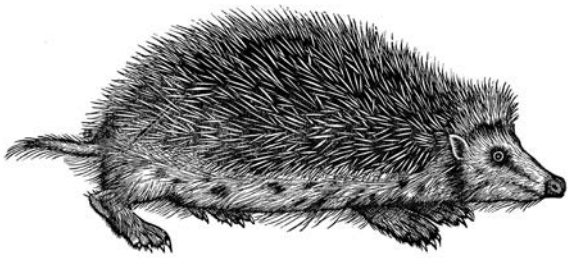
"There was a certain 'predetermination' toward salamander eggs in earlier years. When I was 8 or 9 years old I brought home large quantities of newts who would lay even larger quantities of eggs whose hatching and other performances were to be studied. The newts were housed in a large tank in the living room. One day, when the room was crowded with guests, a lady discovered a newt crawling up the window curtains, and then another one and then another one, whereupon she fainted. The newts had followed their natural urge of going on land, or to put it more simply, of becoming negatively geotropic in summer, under the impact of a hormonal change in their systems, which neither the lady nor I knew at that time. This episode ended the potential zoologist's first contact with his future victims.

"After a few years of egg-splitting and other graduate work in Spemann's laboratory, [I left for a fellowship in the United States]. Upon arrival in this country I . . . parted from Amphibians and climbed one step up the Vertebrate ladder to the Aminota [vertebrate clade including the reptiles, birds and mammals, referring here to his turning to the chick as a model organism for developmental research].

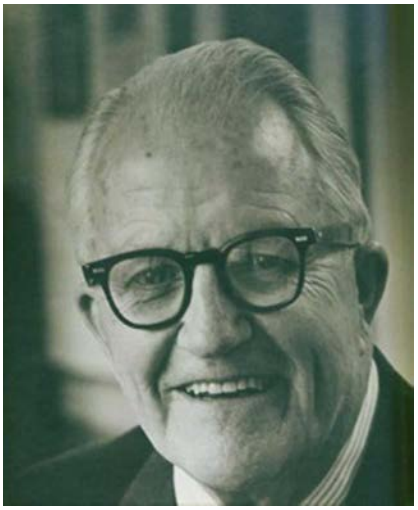
—cont'd on page 5

Hamburger cont'd—"And why am I still happy at being a zoologist? Simply because animals are a delightful company. They are understanding and unobtrusive. They don't talk back and they don't ask any questions, and thy never, never request any contributions of any kind."

Hamburger later said that he loved studying the embryo, because it was the best teacher – and the only one that was never wrong!



"On Being A Botanist," —by Edgar Anderson



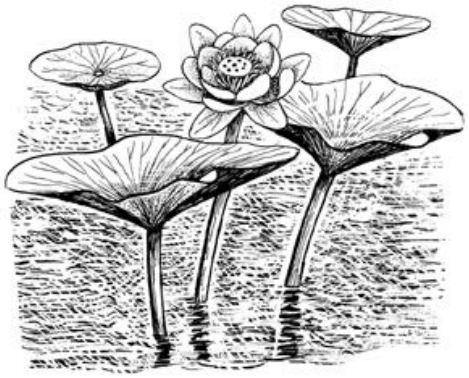
"I am a botanist and happy to be one. From my earliest days I have been rather intemperately interested in plants and their doings. It is a perennial source of astonishment that in a world where many drudge at work they hate that I should be overpaid for work I love to do.

"So, I am quite happy at being a botanist, but I am seriously puzzled at the world's attitude toward [our] profession. During the hectic years when I lectured to . . . portions of the general public, . . . I had continual experiences with this curious attitude. I remember one dear lady who . . . after dinner in her [house] she led me out-of-doors to look at the one lonely shrub in the middle of a drab city backyard. She didn't want to know its name, nor was she concerned about its health. I was a botanist and therefore she was dragging me out to look at a plant. This may seem like an exceptional instance, but I assure you it is not. Tell your host or hostess that you are a dentist or a plumber, or a banker, and [they] will discuss topics of the day with you. But tell them you are a botanist and you will see a dull film erase the brightness from their eyes; you can almost read their thoughts, 'Oh yes, botanist, . . . one of those queer people who study plants. Whatever shall I do with this man? Maybe I should take him three doors down to see the neighbor's vegetable garden.' If you think this is far-fetched, just try out the simple statement that you study plants on a random lot of people, and note the curious results.

