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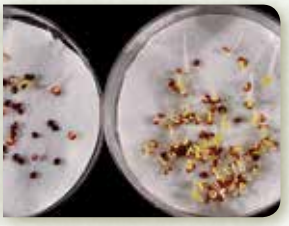

SCHOOL OF
BIOLOGICAL SCIENCES NEWS
SPRING 2015

Developing a new crop for the 21st century

By John Sedbrook, associate professor of genetics

A defining feature of the Central Illinois is its seemingly endless fields of corn and soybeans. These fields are part of the Midwest Corn Belt, which totals 80 million acres of the richest farmland in the world, a vestige of tall grass prairies from years past. While the summer months are reserved for growing corn and soybeans, the students in my lab in collaboration with others are working to put these acres to good use during the fall through spring months by domesticating a harmless weed commonly known as pennycress.

A field of pennycress growing near the Bloomington airport (early May). Sedbrook and colleagues recently received a $1 million USDA grant to develop pennycress as a new winter annual oilseed cover crop.

Pennycress (*Thlaspi arvense*) is a close relative of canola and holds tremendous agronomic and economic potential due to its unique combination of attributes, including an overwintering growth habit, extreme cold tolerance, rapid growth, and natural ability to produce copious amounts of seeds high in oil and protein content. Pennycress can be planted in the fall near the time of corn harvest and harvested the following spring in time for soybeans planting, having the potential to generate as much as 2 billion gallons of oil annually in the U.S. without displacing food crops or requiring land use changes. An added benefit of pennycress is that it serves as ground cover that limits soil erosion and nutrient run off from fields otherwise left fallow.

Pennycress seed oil has a variety of uses as biodiesel, jet fuels, and specialty chemicals feedstocks, in consumer products, as well as an ingredient in foods and feed. While holding tremendous potential as a new oilseed cover crop, wild pennycress strains are hampered by inconsistent seed germination and suboptimal oils quality. The students in my lab, along with colleagues at the University of Minnesota and Western Illinois University, were recently awarded a $1 million grant from the USDA to develop genetic resources that can be used to improve these and other pennycress traits.

A hoverfly (*Toxomerus geminatus*; syrphid fly) visiting flowers of a pennycress plant. Hoverfly larvae prey on insect pests including aphids (a pest of soybeans).

To provide a perspective of the potential of pennycress, its close relative canola was virtually non-existent before the

Continued on Page 2

Director's message

These are exciting times at Illinois State University and I'm thrilled to be the director of a dynamic and vibrant school. These are certainly tough fiscal times in the state and at ISU, but we are grateful that biology's popularity among students remains high. During a time when many colleges and universities are experiencing significantly declining student enrollment, ISU had the largest freshmen class in history. I'm happy to report that biology contributed to the institutional growth with a 10 percent increase in the number of our majors. We believe that our newly developed sequences have played a part in this growth after seven years of level enrollment. The productivity of our talented faculty is such that the university continues to invest in success, and we are well prepared for the future. Andres Vidal, a molecular neuroscientist, joined our faculty in January and we are recruiting a new colleague in the area of immunology.

Director Craig Gatto

Our faculty continues to actively contribute to their scholarly professions via scientific investigation. Their research programs are sustained by the talented graduate and undergraduate students in our programs who are generating data and sharing those findings with the scientific community at national and international conferences. More critically, the rate of peer-reviewed articles published by

Continued on Page 2

Director's message *continued from Page 1*

our faculty and students continues to be among the best in the college. Specifically, ISU biology students and faculty presented their works at 76 scientific meetings last year and published 62 manuscripts (56 of which had one or more ISU students as authors).

My first four years as director have flown by, and in hindsight it is easy to see why. We have made many advances in the school during this brief period. We have recruited seven new tenure track faculty and three new support staff, overhauled the curriculum, upgraded all of our classroom technology, and added more than $1 million dollars of new equipment for research. The School of Biological Sciences stands as one of the most active on campus in terms of undergraduate and graduate teaching, publications produced, and research dollars obtained (nearly $2 million in fiscal year 2014). With the influx of new faculty and students, we expect to maintain this trajectory as we continue moving forward.

We want to continue to brag about the School of Biological Sciences, and there is nothing we like to brag about more than the success of our alumni. Stay connected (or reconnect) with us, and let us know where you are and what you are doing. We would love to hear from you. You can simply send me an email or Like us on Facebook. If you are ever in the Bloomington-Normal area please stop in and say hello.

Wishing you much success,

Craig Gatto, Ph.D.
Director, School of Biological Sciences

Our faculty and graduate students fall 2014

New Crop *continued from Page 1*

Michaela Lottes, a Ph.D. student, working with John Fleming, one of eight undergraduates in the Sedbrook lab

A pennycress seedpod, broken open to reveal its seeds, which contain 34 percent oil and 19 percent protein by dry weight.

1970s. Now, canola is planted on 20 million acres annually in Canada and the U.S. plains states, constituting a multi-billion dollar a year industry. Canola was made possible by two mutations in rapeseed, its progenitor. One mutation reduced the erucic acid content of the seed oil, while the other reduced the presence of the defense compound sinigrin. Erucic acid is a long-chain fatty acid thought to be unhealthy to eat. Interestingly, sinigrin (a glucosinolate) is what gives horseradish the pungent taste that people love or hate.

Given that pennycress is closely related to canola and to the model plant Arabidopsis, the tremendous amount of knowledge that has been acquired in those systems can be directly translated to improving pennycress. That knowledge, in combination with cutting-edge DNA sequencing technologies that are now affordable, should allow us to domesticate pennycress within a timeframe of years instead of the hundreds or even thousands of years it took to domesticate other crops.

