Bugged

MSU DEPARTMENT OF ENTOMOLOGY

MICHIGAN STATE UNIVERSITY

Jumping spider by Bill Ravlin, MSU Entomology

FROM THE CHAIR

I think we can all agree it's an interesting time as we find innovative ways to cope with a new way of life due to COVID-19, the infectious disease caused by the novel coronavirus. MSU Entomology is no different. Face-to-face classes ended mid-March and our instructors were forced to make a rapid one-week shift to remote delivery of their courses. This presented and still presents many challenges, especially for entomology courses that feature and depend on labs (think Introductory Entomology, Systematics).

Needless to say, hands-on components of our courses will change, as will some of the interactive elements of traditional face-to-face classroom teaching and learning.

The majority of our faculty, students, postdocs and staff are working from home. We're all getting large doses of Zoom meetings, taking on projects that may have been earlier set aside and coping with the challenges of social distancing.

Plenty of questions going forward. Will face-to-face courses survive? Should they survive? How can we deliver laboratories that require microscopes, specimens and instructor assistance? Assuming we can deliver laboratories, how will they be affected by social distancing and face coverings? Can we adequately implement MS and PhD defenses, seminars and other elements of our graduate programs using technology? The list goes on and on.

Our research and extension programs are impacted by these same challenges and more. Here we are faced with going to the field limited by one person per vehicle, social distancing in laboratories and, when possible, working from home. Out-of-state and international travel does not occur and in-state travel has been minimized. Like our courses, face-to-face interactions are limited to Zoom meetings. I could go on, but the university environment is vastly different than it was two short months ago.

Despite the turmoil, we have much to celebrate with many awards, graduations and accomplishments featured in this issue of *Bugged*. Please join in congratulating the best and brightest of our Entomology family!

A Zoom faculty meeting underway this spring.

Bill Ravlin,
Chairperson

RESEARCH & PROJECTS

Scientific Animations Without Borders (SAWBO) co-creators Barry Pittendrigh and Julia Bello-Bravo have expanded the scope of their globally popular animation series to address staying healthy during the COVID-19 crisis. The two have built a team of students, alumni and other collaborators to produce universally identified imagery animations with information and educational content in numerous languages. Past efforts have covered everything from scouting for fall armyworm to preventing Cholera and navigating the world of microfinance. "Protecting Yourself from Coronavirus" was released on March 24 to global partners and is being rapidly translated to additional languages. This latest animation was created in a 100% virtual space because of social isolation restraints. View the production at: https://sawbo-animations.org/859

Doctoral student Allison Zahorec has received $138,000 from the National Science Foundation to learn more about how soil microarthropod communities found in various bioenergy crop systems influence microbial and plant functions to help soils retain carbon. Zahorec and her adviser, Doug Landis, are researchers with the Great Lakes Bioenergy Research Center (GLBRC), a U.S. Department of Energy project including MSU with the University of Wisconsin-Madison. More than 400 scientists, students and staff collaborate in this interdisciplinary effort to develop and support more sustainable systems to produce efficient bioenergy fuels.

"Soil communities and their function have been considered ecological black boxes. We have an idea of what is going in and coming out from them, but a poor understanding of how they work," said Zahorec. "With advances in stable isotope tracing and other techniques, we can investigate how carbon and nitrogen move through soil food webs and identify the potential biotic factors influencing whether these key nutrients are stored or lost from soils. This information will help in forming more sustainable bioenergy cropping systems."

Kurt Stepnitz

Zahorec sampling soil at Kellogg Biological Station.

COLLEGE HONORS GEORGE BIRD DISTINGUISHED FACULTY

The MSU College of Agriculture and Natural Resources (CANR) awarded Entomology professor emeritus George Bird its 2020 CANR Distinguished Faculty Award at a recent ANR Week ceremony. The Distinguished Faculty Award recognizes faculty members who have brought distinction through their work and provided leadership that has helped students, faculty members or citizens reach their potential for excellence.

Bird has been teaching at MSU since 1973. Although he retired over a decade ago, he continues to teach the Honors College section of Entomology 205 every spring. He has a passion for nematology, soil health and the education of both student and producers of food, feed and fiber plants in Michigan and around the globe.