"One of my best friends is a tooth-paste manufacturer. I wondered if he suffered from such an occupational disease. Did his chance acquaintances drag him off to look in their medicine [cabinet at tubes of toothpaste]? He tells me that none of his hosts or hostesses have ever shown him a single tube and that if anything they are inclined to keep the conversation as far away from teeth as possible.

"Well, it is a curious attitude and quite incomprehensible to me. One does not of course meet with it with [more academic] people. They treat a botanist as man to man, or one scholar to another. The scholarship is what really matters and the subject under consideration is merely incidental. [However] from time to time I notice lingering traces of [the curious attitude about botanists] lingering among graduate students in zoology."

So, I wonder if current plant biologists, who are no longer called "botanists," experience a "dull film erase the brightness from their eyes" of people when you tell them you study "plants."



FACULTY AND STAFF HONORS AND AWARDS

Richard D. Vierstra was installed as the inaugural holder of the George and Charmaine Mallinckrodt Professorship

Richard Vierstra (center) was installed as the inaugural George and Charmaine Mallinckrodt Professor March 7. The Mallinckrodts (left) came from London to attend the ceremony. Dean Barbara Schaal (second from right) introduced Vierstra, and Chancellor Mark S. Wrighton conferred the medallion that is a symbol of his professorship. (Photo: Mary Butkus / Washington University)

Richard D. Vierstra was installed as the inaugural holder of the George and Charmaine Mallinckrodt Professorship at a ceremony held March 7 in Holmes Lounge at Washington University in St. Louis.

George and Charmaine Mallinckrodt established the professorship in 2013 with a gift of $2 million. The professorship resides in Arts & Sciences and is designated for the field of plant biology, an area of great strength, and even greater potential, at Washington University.

Vierstra, one of the world's leaders in plant science, joined Washington University in 2015 after 30 years at the University of Wisconsin-Madison, where he had unraveled the secrets of plant pathways that destroy unwanted proteins and allow plants to sense daylight, so that they know when to germinate and flower.

"In seeking a holder for the George and Charmaine Mallinckrodt Professorship, we searched aggressively in collaboration with the Donald Danforth Plant Science Center leadership to identify a global leader, a person who would help us build our region-wide initiative in plant science," said Chancellor Mark S. Wrighton. "I am so glad we were able to appoint Richard Vierstra to this important professorship, and am deeply grateful to George and Charmaine Mallinckrodt for their generous support that has made this possible. Their professorship will have a lasting impact on the field of plant biology and the work of our faculty."

Vierstra was introduced by Barbara Schaal, dean of the Faculty of Arts & Sciences and the Mary-Dell Chilton Distinguished Professor. Schaal, herself a prominent plant biologist, summarized Vierstra's research for the audience, saying he "brings great distinction to the university and to the Department of Biology. It's hard to imagine anyone who would be more fitting to serve as the inaugural George and Charmaine Mallinckrodt Professor."

Vierstra's lab group is interested in the control of processes that regulate growth, Schaal said. Scientists have long known that the creation of proteins is crucial for most, if not all, aspects of plant biology, but only recently have they begun to understand that protein destruction is equally important.

Vierstra's lab studies the ubiquitin-26S proteasome system, the main pathway for protein destruction in animals and plants. Ubiquitin marks proteins for destruction and 26S proteasome snips them in pieces, releasing the ubiquitin for reuse.

Another major area of research for the Vierstra lab is phytochrome, a light-sensing pigment found in the leaves of most plants that allows them to detect the time of day and the season. Vierstra's postdoctoral study of phytochrome led to the purification and characterization of this photoreceptor.

The Vierstra lab has continued to make discoveries about the biochemistry of phytochrome, discoveries that have opened the door to engineering these light-sensing molecules for agronomic and medical benefit.