This is an exciting time to be a biologist, given the wealth of information at our fingertips, which we can apply toward solving some of the world's most pressing problems. For example, it has been projected that by 2030 the equivalent of two earths will be required to sustain human consumption. Not only could pennycress be grown as a food and feed crop throughout temperate regions of the world to help feed a burgeoning population, using pennycress oil-derived biodiesel and jet fuels would help displace the burning of fossil fuels, thereby mitigating climate change without causing ecosystems-damaging land use changes. It is my hope that our work with pennycress will contribute to bringing about a sustainable future for generations to come in Illinois and throughout the world.

Spore killer in fungi to neurons in crabs

Undergraduate perform original research, preparing for their careers

Austin Harvey and Tyler Malone are biological sciences undergraduates working in the genomics research lab of Thomas Hammond, assistant professor in the school of biological sciences.

Harvey has been working with Hammond for the past two years studying a gene called "Spore killer" in *Neurospora* fungi. Spore killer is a rare example of a selfish gene that increases its frequency in populations by killing individuals that do not carry it within their chromosomes.

Tyler Malone and Austin Harvey are observing spores of *Neurospora*.

These selfish genes appear to evolve in all eukaryotic organisms, including mice, fruit flies, maize, and possibly even humans. Harvey's work focuses on identifying and characterizing how Spore killer spreads throughout populations of *Neurospora,* and his work has recently been published in the prestigious journal, *Genetics*. Harvey's experience performing cutting-edge research in the Hammond lab has inspired him to pursue a Ph.D. in biological sciences.

Malone has been studying a process called meiosis in the Hammond lab for nearly a year. Meiosis is critical for transmitting undamaged chromosomes from parents to offspring in most organisms; and in humans it is required for the production of healthy sperm and egg cells. During meiosis, similar chromosomes are paired together through a process that is not well understood. Malone uses *Neurospora crassa* as a model in hopes to better understand this chromosome pairing process. In addition to his work on meiosis, Malone helps the lab study large datasets by writing custom computer programs. Recently, Malone used these skills to analyze datasets in two different projects in the Hammond lab, one of which was published with him as a co-author. Malone is double majoring in biological sciences and mathematics, and is planning on pursuing a Ph.D. in biostatistics after graduation.

The rewards of working with dopamine

Marissa Elaine Cruz is a senior in the biology/pre-medical program at ISU with a minor in chemistry and a focus on the neuroscience, physiology, and behavior sequence. She was an active member of BSSA for four years and served on the board as an event coordinator for a year. During her time in BSSA, she helped with events such as Expand Your Horizons and organized BSSA's participation in Relay for Life. During Cruz's sophomore year, she also volunteered at ASTA hospice center where she provided companionship to some of the elderly patients.

Marissa Cruz observing the stomatogastric nervous system of the crab

For two years she has been a member of Wolfgang Stein's lab that takes an electrophysiological approach to study and understand neural circuits using the stomatogastric nervous system of the crab, *Cancer Borealis*. The stomatogastric nervous system is an extension of the central nervous system of the crab and sits directly on top of the stomach where it controls aspects of feeding such as filtering and chewing. The neurons in these circuits are known as "central pattern generators," neural circuits that drive essential rhythmic behaviors such as breathing, walking, swallowing, and chewing in all animals and also humans.

"My favorite part of every experiment is being able to watch and record the neurons activity directly. I think it's fascinating," said Cruz.

Cruz has done a variety of projects in Stein's lab ranging from neuronal stainings to characterizing the effects of neuromodulators, such as dopamine on the rhythmic activity of this neural system. From her work in the Stein lab, she was awarded an undergraduate research grant which funded her internship to continue research in the summer of 2013. Following that research grant, she placed third at the annual Phi Sigma Research Symposium for her research characterizing the effects of dopamine on the pyloric rhythm (which controls the filtering of food in the crab). Cruz also participated in the 2014 Illinois State University Research Symposium held at the Bone Student Center. At the end of the year, she was awarded the David Borst Undergraduate Research Scholarship for her studies on short-term and long-term actions of dopamine.

Marissa plans to continue her research in Stein's Lab as a master's student once she graduates in May. Her ultimate goal is to continue her education as a Ph.D. student or as a medical student.

New faculty

We welcome Andrés Vidal-Gadea as an assistant professor of molecular neuroethology in the School of Biological Sciences. A native of Uruguay, Vidal-Gadea obtained his B.Sc. from the University of Victoria in British Columbia (Canada). He received his Ph.D. from Louisiana State University and postdoctoral training at the University of Southampton (UK) and the University of Texas at Austin.

Andrés Vidal-Gadea joined the faculty in January.

Vidal-Gadea is interested in understanding how natural behavior emerges from the interactions between an organism's genes, nervous system, and environment. To this end, he uses a tiny nematode worm (*Caenorhabditis elegans*) because of its great experimental amenability. Insights gained from these studies can then be harnessed for the study of disease. His lab will focus on two nematode behaviors: burrowing and orientation to magnetic fields. Worms in the wild use the magnetic field of the earth to guide their burrowing behavior. By itself, burrowing is a physically challenging behavior that can be used to elucidate human diseases like muscular dystrophies. Magnetic orientation is a fascinating but poorly understood behavior that can help us understand the effect of natural and artificial magnetic fields on humans and other animals.

Vidal-Gadea enjoys traveling with family, the outdoors, and cooking with friends.

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Contributors: Austin Harvey, Tyler Malone, Marissa Cruz, and Andrés Vidal-Gadea

Bio.IllinoisState.edu

Student awards

Every year the school gives awards in recognition of the excellent contributions undergraduate and graduate students have made in research, teaching, and service. Many of these are named awards, for those who started the fund or in whose memory the fund was established. Here are the recipients from this past year.

