

Bugged

FROM
MSU DEPARTMENT
OF ENTOMOLOGY

SUMMER 2016



Image: Bill Ravlin, MSU Entomology

FROM THE CHAIR

I got my start in entomology as a result of being a hockey goalie. It's fair to say, this is not the usual route. I was a fair, but not great goalkeeper, good enough to keep me between the pipes for my first couple of decades. Thanks to a point blank slap shot and a not so stellar grade point average, I decided it was time to make a change. That change came courtesy of Roger Hoopingartner and my first entomology course. Roger must have had some "secret sauce" because inside of a month, I changed my major to entomology and today I'm still passionate about insects.

I liked the idea of being an entomology undergraduate because I found insects fascinating and enjoyed doing things out of the ordinary (hence, my love of goalkeeping). This fascination gave me a desire to learn everything possible about insects. I spent countless hours collecting bugs, and hanging out in a "laboratory" (modified bedroom closet) armed with a microscope and forceps. How could it get better?!

"Several" years later, I'm still a passionate entomologist, but with a few updates. I no longer use a closet as a lab, I spend most of my time studying people who study insects, and I usually

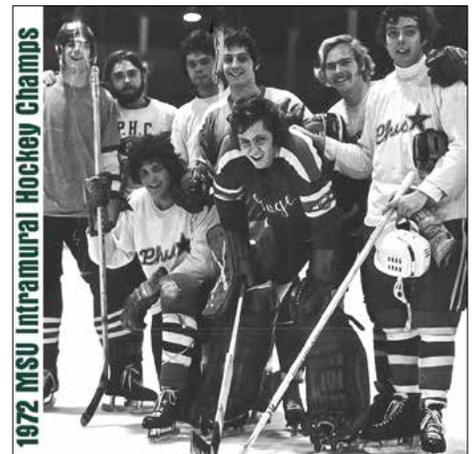
employ a "digital net" (camera) to collect insects. These updates have strengthened my belief that entomology serves as probably the best platform to go into any field of biology, environmental studies, medicine, computer science, business and even law. I know of professionals in all of those areas who, at the very least, took some entomology courses. One of my graduate students became a bank vice president.

I was reminded of this recently when I participated in the annual meeting of the Michigan Entomological Society. We talked about insects and photographing insects all day! More importantly, I was able to connect with Michigan entomologists of various ages and career experience. I was reminded that my story is not unlike other entomologists who discovered insects, found others with similar interests and pursued a life that includes the significance of insects and entomology. Many of them readily offer why entomology matters in their life. Here is my version taken from one of our recent planning documents. "Insects impact every aspect of the human condition. One-third of our food comes from insect-pollinated crops. Much of our knowledge of genetics, evolution, ecology, physiological processes and biological principles was derived from the study of insects.

They infest crops destined for human and animal uses, spread pathogens, make some areas of the world uninhabitable and reduce the economic value of products and services. Without an understanding of insects, society cannot address critical issues surrounding food safety and security. We cannot solve environmental issues, mitigate global human health concerns (e.g., malaria, zika), or make informed political decisions on grand challenges associated with human health, genetically modified organisms, climate change or biodiversity without understanding the role of insects in our world."

Oh, and it beats getting hit with a 100 mile-per-hour hockey puck.

All the best,
Bill
Bill Ravlin, Chairperson



RESEARCH & PROJECTS

Entomologist [David Mota-Sanchez](#)

is part of the USDA NC507-monarch butterfly conservation rapid response team that is surveying and improving monarch butterfly habitat in the north central states. With its millions of acres planted with field crops and grasslands as well as other areas suitable for monarch butterflies, Michigan is very important to the butterfly's survival. In February 2016, Mota-Sanchez traveled to the monarch overwintering sites in Mexico. Unfortunately, following a season of population growth in the United States, an unusual frost event killed millions of butterflies in Mexico.



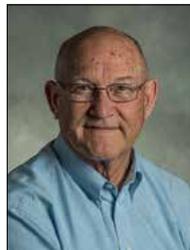
See "[Saving monarch butterflies](#)" for a video view of Mota-Sanchez's travels to the sanctuaries. For tips about planting habitat for monarchs in Michigan and similar climates, see "[Growing milkweeds for monarch butterflies](#)" by Michigan State University Extension.