Vierstra earned a bachelor's degree in biology and chemistry from the University of Connecticut, and his doctorate in plant biology from the Department of Energy's Plant Research Laboratory at Michigan State University.

After a postdoctoral appointment at the University of Wisconsin, he joined the faculty there and later became a full professor. In 1993, he spent a sabbatical as a Fulbright Scholar at the University of Melbourne, Australia, and, in

—continued on page 7

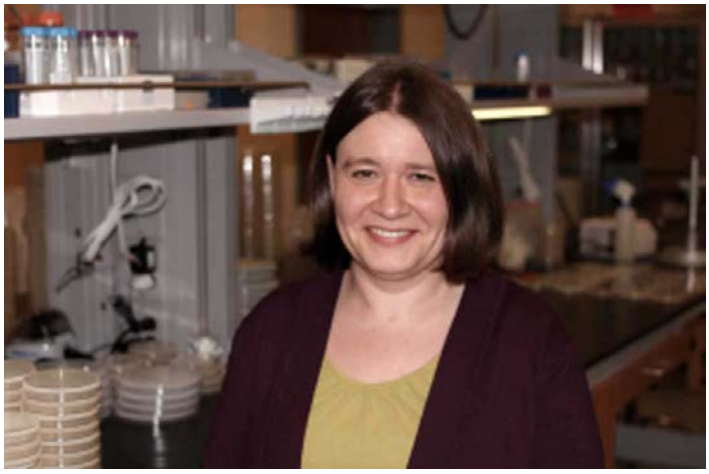
Vierstra cont'd— 2011, he was appointed the Stanley J. Peloquin Professor in the Department of Genetics at the University of Wisconsin.

Throughout his career at Wisconsin, Vierstra won many awards for outstanding research and teaching. Outside the university, he has served at the International Society for Plant Molecular Biology and the American Society for Plant Biology.

In 2014, he was listed by Thomson Reuters in the top 1 percent of researchers in plant and animal sciences worldwide, based on citation impact.

He has also been a member of the editorial boards of several scientific journals, participated in review panels for federal science funding agencies, and organized international scientific meetings related to his research. In 2002, he was elected as a fellow of the American Association for the Advancement of Science. —*theSource*

Tammy Haselkorn to begin new Assistant Professor position



Tammy Haselkorn of Strassmann Queller Lab will be starting an assistant professor position in August 2016 in the Department of Biology at The University of Central Arkansas. She will be teaching genetics and continuing her research on symbioses between bacteria and their eukaryotic hosts.

Longfei Shu receives fellowship from LSRF

Longfei Shu, of Strassmann Queller Lab, is a molecular biologist working on ecology and evolutionary biology. He is interested in understanding the molecular basis of evolution, which is fundamental to elucidating how diversity of life emerges and is maintained. More specifically he is working on evolution of cooperation. He wants to investigate interactions between social amoebae and their microbial passengers. In addition, he aims to establish D. discoideum as a model system for study of between-species cooperation. You can see more in his personal website: *https://sites.google.com/site/longfeishu/home.*

He recently received a $180,000 fellowship from the Life Sciences Research Foundation (*http://lsrf.org/home*). Since 1983, the Life Sciences Research Foundation (LSRF) has funded nearly 500 outstanding postdoctoral fellows in all areas of the life sciences, and raised more than $50 million from generous industries, foundations and individuals to support this effort.

We believe that discoveries and application of innovations in biology for the public's good depends upon the training and support of the highest quality young scientists. Every year our selection committee of renowned scientists identify the top 5% of applicants from an international pool of more than 1000 postdoctoral applicants. Once chosen, the LSRF collaborates with current and potential sponsors to match them with fellows with similar research interests. In 2015, thirty of these remarkable young scientists were matched with sponsors to support their research.Yet even now many excellent scientists remain unfunded. —lsrf.org

David Goad teams up with Turfgrass Breeding Program to study grass sustainability on golf courses—*Natalia Alamdari*

David Goad, a Washington University doctoral student working on the [golf course sustainability] project, understands the work that goes into keeping a golf course green. His father is the general manager of a golf course. Photo Credit: Chris Lee, Post Dispatch

. . . Researchers are taking a twofold approach to understanding seashore paspalum's salt tolerance. First, Goad is growing different types of paspalum grass in water with low, medium and high levels of salt. That will not only show how much salt the grass can tolerate, but also which variety of paspalum survives better in salty conditions.