Undergraduate student awards

Elizabeth Quinn, recipient of the teaching stipend, with Jennifer and Richard Grogg

David Borst Memorial Scholarship
Marissa Cruz

Gletten Scholarship
Kelly Ann Rosinia

Jennifer Grogg Student Teaching Stipend Award
Elizabeth Quinn

Barb Bathe Award
Natalie Lynch

Undergraduate Researcher
Austin Harvey

Undergraduate Teaching Assistant
Elizabeth Quinn

Undergraduate Service
Lauren Vorderer

Biological Sciences Students of the Year
Jacob Birlingmair and Joseph Powers

Biochemistry and Molecular Biology Student of the Year
Mackenzie Walker

Mackenzie Walker receives her BMB award from Kevin Edwards.

Report from the Biological Sciences Student Association

By Ashley Waring

Some BSSA displays from the Expand Your Horizons Conference in 2014

The Biological Sciences Student Association (BSSA), is a student-run organization that provides useful resources to its members. BSSA is open to all biology majors and minors. Our mission is to provide more information about the biology field and allow students to interact with others who are also interested in the biology field. We also help students to get involved on campus by participating in volunteer work or working in a biology research lab. At our BSSA meetings we provide our members with information on internships, volunteer work around the community and campus, as well as information on research opportunities. At each meeting we invite professors from the ISU biology department to come in and talk about their research. This allows members to be exposed to the many different research opportunities that are available at ISU. While presenting their research, the professors explain exactly what it is that they do in their labs. This opportunity is fantastic for our members, because it helps them to determine which lab they would be interested in working in. BSSA also allows members to network. Members talk to professionals in the biology field, and we provide them with necessary resources to be involved in the biology department.

BSSA provides volunteer opportunities at places like BroMenn Hospital, local animal shelters, Miller Park Zoo, Children's Discovery Museum, and ISU's Family Science Day. BSSA is also an active participant in the Expanding Your Horizons Conference every year. At this conference, members work with the organization to provide interactive displays that will get kids interested in biology and the other sciences. It is an opportunity for us to further a kid's interest in the sciences. In the future, BSSA is hoping to plan for more guest speakers and maybe even a trip to a cadaver lab!

Biology embraces greenhouses for teaching and research

By Bethany Evans Campbell, greenhouse gardener

The School of Biological Sciences operates multiple greenhouse facilities on campus. These facilities each have a unique purpose to support various biology programs at Illinois State. The Science Laboratory Building contains three separate research greenhouses that are utilized for faculty and student research projects. These facilities were constructed in 1998 and are operated with sophisticated controls to maintain favorable conditions for each individual research project. The Felmley Collections Greenhouse is an expansive collections house, containing over 650 species of plants from around the world. It represents major climatic areas including tropical, desert, and Mediterranean environments. This is an impressive, diverse collection dating back to 1965. The collection is used to showcase the diversity of plants and their forms, interactions and relationships with other plants and organisms, and the diversity of economically and horticulturally important species. Students and faculty benefit from this wonderful, living classroom where one can see many rare, beautiful specimens firsthand. Tours are offered to the public and can be scheduled via Bethany Evans Campbell at baevans@IllinoisState.edu.

Enjoy our outdoor plant collection

By Patrick Murphy, horticulturist and curator of the Fell Arboretum

The Fell Arboretum Curator Patrick Murphy '00 received a degree in horticulture after serving in the U.S. Army as a non-commissioned officer for 10 years. After graduating, Murphy practiced his passion of landscape design and contracting for 15 years. Some of his work has been featured in *Chicago Home Magazine*, *The Chicago Tribune*, *Better Homes and Gardens*, and *Outdoor Style Magazine*. Murphy is an ISA certified arborist and a member of the American Landscape Designers Association. He recently became a board member for the ParkLands Foundation, a forest preserve in McLean and Woodford Counties that receives support from the ISU School of Biological Sciences. He looks forward to bringing the latest in green industry practices and sustainable landscapes to the Fell Arboretum.

The Weibring Golf Course is the focus of activity with the goal of achieving Audubon Classification through operational and sustainment procedures.

Ongoing events at the Fell Arboretum

The goal of the Fell Arboretum is to provide the University and public with an environment conducive to learning, teaching, and demonstrating the importance of trees, woody plants, and landscapes of intrinsic beauty. We aim to accomplish this by utilizing best practices as they apply to horticulture, botany, biology and agriculture. In doing so, Illinois State University will be recognized as a leader in creating and maintaining a respected and diverse arboretum. For more information, contact Patrick Murphy at rmurphy@IllinoisState.edu.

- Guided tree tours for any audience
- The Fell Arboretum Plant Sale
- WGLT sponsored GROW program, broadcast every Friday at 8:50 a.m. and 4:50 p.m.
- Earth Day and Arbor Day recognition events
- Community Outreach to increase the awareness and utilization of the Fell Arboretum and other prominent garden elements on the 490-acre continuous campus that makes up the Fell Arboretum
- Donor tree and tree dedication for alumni, students, and professional groups
- Support of ISA Arborist Training and Certification
- Support of the Illinois Master Gardener Training and Certification
- Leadership of the Fell Arboretum Tree Campus Advisory Council
- Creation of updated landscapes and an ISU plant pallet that will showcase the diverse architecture and history of our campus

Bethany Campbell in the Felmley greenhouse

Patrick Murphy with tour group

Flowers of the Felmley greenhouse

Graduate student awards

Cheung and Brown Publication Award
Keith Bowers

Robert Gray Ecology Scholarship
Molly Schumacher

Phi Sigma Outstanding M.S. Award
Christine Hodges

Phi Sigma Outstanding Ph.D. Award
Deb Petrik

Charlena Wallen Award
Tess Piening

Jack Ward Service Award
Brian Grebliunas

Tak Cheung/Joni St. John General Education Teaching Assistant Awards
Dana Tilley, Rachel Van Essen, Janet Stromberg, Ashley Hemborough, Pegan Sauls, and Lisa Treidel

Outstanding Biology Teaching Assistants, *In Memory of Robert and Marion Finn*
Samuel McFadden, M.S. student, and Keith Bowers, Ph.D. student

Rilett Scholarship Awards
Molly Schumacher, Christine Hodges, Meghan Strange, Pegan Sauls, Jonathan Williams, Dilini Ralalage, Katie Westby, Keith Bowers, Jay Pyle, Christopher Goldsmith, Carola Staedele, and Chris Loebach

Keith Bowers received the Publication Award.