In an MSU-led *Varroa* mite study, [Zachary Huang](#) and colleagues have found the mites prefer to infest adult bees at mid-age, or during the nurse phase of a bee's lifecycle when they care for larvae, rather than during the newly-emerged or older forager phases of an adult bee. The study, published in the [Scientific Reports](#), also found the physiological type of a host bee had significant effects on the mite's reproductive fitness and success later on.

PEOPLE

The Department honored and, at his request, "roasted" [Larry Olsen](#) on April 28 at the Kellogg Center.

Olsen worked as [Integrated Pest Management](#) (IPM) and [Pesticide Safety](#) coordinator for the [Department of Entomology](#), an associate Extension director for the [College of Agriculture and Natural Resources](#) and co-director of the [North Central Regional IPM Center](#). His future plans include continuing his



development project in the central highlands of Peru where people live a subsistence life depending on potato production. Olsen is also hiking the Appalachian Trail piece by piece over several years, and will travel to more national parks with his wife, Bev.



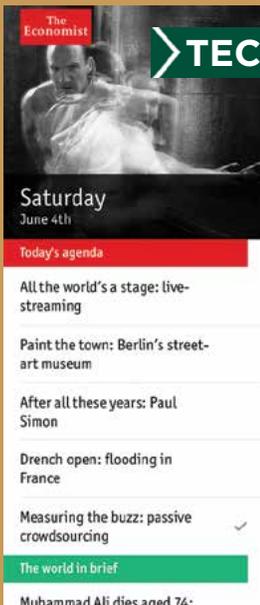
New graduates Chris Adams and Marissa Schuh with Department Chairperson Bill Ravlin.

Congratulations to our May graduates! Undergraduates with an entomology major include **Kelsey Kruschinka, Mitch Efaw, Beauchamp Thomas, Marisa Tucker** and **Madison Ahmad**. **Kelly Sinnave** graduated with an entomology minor and majored in Forestry.

(Continued on page 4.)

TECHNOLOGY: RESEARCH AND PASSIVE CROWD SOURCING

Entomology post-doc [Christie Bahlai](#) and [Doug Landis](#) have published "[Predicting Plant Attractiveness to Pollinators](#)" with [Royal Society Open Science](#). Noting that people passively collect data about the world around them, they examined a common leisure activity – photographing and sharing images of flowers – for its ability to capture ecological phenomena, the visitation rates of pollinators to flowers of different species. In a methodology they termed "passive crowdsourcing," they searched Google Images for pictures of blooms of 43 common flowering plants, and identified insects visible visiting the flowers in the photos. They then compared these observations to visitation rates observed in controlled experimental trials using these same plants. They found they could predict how often a flower was visited by wild bees by the number of visits observed in the internet images, although relationships were less clear for honey bees and bee-mimicking flies. This method could be used by scientists to make predictions about other ecological phenomena that may be documented by human use of the web. The study caught the interest of *The Economist*, which reported the story in its "Espresso" app designed for news-hungry commuters.



FEATURED STUDENTS



**JOSEPH
LONCHAR**
FEATURED UNDERGRAD
STUDENT

Hometown:
Stockbridge,
Michigan
**Future study or
career plans:**
Pursue a master's
degree in
entomology.

What is the best selling point about an entomology major that you would like others to know? An entomology major can be an end in itself or a field that compliments another area of study like plant breeding or epidemiology.

What or who inspired your interest in entomology? Well-known biologist E.O. Wilson and retired Army medical entomologist Harold Harlan. I find Wilson interesting as he relates his studies to other animals, including humans, based on his examination of behavior and biology. Harlan is known for his work with bed bugs, and I appreciate his dedication to studying and maintaining an insect that was largely unknown to many and disregarded as an important pest to humans.

What has been your best experience with entomology? I volunteer with the Bug House and I assist visitors with questions or handling the live specimens. My best experiences are seeing individuals, who at first proclaim a strong aversion to insects or the tarantulas, muster the courage to face their fear, if not overcome it, and handle one of our specimens. I find helping those individuals to do something so personally challenging very rewarding.

Favorite insect? There are far too to pick just one! Instead, I would like to add two more legs so that I can point out there is such a thing as "face mites." They live, breed and die in our hair follicles, like eyebrows and eyelashes! Isn't that splendid? Don't believe me? Look up the genus "Demodex" on Wikipedia. Sleep tight!

Do you have advice for anyone interested in an entomology major? Get in touch with someone and ask questions. Talking with the advisors (Chris DiFonzo or Walter Pett) is a great first step. Speak with any of the entomology professors or students. Or consider signing up for an introductory entomology class, which could easily fill an elective and get a taste of what more could come.