It's like comparing dogs, explained Elizabeth Kellogg, a Danforth Center researcher leading the project. All dogs are the same species, but certain breeds are better at retrieving. All varieties of paspalum are the same species, but some handle salt better. . .

. . . Once they understand how the grass handles salt, they'll be able to use genome mapping to figure out the genetic puzzle piece that makes it salt tolerant. Figure out the piece, and you're able to control it, both in paspalum and through crossbreeding with similar grass crops, like corn and wheat.

Of course, applying their findings to agriculture could take decades, Kellogg said. Improving golf course turf and sustainability could happen within years. By partnering with the Turfgrass Breeding Program at the University of Georgia, researchers are feeding their findings into the commercial sphere.

"Turfgrass is a major industry, and there's a lot of environmental impact our research can have," Kellogg said. "This certainly will apply to feeding 9 billion people, but we don't have to wait that long to see some benefit." –Read More in the Post Dispatch: *http://www.stltoday.com/news/local/metro/danforth-center-and-usga-partnering-to-improve-golf-course-sustainability/article_6fd5fe8e-0c26-5860-beba-afbd345028e6.html*

Jez Lab Announcements

Ron Nwumeh, an Biology undergrad in the lab, was one of the 2016 Class Acts - see *commencement.wustl.edu/a-love-of-learning/* - Ron will be returning to Nobel-Prize winner Tom Cech's lab at UC-Boulder this summer before heading to med school at Penn.

Ashley Galant, PMB grad student, began an internship at Monsanto as a Trait Discovery Breeder.

Ron Nwumeh (Biology undergrad), Cynthia Holland (PMB grad student), and Barrie Cascella (postdoc) were awarded travel awards to the 2016 Experimental Biology/ASBMB meeting in San Diego.

David Korasick (PMB grad student), who was co-advised with Lucia Strader, received the Spencer T. and Ann W. Olin Biomedical Fellows Award in recognition of his thesis work.

Tech News: Access to High Performance Computing

All members of the Biology Department now have access to the cluster at the Center for High Performance Computing (CHPC) located at the Medical School. The department will pay a flat yearly fee which entitles everyone in Biology to use the system. Besides the flat fee, there is no additional charge for the amount of processing done.

The main website for the center can be found here: *https://www.mir.wustl.edu/research/research-support-facilities/center-for-high-performance-computing-chpc*.

To request an account visit: *https://www.mir.wustl.edu/research/research-support-facilities/center-for-high-performance-computing-chpc/services/request-an-account*.
NOTE: Only faculty can submit account requests. Students and staff will need a faculty sponsor to fill out the request form for them.

Here are some other helpful websites:
Wiki main page: *http://mgt2.chpc.wustl.edu/wiki119/index.php/Main_Page*
Software available: *http://mgt2.chpc.wustl.edu/wiki119/index.php/Software*
Hardware: *http://mgt2.chpc.wustl.edu/wiki119/index.php/Hardware*

In addition to the software listed at the link above the managers of the facility are willing to work with individuals to install freeware/commercial packages. Please see the contact list on the center's main website.

As a reminder Biology also has a cluster available. For a list of software installed: *http://172.20.93.160/index.html* For more information please contact Carl Hennicke (*chennicke@wustl.edu*) or myself with questions or account requests. — *Frances Thuet*

We have a new HP DesignJet Z6800 Photo Production Printer 60" that is replacing our 42" poster printer. The new poster printer has better color, prints faster on a wider variety of media including some fabrics for use in anything from exhibition and event graphics to professional photography and digital fine art. It can also do line drawings, maps, orthophotos, renderings and posters. With the availability of matte & gloss papers and fabric media pricing will change to reflect these new materials. Contact Michael Malolepszy for more information: *klaus@wustl.edu*.