Our Plant Collections

After many years of dedication to the care of our plant collections our beloved Dean of Green Donald Schmitt, M.S. '89, retired in the summer of 2014. Bethany Evan Campbell, M.S. '12, and Patrick Murphy '00 are now building on his legacy and expanding in new directions.

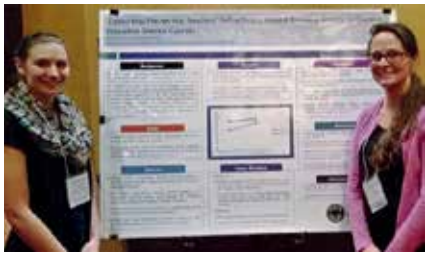
Dean of Green Donald Schmitt

Events

Spring 2014

Faculty and students represent the school at the annual Teaching and Learning Symposium

ISU's Teaching and Learning Symposium is an annual, free event sponsored by the Harold K. Sage Foundation and the ISU Foundation Fund. The Symposium allows ISU faculty to share their scholarship of teaching and learning so that they can continue to provide innovative, effective instruction across the University. In January 2014, the School of Biological Sciences was represented at the symposium by Cynthia Moore and her poster presentation, *Enhancing Student Participation in a Biology Class by Flipping Instruction.* Rebekka Darner Gougis, copresented two posters with her students: *Student and Mentor Perceptions of Undergraduate STEM Research Experiences*, presented with biology master's student Janet Stomberg, and *Supporting Pre-service Teachers' Self-efficacy toward Teaching Science in Our General Education Science Courses*, presented with undergraduate teacher-candidate Elizabeth Quinn. In 2015, Gougis will be copresenting a poster, *How does an in-class note-taker help freshmen take better notes in large enrollment courses,?* with undergraduate student Emma Kombrink, Associate Director of University College Pamm Ambrose, and Coordinator of Learning Services Rebecca Elliot. Discover more about the annual Teaching and Learning Symposium at CTLT.IllinoisState.edu/Events/Symposium.



Elizabeth Quinn and Rebekka Darner Gougis, assistant professor at the ISU Teaching and Learning Symposium

News

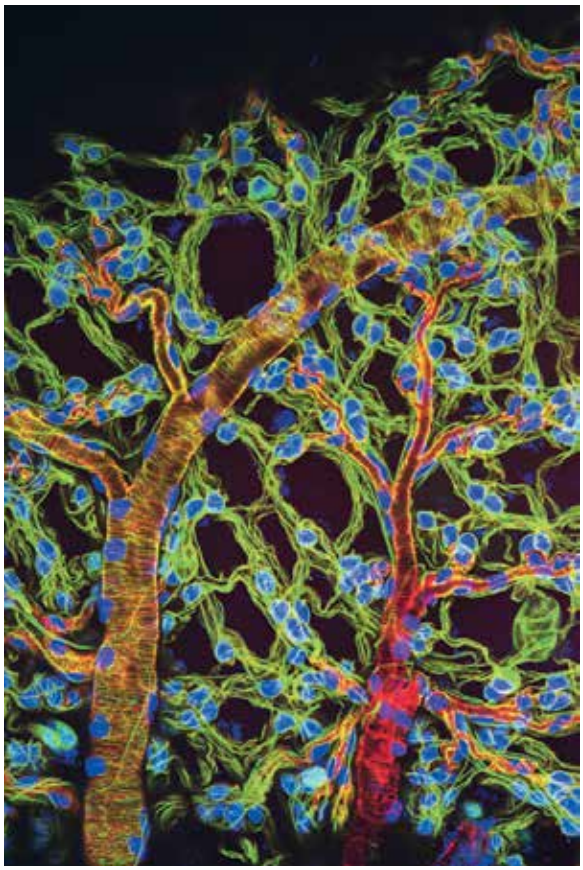
Since graduating, Ebony Murrell (MS '07, Ph.D. '12) has been a post-doctoral student in entomology at the University of Wisconsin–Madison. In 2014, Murrell published one more paper from her dissertation. (Reference: Murrell, EG, AR Ives, SA Juliano. 2014. Intrinsic and extrinsic drivers of succession: Effects of habitat age and season on an aquatic insect community. *Ecological Entomology* 39:316–324.) This paper tests alternative hypotheses for observed species turnover within aquatic communities dominated by mosquitoes. It shows that both season and aquatic community age are important influences on community composition. Besides its theoretical importance, these communities produce adult mosquitoes, and understanding the processes that govern that production is an important practical consequence of this paper.

Kevin Stanley, a Ph.D. student with the Gatto lab, received a National Phi Sigma travel grant to present his work in the Netherlands at the 14th International Conference on Na,K-ATPase and related transport ATPases in September 2014.

E. Keith Bowers, Ph.D. candidate, made an oral presentation, and Christine Hodges, M.S. '14, and Meghan Strange, M.S. student, presented posters at the 15th International Behavioral Ecology Congress in August in New York City. Bowers received a travel grant from the International Society for Behavioral Ecology, and all three received travel grants from the national office of the Phi Sigma Honor Society.

Ashley Hembrough, M.S. student in the Borowicz lab, was selected as a 2014 Garden Club of America Fellow in Field Botany for her work in plant conservation. As an outreach component, she assisted with the nature study programs for younger children conducted by the Sugar Grove Nature Center in McLean.