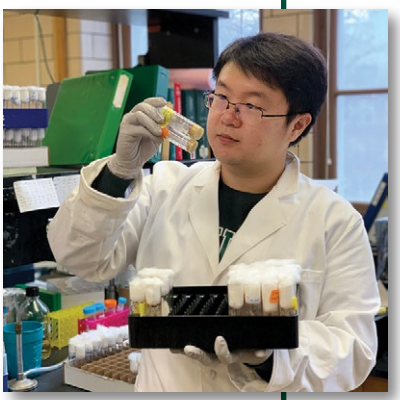
Bird's contributions to science and agriculture include serving as president of the Society of Nematologists, the first national director for the Sustainable Agriculture Research and Education Program and 19 years of service on the Board of Directors for the Rodale Institute. He was instrumental in forming MSU Plant & Pest Diagnostics (formerly Diagnostic Services). Among his recognitions are the Michigan Vegetable Council Master Farmer Associate Award, Melvin Jones Humanitarian Services Award, Sustainable Agriculture Hero Award and the Howard and Lili Ann Camden Endowed Teacher/Scholar Award.

Bird with CANR Dean Ron Hendrick.

FEATURED STUDENTS

Hometown: Hudson, Michigan
Future study or career plans: I want to work with science policy.

Hometown: Jingdezhen, China.
Previous education: BS Beijing Forestry University; MS Louisiana State University.



OSTEN ESCHEDOR
UNDERGRAD STUDENT

What or who inspired your interest in entomology? I was always interested in the natural sciences and my experiences in MSU Extension's 4-H programs gave me a great appreciation for agriculture. I would say competing in the entomology event on my middle school Science Olympiad team opened me up to pursuing a career in entomology specifically.

What has been your best experience with entomology? I loved working with Chris Difonzo in her Field Crops Entomology Lab this past summer. We traveled around Michigan participating in many studies including soybean defoliation and Asiatic garden beetle populations. It was my first hands-on experience with entomology and is by far my favorite.

Tell us about your experiences with the MSU Bug House. I am a tour guide at the MSU Bug House where I help the public gain a new appreciation for our insects and their arthropod relatives by overcoming their fears through live encounters. I find it to be very rewarding when I change people's perception of our bugs through education.

Do you have advice for anyone interested in an entomology major? Come to Bug Club! It's a good way to meet fellow students with a passion for entomology. You should also talk to our amazing adviser, Amanda Lorenz-Reaves.

Other fun things. I was selected to represent Michigan at the 2018 National 4-H Conference where I presented to the Senate Agriculture Committee and promoted the renewal of the Farm Bill. The bill also deregulated hemp, which I helped conduct a research study on with the Field Crops Entomology Lab the following summer. It was cool to experience firsthand how national policy affects our ability to do research.

ZINAN WANG
GRADUATE STUDENT

What are you researching? I am a student in Henry Chung's lab and am studying the genetic mechanisms underlying the evolution of a waxy layer on an insect's body surface called cuticular hydrocarbons, which have roles in preventing water loss and resisting desiccation.

What or who inspired your interest in entomology? The lectures and research from my bachelor's and master's studies in entomology made me realize how amazing insects are. The more I learn, the more I feel I do not fully understand many aspects of insect biology, which is why I am motivated to keep learning.

What is your favorite activity as part of your graduate studies? Conducting experiments in the laboratory. I enjoy the moments when I obtain data from experiments to test my hypotheses.

What is your favorite thing about MSU? The diverse resources here for supporting scientific research, including plenty of brilliant professors and graduate students and technical support from different departments.

What is your favorite insect? Fruit flies (*Drosophila* spp.) are one of my favorite insect groups because not only do they have diverse morphology but also various physiological evolutions. These tiny flies have been the model to answer many biological questions. The implications from fruit fly studies provide me chances to better know the biology and nature of all animals, including us, humankind.

What is your favorite way to spend your time outside of your studies? I like watching science fiction movies or TV series, which imagine how science and technology may evolve and change our life.

In a recent interview, MSU Entomology alumna Emily May described how her studies opened doors for her job with the Xerces Society, an international conservation society. Based on her experiences, she shares some advice for students.

When did you graduate from MSU? I graduated in 2015 with a master's in entomology and the Ecology, Evolutionary Biology and Behavior program.

What was your path to your current job? I work for The Xerces Society as a pollinator conservation specialist in the pesticide program. My job draws on USDA's Natural Resources Conservation Service (NRCS) cost-share programs to provide technical assistance for farmers in the Northeastern United States for creating pollinator habitat. I help them consider what plants to use, site-specific conditions and other details. I also do a lot of outreach and communication, writing publications on pesticides and pollinators. In the past year, I've been laying the groundwork for Xerces to expand its work in New Mexico. In particular, I'm setting up infrastructure to increase urban outreach in Santa Fe and Albuquerque.

I started work at Xerces a week after graduating at MSU by continuing some of the work I'd been doing with Rufus Isaacs on the Integrated Crop Pollination (ICP) project, a multi-university project looking at the different contributions of various crop pollinators in different crops. My first two years with Xerces, I did outreach and extension for the ICP project. After the ICP grant ended, I switched to my current work in the pollinator and pesticide programs at Xerces.