**DAN
GIBSON**
FEATURED GRADUATE
STUDENT

Hometown:
Urbandale, Iowa
Major professor:
Doug Landis
Future career plans:
Pursue a career in
ecological restora-
tion, preferably
with a regional land
conservancy.

What are you researching? My project is screening several dozen native perennial wildflowers for their usefulness as floral resource plants for predators and parasites of crop pests. The end goal is to use the most attractive flowers for insectary plantings around crop fields to support natural enemy populations.

Why study entomology? You can study anything! Insects have an impact everywhere, from basic ecology to agriculture to molecular biology, so entomologists can be found working in many different subfields. If there is a field you are interested in, you can probably approach it by studying insects.

What or who inspired your interest in entomology? I first tuned into the six-legged world when I started insect hunting the summer before I took entomology as an undergrad. Going out with a net and a killing jar opened my eyes to the spectacular and colorful diversity I had never noticed earlier. That course was taught by Kirk Larsen, an MSU Entomology alumnus, who showed me that entomology was fun and could lead me down any number of paths I chose to follow.

Why did you choose MSU for graduate school? I was attracted initially by my particular research project, which integrated entomology, conservation and outreach into a single project. Add to that a respected department and a great advisor and the deal was sealed.

What is your favorite way to spend your time outside of your studies? When not thinking about work, I can often be found in a kayak or in the woods quietly enjoying all the life around me. If I'm home, I'm probably building something. Projects currently in progress include a bicycle trailer (for the kayak) and a Settlers of Catan board.

Those earning graduate degrees and their plans:

- **Christopher Adams** (PhD with Jim Miller) is a research associate with Larry Gut.
- **Elizabeth Davidson-Lowe** (MS with Jared Ali) will be a PhD student at Penn State University.
- **Scooter Nowak** (MS with Eric Benbow) is moving to Arizona.
- **Marissa Schuh** (MS with Doug Landis) is the MSU Extension vegetable educator in southeast Michigan.

AWARD-WINNING

Chris DiFonzo was awarded CANR's 2016 H. Paul Roberts Award for Distinguished Service in Study Abroad Programs.

DiFonzo organized and led the "Sustainable Tropical Agricultural Systems in Sri Lanka" based on discussions with officials of the Agriculture Education Unit of the University of Peradeniya, Sri Lanka. At the award ceremony, it was noted that DiFonzo's "... leadership, enthusiasm, innovativeness and dedication allowed the program to run at full capacity successfully for four consecutive years."



Chris DiFonzo receives her award from Kelly Millenbah and George Smith.

MSU Entomology members won two awards from the Association for Communication Excellence (ACE).

- **Joy Landis, Mallory Fournier, Julianna Wilson and Amos Ziegler.** 2016 Silver Award

for best use of information technology for "Combining technologies sends a stink bug request viral."

- **Joy Landis and Mallory Fournier.** 2016 Bronze Award for best newsletter for "Michigan State University Entomology's 'Bugged' newsletter."

Entomology undergraduate **Lidia Komondy received a first prize in the environmental section at MSU's 2016 University**



Undergrad Lidia Komondy celebrating her research award.

Undergraduate Research and Arts Forum (UURAF). Her entry was titled "The Effect of Border Habitats on Predation of a Key Pest." Komondy is part of the team in [Zsofia Szendrei's vegetable entomology lab](#) and received \$100 as part of this honor.

ALUMNI NEWS

Bernice Demarco is a Smithsonian Fellow with the National Museum of Natural History. Demarco reports she will be continuing her studies into the evolutionary history of the ant genus *Aphaenogaster* in North America. As an MSU doctoral student, she used four nuclear genes and one mitochondrial gene to infer the evolutionary relationships between species in the genus. Each sample (over 120 specimens) contained 3,000 base pairs, or bits of information to create a phylogenetic tree. Collaborating with Dr. Ted Schultz will mean using newer techniques, Next-Gen sequencing, which will allow her to sample the DNA across the entire genome. Her data will increase to about 170,000 base pairs, or more than 50 times the original amount of DNA data.



MSU Entomology won the North Central Entomological Society of America Linnaean games for the second year straight. Held in June in Cleveland, Ohio, the games are named after Carl Linnaeus, the founder of binomial nomenclature. The team defeated Ohio State University in the final round. Team members include Kristin Poley, Daniel Hulbert, Dan Gibson and Courtney Larson and Coach Matt Grieshop.