ISU science was on display at Washington Dulles International Airport from June–November of 2014. A confocal microscopy image of grasshopper tissues by the Edwards and Whitman labs was selected from a national competition to be presented in the NIH's "Life: Magnified" photo exhibit. View all the winners at www.nigms.nih.gov/education/life-magnified.



Tracheal tree in grasshopper ovary

Jonny Williams, Ph.D. student with the Larson Lab, presented his research on bioinformatics and molecular analysis of the t(1;19) chromosome translocation at the international conference on Dynamic DNA Structures in Biology, a FASEB meeting in Itasca, July 2014.

Jennifer Breaux, Ph.D. '13, and Molly Schumacher '11 published a paper from Breaux's dissertation and Schumacher's undergraduate research (Reference: Breaux, JA, MK Schumacher, SA Juliano. 2014. What does not kill them makes them stronger: Larval environment and infectious dose alter mosquito potential to transmit filarial worms. *Proceedings of the Royal Society* B. 281:1786, 2014.0459). This paper tests the hypothesis that development of mosquito larvae in stressful conditions impacts the ability of resulting adults to acquire and to transmit a pathogenic nematode. The results are important because they indicate the complex relationship between developmental history and pathogen transmission by mosquitoes.

Breaux recently accepted a post-doctoral appointment in biology at Universidade Federal de Viçosa, Brazil, for work based in Chapecó, Santa Catarina State, Brazil. Schumacher is now an M.S. student in biological sciences at ISU.

Travis Mitchell's M.S. thesis work with the Gatto lab was published in June 2014. Mitchell observed that the cell's sodium pump also moves H+ ions, implying a new physiological role for this enzyme in cellular pH homeostasis. The work was recognized in the "New & Notable" section of the *Biophysical Journal*, and an invited commentary was requested by the editor from one of the best kineticists in the field, Hans-Jurgen Apell. (Reference: Mitchell TJ, Zugarramurdi C, Olivera JF, Gatto C, Artigas P. 2014. Sodium and proton effects on inward proton transport through Na/K pumps. Biophys. J. 106:2555-65. Commentary: Apell HJ. Biophys. J. 106, 2552-2554)

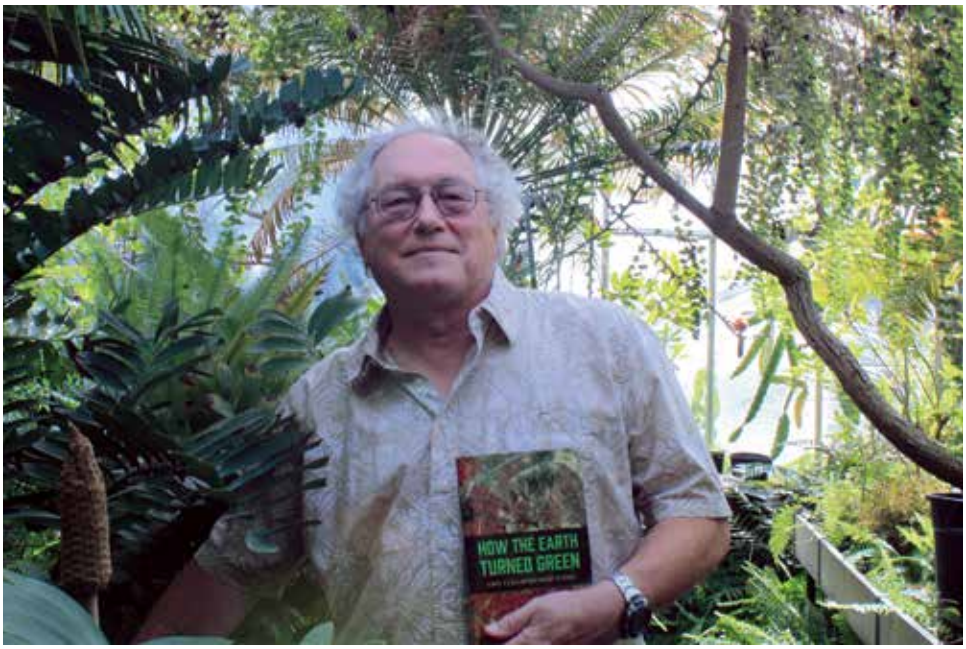
E. Keith Bowers, Ph.D. candidate, was the lead author on a paper in *Journal of Animal Ecology* investigating offspring sex ratios in wrens. (Bowers, E.K., C.F. Thompson, & S.K. Sakaluk. 2014. Persistent sex-by-environment effects on offspring fitness and adjustment in a wild bird population. J. Animal Ecol. September 29.) Sex-specific sibling rivalry and sensitivity to the quality of the rearing environment favors sex-ratio adjustment by parents through natural selection; however, increased sensitivity of males to environmental conditions can actually reduce the fitness returns from highly male-biased broods, generating stabilizing selection for 1:1 offspring sex ratios in wild populations.

Sara Fleetwood, an undergraduate student with the Larson Lab, investigated the molecular basis of BCR-ABL chromosome translocations in summer 2014. She was supported by an Undergrad Research Fellowship awarded to Erik Larson from ISU Research and Sponsored Programs.

Joseph Armstrong, emeritus professor of botany, had his book on plant diversity published by University of Chicago Press. Students who took his plant diversity course may have draft versions, but this is the finished product. Here's what people have to say:

"More engaging than a traditional textbook and displaying astonishing breadth, *How the Earth Turned Green: a brief 3.8 billion year history of plants* will both delight and enlighten embryonic botanists and any student interested in the evolutionary history of plants." –University of Chicago Press.

"Armstrong has opened a door to the sprawling majesty of plant biology and evolution in a way that informs without drudgery, infuses knowledge with example without pedantry, and lightens the heart with a fine sense of humor. This book should be read by anyone who can sense that the world around us is predominately green." –Karl J. Niklas, Cornell University



Joseph Armstrong with his book

Fall 2014

September 13 was the annual Phi Sigma picnic at the home of William Perry. See the Phi Sigma Facebook page, Facebook.com/PhiSigmaBetaLambda, for photos and upcoming events.