Anyone with special impact on your career? I earned my bachelor's degree at Middlebury College where I became interested in farming and food systems. I wanted to do an independent study of pollinators and my adviser, Helen Young, was very supportive of my interests. After leaving Middlebury, I worked on a couple of farms and then as a field research associate at MSU's Kellogg Biological Station. I started applying to grad schools and realized what a good fit Rufus Isaacs' work was for my interests. Fortunately, I got accepted at MSU and Rufus agreed to be my adviser. He was such a good role model of how to be a mentor and an academic.

Emily May honing her outreach skills with children during her graduate studies at MSU.

Best memories as an entomology student or as an entomologist? I have great memories of MSU, like my time in the field traveling for pollinator work in west Michigan blueberry fields and wildflower plantings. The Isaacs lab had an annual end of summer picnic with "Lab Olympics" at Fennville. This was a series of fun activities with research themes like a shuffling of water that somewhat imitated nectar collecting by pollinators, and a field equipment relay where we raced carrying buckets and various awkward equipment familiar from our field work.

Any advice for students from your experience? Take advantage of all the opportunities that grad school offers in and out of academics. Communication skills are really essential. I was lucky to give presentations to many audiences while at MSU. Figure out how to communicate your work to people who are inside and outside of your field and to children as well as adults.

Take opportunities to meet people in your field, travel to conferences and apply for the department's travel grants. It's those personal connections you develop with other grad students and faculty that build community and open opportunities.

Also, I've learned that if you work on interests that easily motivate you, the technical skills will follow from that motivation. I found I didn't need to be concerned about learning skills like statistics because they were part of my bigger motivation to work with pollinators.

PEOPLE

Ke Dong has been awarded the AGRO Innovation Award by the American Chemical Society (ACS). Dong is being honored for her more than two decades of outstanding contributions to the field of molecular insecticide toxicology. Her group was among the first to demonstrate a genetic, and subsequently a molecular, link between pyrethroid resistance and sodium channel mutations in insects, initiating a new phase of study into how pyrethroids act on insect sodium channels to exert their insecticidal activities and how pyrethroid resistance occurs at the target site in insects.

Dong has become a leader in this highly competitive field. Her research has also yielded important insights into the molecular basis of the functional diversity of insect sodium channels, the binding site of sodium channel blocker insecticides, the function of DSC1 as a prototype of a new ion channel family, and, more recently, the molecular basis of repellency by pyrethroids. She has received over $9 million from various funding agencies, including the US National Institutes of Health (for more than 20 consecutive years), the US National Science Foundation and the US Department of Agriculture.

ALUMNI NEWS

Jessie Smith (MS 2004 Bird) has been elected Chair of the Michigan Organic Food and Farm Alliance's (MOFFA) Board of Directors in April, 2019. Raised on her family's organic farm in Barry County, Michigan, Smith lives in Indiana where she continues to raise chickens and garden organically. Her close ties to Michigan keep her an active member of MOFFA.

Congratulations to our new alumnus, **Michael (Mick) Piombino,** who graduated with an MS in Entomology in December and was advised by Dave Smitley. Plombino has returned to North Carolina to seek employment.

LISTEN UP NEW PODCASTS CONNECT YOU TO ENTOMOLOGY

Podcast fans have two new sources to mix some entomology into their playlist. One talks with scientists about challenges to address invasive species in forests, while the other is an in-house production created by members of MSU Entomology to build community during a time of significant disconnect.

Forestcast is a production of the USDA Forest Service with support from MSU Entomology. Its premier season is titled "Balance and Barrier," a reference to early invasion ecology work by renown scientist Charles S. Elton. Listeners learn about scientists and their work to deter the most destructive forest insects in the Northeast and Midwest. The series' first episode explains how insect invasions progress and introduces scientists like **Therese Poland**, an MSU adjunct professor of entomology, who leads a Forest Service team of invasive species experts. In the following episodes, her team describes their efforts to deter invasions of some of America's worst forest pests.

Spartan alums will recognize some researchers interviewed such as **Leah Bauer** and **Dave Smitley**.

Check out the series by listening to Episode 1: A Slow Explosion of Damaging Forest Insects on the Forest Service Northern Research Station's website. Additional episodes are available via Spotify, Apple Podcasts and many other podcasting apps. The second season is nearing completion and focuses on restoring iconic tree species decimated by invasive species. For updates, follow @usfs_nrs on Twitter.

Bug Talk was initially conceived as a place for seminar speakers and department members to share their lives, passions and hobbies with a goal of creating a community around science communication. It has since expanded to include talk of doing your science and living your life under the constraints of COVID-19.