MAKING AN IMPACT 10 YEARS TOWARD FOOD SECURITY IN CENTRAL ASIA

Genuine, tenacious, diverse, open, collaborative, bold, world-changing: These attributes are essential characteristics of Michigan State University's identity and are readily identifiable in the 10-year, USAID-funded project in Central Asia led by **Karim Maredia**. A skilled networker, through his WorldTap Program Maredia identifies MSU's research expertise for collaborating in building global knowledge partnerships. In the case of the Central Asia Integrated Pest Management Project, he brought together faculty from three universities and an international research center to collaborate with researchers and leaders in Tajikistan, Kyrgyzstan and Uzbekistan to address food security.

When the Soviet Union left Central Asia in 1991, food was difficult to grow. Soil and water resources were depleted and pesticides overused, creating various environmental hazards and pesticide resistance. Such a scenario cannot be quickly turned around, but Maredia and colleagues agreed to assist with finding practices to put the region back on the road to food security. They built a capacity-building program by hiring local researchers to oversee activities in each of the three countries and brought three young people to MSU to earn graduate degrees.

Dr. Murat Aitmatov was the project research leader for Kyrgyzstan. While on the MSU campus working with **George Bird** and **Walter Pett**, he visited MSU's Student Organic Farm and found something valuable for his students back in Kyrgyzstan. Aitmatov nearly filled a notebook with drawings and notes. He returned home and helped his students launch an organic farm where students learn hands-on about pests, soils and growing food with hoophouses.

Saltanat Mambetova was one of Aitmatov's students working on the farm. She was later selected by the project to earn a master's degree with MSU's David Douches looking for disease-resistant potatoes that could thrive in Central Asia. Mambetova said when she first heard about studying at MSU, she thought it was just a dream. She has since completed her master's and is in a doctoral program at MSU. "Learning new technologies and new ways to do science and then taking that back home is very important," she said.

In another project effort, **Doug Landis** collaborated with entomologist Mustapha El-Bouhssini to increase biological control by supporting beneficial insects near fields with native flowering plants. In this case, Landis' work in Michigan was adapted to use native plants with medicinal and cooking value and was tested by El-Bouhssini in Syria at the International Center for Agricultural Research in the Dry Areas. Nurali Saidov, project researcher in Tajikistan, built demonstration plots with the research-identified plants on wheat farms in three locations, and worked with colleagues to host extension meetings and resources to help introduced Central Asian farmers to this system of supporting biological control.

To learn more, listen to Aitmatov, Mambetova and Bird in a brief video, "Collaborating for food security in Central Asia," at bit.ly/central-asiaIPM. A comprehensive description and reporting from the project is available at the website: bit.ly/IPMcentralAsia



Maredia with Kyrgyz ag students including Mambetova, back far right.



El-Bouhssini, Landis and a Syrian grad student view native plants at ICARDA.



Farmers at Saidov's Tajik field day.



Plastic forms a hoophouse at the Kyrgyz student farm inspired by the MSU farm.

CELEBRATING EXCELLENCE 2016 ENTOMOLOGY AWARDS

The Entomology Department gathered Thursday evening, April 28, 2016, to recognize excellence in the Department by honoring students at the Entomology Awards Ceremony. This was a new and unique event for celebrating significant achievements of our students by bringing them together with the donors who funded the awards.

Congratulations to the following people:

- **Dan Lawson** – 2016 MSU Entomology Distinguished Alumnus Award
- **Katie Demeuse** (Szendrei and Kaufman Labs) and **Beauchamp Thomas** (Cognato Lab) – Undergraduate Awards
- **Courtney Larson** (Benbow Lab) – Gordon Guyer Endowed Fellowship in Aquatic Entomology
- **Courtney Weatherbee** (Benbow Lab) – Merritt Endowed Fellowship in Aquatic, Medical or Forensic Entomology
- **Logan Rowe** (Isaacs Lab) – Roger and Barbara Hoopingarner Endowed Graduate Fellowship in Apiculture, Honey Bee Science or Pollination
- **Dan Gibson** (Landis Lab) – Rhodes (Gene) Thompson Memorial Fellowship in Applied Entomology
- **Andrew Myers** (Landis Lab) – Scriber Scholar Award in Butterfly Biology and Conservation
- **Katie Demeuse** (Szendrei and Kaufman Labs), **Heather Leach** (Isaacs Lab) and **Mario Pinilla-Gallego** (Isaacs Lab) – MS Hutson Endowment Research Proposal Awards
- **Rachel Osborn** (Cognato Lab) – PhD Hutson Endowment Research Proposal Award
- **Chris Adams** (Miller Lab) – Robert Dreisbach Award
- **Nicole Quinn** (Szendrei Lab) – Paul Wooley Award
- **Dan Hulbert** (Smith Lab) – Eugenia McDaniel Award
- **Heather Leach** (Isaacs Lab) – Gordon Guyer Award
- **Courtney Weatherbee** (Benbow Lab) – Bug House Fellow
- **Steven Crisp** (Ziegler Lab) – James Bath Award