Professors Katz and Wilkinson relaxing at the Phi Sigma picnic

On October 11, the 16th Annual Retiree Reunion was held at the home of Craig Gatto, school director and professor. Retirees in attendance were Roger Anderson, emeritus Distinguished University professor; Edward Mockford, emeritus Distinguished University Professor, Carol Schmidt, Ph.D. '91, former undergraduate advisor and lecture; Don Schmidt, M.S. '89; David Weber, emeritus professor; Charles Thompson, emeritus professor and his wife Karen. Dean Gregory Simpson and some current biology faculty and staff also attended the fall event. Everyone enjoyed sharing stories and experiences while partaking in the barbeque feast that was prepared by the grill master, Craig Gatto.

Thomas Hammond and Edward Mockford at the picnic

Our fall seminar series included The School of Biological Sciences Seminar Series and The Integrative Biology Seminar Series. Speakers from fall 2014 included Professor James Bever, Indiana University, who spoke on More than a Sea of Grass: The role of soil organisms

Continued on Page 8

Events *continued from Page 7*

in structuring plant communities. Andrea Fritts, postdoctoral research associate of the Illinois Natural History Survey, spoke on Mussels, not muscles: A look into the secret lives of freshwater bivalve. Tih-Fen Ting, an associate professor of environmental studies at the University of Illinois at Springfield, spoke on Recovery Actions for Illinois State Threatened and Endangered Species: Franklin's Ground Squirrel and Osprey. Nayun Kim, assistant professor at The University of Texas Medical School, spoke on Transcription and Genome Instability.

Fall symposium of the Integrative Plant Biology and Bioenergy (IPBB) group was held on November 8, 2014. Undergraduate and graduate students, postdoctoral researchers, and faculty met for an excellent series of presentations mostly by students on current research projects. It's always a great forum for exchanges for ideas and beginning collaborations. In the spring, the IPBB group will be holding a poster session for updates on research projects as well as informal discussions. All are welcome. For additional information, watch the news on the school's home page for announcements.

IPBB symposium participants

Undergraduate Christina Jester collected bees for her research with assistant professor Ben Sadd.

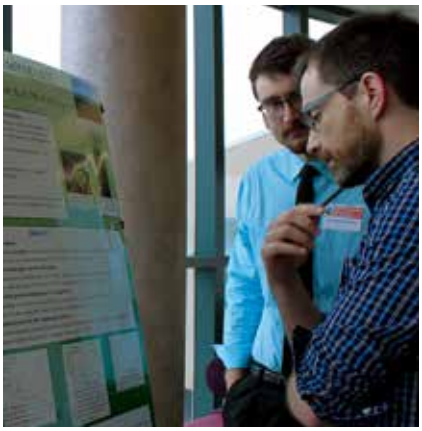
Pegan Sauls, M.S. graduate student, presented her research on gene silencing in the fungi—*Neurispora crassa*. Her presentation of this poster placed first for the poster award at the 2014 Phi Sigma Research symposium.

Faculty (from left to right, professor and school Director Craig Gatto, Assistant Professor Joe Casto and emeritus Professor Joseph Armstrong) relaxed at the Phi Sigma fall picnic

At the Phi Sigma fall picnic, Erin Dorset and Sarah Marrochello enjoyed a burger grilled by Associate Professor Bill Perry.

Meghan Strange, M.S. graduate student, presented her research on the corticosterone impact on fitness of the house wren (Troglodytes aedon) at the 2014 Phi Sigma Research symposium.

The sagebrush grig (*Cyphoderris strepitans*) research team and (from left to right) Jeannine St. John '08, Angela Kerr, Distinguished Professor Scott Sakaluk, M.S. '09, Joseph Leman M.S. '08, and Carie Weddle M.S. '01, Ph.D. '12 in Wyoming



Brandon Mardoian '14 discussed his senior thesis research on the impact of the light environment on hemiparasite plant (*Pedicularis canadensis*) with Assistant Professor Thomas Hammond.

Undergraduates (left to right) Tyler Rippel and Robert Philips searched for pale spiked Lobelia (*Lobelia spicata*) on a Illinois hill prairie for their research with Associate Professor Diane Byers.

The newly inaugurated Phi Sigma officers (from left to right: Amanda Carter, president; Sarah Marrochello, vice president; Erin Dorset, treasurer; Kristin Duffield, secretary; and Molly Schumacher, social chair, at the 2014 Phi Sigma spring banquet. Missing officer from this photo is Ashley Hembrough, bookstore manager.

Upcoming Events

February 27 will be the 16th Annual Research Symposium, hosted by Phi Sigma. Students will be presenting their research work at this all-day event. Jaap de Roode, an associate professor of biology from Emory University who studies the ecology and evolution of parasites, will be the keynote speaker.

The ISU School of Biological Sciences presents two additional seminar series beyond the main biological sciences series that runs on Thursdays. See the school home page for the schedules at Biology.IllinoisState.edu.

In order to give our students more opportunities to present their work, and to provide a venue for other special speakers and topics, there are two "brown bag" Lunchtime Seminar Series. In this series, the student can present in a semi-formal setting that allows feedback from a variety of faculty and other students. Students often find the talks can help them find answers to technical problems, form new collaborations, etc.

The Integrative Biology Seminar meets every Tuesday throughout the school year from noon–1 p.m. in SLB121. Undergraduate and graduate students have the opportunity to present their research or teaching accomplishments and discuss them with faculty. For more information, contact Wolfgang Stein at wstein@IllinoisState.edu.

In the spring, we also run the **Molecular and Cellular Biology (MCB) Lunchtime Seminar Series**. This meets Wednesdays from noon–1 p.m. in SLB121. For details or to go on the MCB mailing list, contact Kevin Edwards at kaedwar@IllinoisState.edu.