Bug Talk is a weekly released podcast that's set up as a conversation between two or more people. Episode 1 features associate professor **Zsofia Szendrei**, post-doc **Andrea Glassmire** and graduate students **Natalie Constancio**, **Kayleigh Hauri** and **Jenn Zavalnitskaya**. Over six episodes are available featuring a mix of students, staff and faculty and can be accessed at: https://www.buzzsprout.com/911479

Remember when?

With restrictions on field work this spring, it seems like a good time to look back in time! Recognize anyone? Enjoy.

2004

2014

2004

2011

2016

BREAKING NEWS

Dan Turner, a doctoral student in Will Wetzel's lab, has received two awards to support his work into plant and insect herbivore interactions. He notes that plants do not defend themselves against insect herbivores uniformly throughout their lifetimes, and insect species do not all attack plants species simultaneously. This variation creates patterns of diversity in time, which is at the heart of his research. At Kellogg Biological Station, he tests hypotheses about timing in ecology by manipulating genetic diversity and herbivore exposure in plots of tall goldenrod (*Solidago altissima*) and tracking goldenrod-herbivore interactions throughout the growing season. He recently received an Honorable Mention from the National Science Foundation-Graduate Research Fellowship Program with a proposal to continue his work in the goldenrod system.

With a recent Fulbright Open Research Award beginning in Winter 2021, Turner will travel to southeastern Brazil for nine months to work in rupestrian, or rocky, grassland habitats with Dr. Tatiana Cornelissen, an entomologist at the Federal University of Minas Gerais (UFMG). These grasslands are home to a rich galling insect community and represent a unique opportunity to investigate how the mosaic of resources across this habitat influences galling insect diversity throughout the rainy season. Turner says the Fulbright has a central mission for cultural exchange, and he looks forward to collaborating with the broad network of plant-insect ecologists and evolutionary biologists located at UFMG and beyond in Brazil.

Bugged newsletter

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Larvae of an approved biological control agent, defoliating swallow-wort.

Assistant professor Marianna Szűcs was interviewed by Katie Nicpon for the College's *Futures* magazine. Learn something new about our biological control expert.

Hometown: Makó, Hungary.
Education: Diploma in geography and geology from the University of Szeged (Hungary); PhD in entomology from the University of Idaho; and postdoctoral research at Colorado State University.
Joined MSU in: January 2018

Why I chose my field of study: It chose me. I always knew I liked biology, I just didn't know what aspect to study. After I finished my degree in geology, I was ready for more biology. There was a biological control program for an invasive pest of corn introduced to Europe from the U.S., and they needed researchers who spoke English and German. I started working as a research assistant, and it was just fascinating!

Muse (person who has influenced or inspired me): Growing up, I watched many documentaries by David Attenborough. They made me want to study nature, so they had a huge influence on me. I feel like my postdoctoral adviser at Colorado State University shaped me the most to be the scientist that I am today. Of course, I've learned a lot from other faculty that I've met along the way.

On my bucket list: Traveling to New Zealand and Bora Bora. I'd like to hike both islands of New Zealand to see the unique flora, fauna and beautiful nature.

Favorite type of vacation: Mostly the hiking kinds, but there's something to be said about lying on the beach and doing nothing. I like to combine things.

On a Saturday afternoon, you'll likely find me: Probably curled up with a book. I'm also learning to bake bread, and I like baking cookies and cakes. We have a big garden – it's never ending – so that's fun. I taught myself how to sew from YouTube. I do some crafting, and I dye my own fabric. I have so many options to choose from.

Best part of my job: I really like meeting new researchers, being exposed to new ideas, passing along those new ideas to students and seeing that spark in their eyes when they realize something they didn't know before. There are a lot of things that make me happy about this job.

If I wasn't a researcher, I'd be: A science fiction writer. I'm not sure I'm qualified, I just read so much of it.

Szűcs tweets about caring for her colony at home with social distancing.

Zachary Huang, MSU Entomology

In February, pollinator experts from MSU participated in a bi-national conference, One Health for the Bees of Yucatan in Merida, Mexico. Above, the group observes sting-less bees.

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SCRIBER SCHOLAR AWARD IMPACT

FISCHER BOOSTS BUTTERFLY AND MOTH DATA

Recently graduated master's student **Erica Fischer** is a past recipient of the Mark and Kathleen Scriber Scholar Award. Fischer's commitment was to move the label information from butterfly and moth specimens in the AJ Cook Arthropod Research Collection into its database. As a result, 5,000 additional specimens were included in the collection's database, which currently holds more than 125,000 butterflies and moths. These records contain information of where and when the specimens were collected and often associated food plants.

The expanded information provides scientists with data needed to test predictions concerning butterfly and moth ecology and biology. Fischer is one of those scientists, using these data to explain trends in butterfly and moth collecting in the United States since the 1800s.

At right, Erica Fischer and faculty adviser Anthony Cognato celebrate graduation.