New Faculty Richard Vierstra cont'd—

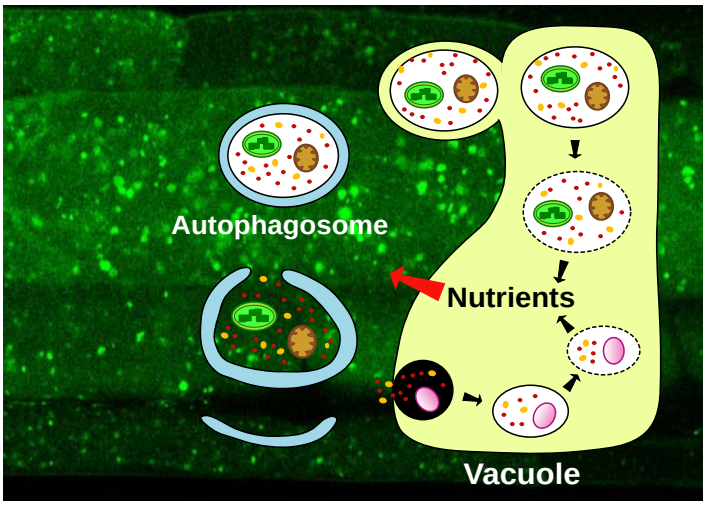


Diagram showing how autophagy captures cytoplasmic material and transport it to the vacuole for degradation. The background shows Arabidopsis root cells containing GFP-labeled autophagic vesicles inside the vacuole.

that control growth and development. The Vierstra lab is studying two key degradative routes in plants, the ubiquitin/proteasome system (UPS) and autophagy, with the goals of understanding how they work, how they select targets, and how they function synergistically. The UPS involves tagging of unwanted proteins with the highly conserved protein ubiquitin. Once modified, these targets are individually recognized and broken down by the 26S proteasome, a self-compartmentalized proteolytic machine. Over 6% of the Arabidopsis genome encodes UPS components, with over a 1000 factors participating in target selection alone. Autophagy ('self eating') involves encapsulating unwanted cytosolic constituents in vesicles called autophagosomes, which are delivered to the vacuole for degradation. In contrast to the UPS, autophagy is designed to handle large protein complexes, protein aggregates and even entire organelles. The Vierstra lab is also studying a relative of ubiquitin called SUMO that becomes post-translationally attached to a plethora of nuclear proteins when cells are exposed to various environmental insults, presumably to provide stress protection. For all this research, the Vierstra lab combines data on the proteome, transcriptome and interactome using a variety of cell biological, biochemical, genetic and mass spectrometric techniques.

SAFETY SPOTLIGHT— *by Gerry Rohde*

Welcome to "safety spotlight".

Thankfully, we have no recent chemical spills or laboratory fires to write about.

However, as we are now in the process of becoming exponentially engulfed by our exquisite brew of transitional humid continental and humid subtropical climates characteristic of The Lou, there has also been a correspondingly higher incidence of summer clothing sightings around the department.

While sandals, flip-flops, shorts, and the like are obvious and excellent choices for being (more) comfortable, they have no place when working with and/or around hazardous chemicals in a laboratory setting, because potential spills or drops are typically very likely to affect your feet, lower legs, and ankles. In conjunction with these considerations, a quote from section (D.), subsection (a), part (ix) of the chemical hygiene plan for laboratories on the Danforth Campus:

"1. Confine long hair and loose clothing. Wear appropriate shoes at all times in the laboratory.

Clogs, sandals, perforated or cloth shoes are not appropriate.

2. Clothing must provide adequate coverage so that there is no skin exposed to hazardous materials."

Your appropriate lab clothes, along with a lab coat, can be stored in one of our numerous hallway lockers, allowing you to still dress seasonally adjusted when you're spending time outside the lab.

Continue to be safe – and remember:

"Falling objects can be brutal if you don't protect your noodle".

Do you have any exciting news to share? Please submit announcements, lab notes and photos to Erin Gerrity:
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HAVE A GREAT SUMMER!