Our alumni: Where have you been and where are you now?

This year we received over 100 responses to our survey requesting information. Here are the ones that contained more information. This spring we will have more of these on the website. Look in "About Us" for the alumni pages.

1960s

John Raymond Todt '67, general biology, is a retired high school biology teacher. He has served as president of Peoria Academy of Science, as well as president of the Illinois Association of Conservation.

James E. Cole Ph.D. '68, behavior, ecology, evolution and systematics, has retired from the department of Biological and Allied Health Sciences, Bloomsburg University, Pennsylvania. He served as chair of the department, started a nursing program and a medical imaging program. Earlier he was the associate dean of arts and the sciences program coordinator of Allied Health Sciences.

Leo A. Lazaroff '69, teacher education, is a science curriculum advisor and instructor at Morton High School in Hammond, Indiana. He received his M.Ed from National Lewis University. He retired from Thornwood High School.

Richard G. Melinder, Ph.D. '69, molecular and cellular biology, is retired from Southwestern Illinois College where he was the dean of the science department and professor of biology. Now he enjoys many fun experiences with his eight grandchildren and travels throughout the United States and Canada.

1970s

James Obenland '71, teacher education, is now retired. After spending his early work years teaching middle school and high school, he spent the next 33 years in the pharmaceutical industry in the northern Chicago suburbs. He and his wife have recently relocated to Mahomet. Obenland enjoys gardening, and hiking and participates in the management of the family farmland in Champaign and Vermilion Counties. He and his wife, Linda, have four children and two grandchildren.

John Berger '72, teacher education, is the city director for International Students, Inc., Bloomington-Normal. He has been in this position since 2003. Since graduation, he has worked as a microbiologist with Central Soya Company; science teacher at Bellflower High School; a Registered Environmental Health Specialist with the McLean County Health Department; and as a Safety Officer at Illinois State University.

Glen Moulton '72, teacher education, is part-time faculty at Rogue Community College. He retired after 30 years as a teacher, high school administrator, and supervisor of instruction in Calvert County Maryland. He has written several books: Complete Idiot's Guide to Biology; PRAXIS: Biology; and PRAXIS: General Science.

John G Behnke '73, general biology, retired in 2010 after 35 years at State Farm.

Michael Surma '73, general biology, is a retired school superintendent. He is still working with conservation and science education.

Marylynn (Park) Tyler '75, general biology, has retired after 22 years of service at Edward Hospital in Naperville as a cardiac/neuro critical care nurse. "Now I enjoy volunteering for Will-Grundy Medical Clinic in Joliet, IL, and spending time with my grandchildren."

Susan Amundsen, M.S. '77, general biology, is a staff scientist at the Fred Hutchinson Cancer Research Center in Seattle, where she is studying the mechanism and control of DNA break repair and homologous recombinationa. She received her Ph.D. from Ohio State University.

Russell Reichter '77, general biology, is chief of radiology at VA Central Iowa Health Care System. He attended the University of Illinois for his M.D. from 1977–1981 and had a diagnostic radiology residency at Indiana University from 1981–1985.

David Paddock, M.S. '79, molecular & cellular biology, is retired from the pharmaceutical industry. He currently lives near Atlanta, GA. "I spend a lot of time hiking in the mountains, volunteering at Tellus Science Museum, and controlling exotic weeds."

1980s

Bobbie (Aten) Scholley '80, general biology, is a retired US Navy Diving Officer who continues to do consulting, public speaking and has been seen on CNN & Fox News as a Diving and Salvage Expert during recent world tragedies.

Gary K. Ostrander, M.S. '82, behavior, ecology, evolution, and systematics, serves as the vice president for research at Florida State University. "I am also a professor of medicine. My time as a university professor has included nine years at Johns Hopkins University, eight years at the University of Hawaii, and has spanned from cancer biology to coral reef ecology."

Natalie (Reynolds) Allen '83, general biology, is currently working as a Sanitarian in City of Austin, Texas.

Wallace Anderson '83, general biology, is a partner with Central Illinois Radiological Associates (CIRA) providing services at St. John's Hospital, Springfield, and St. Francis Hospital, Litchfield. "I am married to April with three children. We reside in Edwardsville IL. I am active with the ISU Foundation."

Denise Macino '83, general biology, is a supervisor of Laboratory Services Northwest Oncology and Hematology. She enjoys traveling and just returned from a trip to Scandinavia and Russia.

Kevin Rust, M.S. '83, molecular and cellular biology, is a principal scientist doing drug development for the Biologics research division of the Pfizer pharmaceutical corporation. "We do cellular expression of therapeutic proteins in mammalian and microbial expression systems. We also develop the cell strains used to produce vaccines, such as Prevnar for pneumococcal pneumonia. I have been with Pfizer or one of its legacy companies for nearly 17 years. Prior to my time at Pfizer, I worked at Washington University in St. Louis, where I worked on the discovery, structure, and function of lung surfactant protein D (SP-D)."

Janet Sinn-Hanlon '83, molecular and cellular biology, is a medical illustrator at University of Illinois at Urbana-Champaign, School of Veterinary Medicine Biomedical Visualization. She received her M.A./M.S. in biomedical visualization from UIC.

Darrell Cooper '84, general biology, is currently a board certified oncology pharmacist working at the San Antonio Military Medical Center as a clinical pharmacist in the Hematology/Oncology Clinic.

Marsha (Dosier) DeBennette '87, teacher education, is an 8th grade science teacher at Zion Central Middle School, in Zion.

Dianne M. Jedlicka, Ph.D. '84, zoology, is doing community-level research on sciurid rodents in Illinois. "I teach Animal Behavior, Evolutionary Mammalogy, Natural History, Ecology, and Anatomy and Physiology at the School of the Art Institute of Chicago. I also teach Environmental Science, Nutrition and Human Reproduction at Columbia College Chicago. I develop online classes in the sciences for DeVry University. I teach Nutrition, Anatomy, Chemistry, and Biology for DeVry University. I teach online Biology for Southern New Hampshire."

Robert Lapsley '85, general biology, is President of California Business Roundtable in Sacramento, California.

Dr. Ann Elizabeth Mazzotti '85, general biology, is a self-employed dentist. "I graduated from the University of Illinois College of Dentistry with a Doctor of Dental Surgery degree in 1989. I have been in private dental practice in Homewood, Illinois, since then."

Tim Logan '86, general biology, is a Kraft Foods Quality Auditor (from March 2014 to present) in Moline. "I travel throughout North America and Canada performing Kraft Quality audits on Kraft manufacturing facilities, co-manufacturers, and suppliers. Previously I worked (from January 1999 to March 2014) for 15 years as a Sr. Quality Systems Supervisor at the Davenport, Iowa, Oscar Mayer manufacturing facility. From 1987–1998, I worked as a QA Laboratory Supervisor/Chemist for Cargill, Inc. at their wet corn milling facility in Eddyville, Iowa."**Stephen L. Reinbold, Ph.D. '86,** general biology, is a biology instructor at Metropolitan Community College-Longview.

1990s

Christopher M. Norem '93, general biology, is a self-employed attorney handling personal injury, wrongful death, products, and medical negligence.

Tammy (Shallow) Cohen '94, general biology, is the vice-president of pharmacy services for Baylor Scott & White Health.

David K. Landess '95, general biology, is a board certified optometrist and partner at McLean County Eye Center.

Tiffany (Banach) Ferguson '97, general biology, is a quality peer reviewer in nursing at Northwest Community Healthcare in Arlington Heights.

David Rafferty-Flatter '97, general biology, is a New Trier High School science teacher.

Xavier Viteri, M.S. '97, conservation biology, is working for the government and teaches at a local University in Quito, Ecuador.

Chad Vance '98, teacher education, is a learning technology coach at Clear Creek ISD in League City, Texas.

Kara Babrowski '99, general biology, is a diplomat at U.S. Department of State, serving overseas. Babrowski received an M.A. and Ph.D. from UIC in anthropology.

Sean Riley '99, general biology, is a high school assistant principal.

2000s

Karla (Sturtevant) Turney '01, general biology, is in her 8th year as a clinical inpatient pharmacist at the Iowa City Veterans Affairs Healthcare.

Mike Dreger '07, zoology, is an analytical chemist at Isotech Laboratories in Champaign. "I am in charge of analyzing gas samples remotely with several isotopic ratio mass spectrometers placed around the world. These include machines in Australia, Saudi Arabia, and Egypt Brazil, and Texas."

Kristina (Herstedt) Dunne '08, general biology, is an RN at St. Francis Medical Center in Peoria, cardiology. She plans to begin graduate school in 2015 to pursue Adult Critical Care APN (Advanced Practice Nurse) and an MBA.

Tom Guilfoyle, Ph.D. '00, general biology, is a professor in the department of biochemistry in University of Missouri. His research interests include plant molecular biology (auxin-regulated gene expression and transcription mechanisms).

Jeffrey M. Lehman, M.S. '08, general biology, is an MD in allergy/immunology working at SIH Medical Group in Carbondale.

Wendy (Meyers) Stenson '00, general biology, works for Diageo Global Supply, North American as a quality manager and environmental sustainability manager. She completed an MBA in 2004.

2010s

Jennifer (Nichols) Dobersztyn '10, teacher education, is a teacher at Joliet Central High School.

Kathy Rossetti '10, general biology, is a teacher of high school biology and chemistry.

Zacariah Shannon, D.C., '10, general biology, is the founder of Shannon Chiropractic in Moline. "I am a chiropractor that strives to help people improve their health and better their overall quality of life."

Jamie Benjamin '11, teacher education, is a 7th grade science and social studies teacher.

Kyle Caron '11, general biology, obtained a master's in public health with a concentration in healthcare administration from NIU in 2014, and is working on his MBA. He is employed at a community mental and behavioral health care facility, working in IT and as a business analyst.

Selina Elliott '11, molecular and cellular biology, is working for Wrigley as a chemist, in Flowery Branch, Georgia.

Bethany Evens Campbell, M.S. '12, behavior, evolution, ecology, and systematics, is greenhouse manager at Illinois State University and adjunct biology professor, Illinois Wesleyan University. Campbell joined the biology staff at Illinois State University as the Greenhouse Manager in the summer of 2014. She is also in her third year at Illinois Wesleyan University, where she teaches various biology courses and laboratories including plant and fungal diversity. Her other endeavors include serving on the board of directors for the ParkLands Foundation and facilitating a prairie restoration project at Funk's Grove.

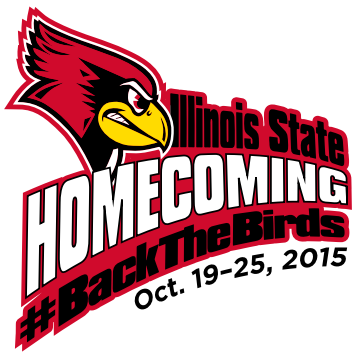
Dave Stetson '12, general biology, is a sales representative for Thermo Fisher Scientific covering the Chicago territory for the Fisher Scientific. "I enjoy spending time outdoors with my wife, and I'm an avid sports fan."

Tyler Kostecki '13, general biology, is at Marquette University, working on his master's in physician assistant studies.

Rebekah Park '13, teacher education, is a teacher at Peoria School District 150 and a member of the United States Marine Corps Reserves.

Amanda Hattar '14, teacher education, is a high school science teacher, teaching integrated science, zoology, and honors biology.

Mackenzie Walker '14, general biology, is a first-year medical student at the University of Illinois.



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