See photos of individual winners with donors and more at the Department website: <http://bit.ly/EntAward16>



Photos: Derrick Turner, MSU Photography

ALUMNI PROFILE DAN LAWSON

Dan Lawson is the recipient of our department's first Distinguished Alumni Award and will accept his award and present a seminar on campus Oct. 24, 2016.

How did your studies at MSU influence your career? After completing my master's degree in MSU's Fisheries and Wildlife Department, I took a year off and worked for entomology professor Rich Merritt as a technician. Soon I decided to pursue a PhD in aquatic entomology in the Merritt Lab. However, entomology clicked even earlier for me. I took a general entomology course taught by Roland Fisher as an undergrad. He was an outstanding instructor and I got hooked. Great teachers are so important!

After completing my PhD, I was fixed on the idea of a tenure-track position, but aquatic positions were difficult to obtain. I was on soft money for years at MSU while working at the Kellogg Biological Station. Keith Kennedy, a one-time MSU Entomology professor, was at the SC Johnson & Son company in Wisconsin and encouraged me to visit. I was impressed with their marvelous facilities, view of environmental sustainability and the support they provided for projects. I worked for SC Johnson for over 20 years and had a great time there. My first assignment was to bring the insect-rearing facility up-to-date with procedures such as documenting good laboratory practices (GLP) for the company's insect control products. Within a few years I became a product development manager supporting mosquito control products, like Off! and Raid, within the U.S. and overseas. In many parts of the world, they don't use window screens, so they have different indoor pest control problems compared to the U.S. The global travel for that job was a great experience. I remember standing on the Great Wall of

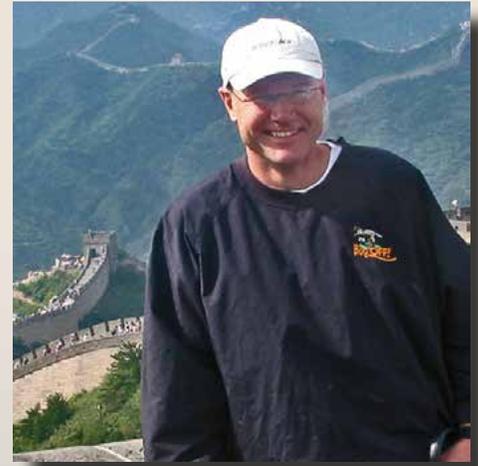
China with Keith Kennedy and looking at each other and saying, "Did you ever think back in the days when we were at MSU that we'd be here some day?"

More recently, I was involved with international regulatory issues and, towards the end of my career, working with the Bill and Melinda Gates Foundation on helping to mitigate malaria in economically challenging areas around the world. SC Johnson is excellent in evaluating the consumer's needs, wishes and every-day challenges before developing a new product. The Gates Foundation recognized that expertise and we became collaborators in fighting malaria.

How did entomology contribute to your career? MSU's Entomology program positioned me so I could excel at anything I wanted to do. MSU has a multidisciplinary approach to research. You learn to work in teams, which is incredibly important anywhere you might work. Team work is how you accomplish great things.

Another important skill emphasized at MSU was basic communication and learning to effectively deliver your scientific message to a wide audience. Students were pressed to have tight, focused presentations -- delivering content that is understandable, fostering a communication style that works within an interdisciplinary setting. I may not know engineering or computer science like I do entomology, but I do understand interdisciplinary aspects that allow me to communicate to those groups. If you cannot communicate and get your points over to a diverse crowd, you are doomed in any field.

Best memories as an entomology student? So much fun, the camaraderie between faculty and students was just great.



How has your work impacted people's lives? You're always hopeful your work has impact. Although I am retired, the Gates Foundation work with malaria continues and I believe is poised for great impact. So many people die of malaria. I also appreciate the work I did with others in SC Johnson product development. I hope we made the lives of those using our products better.

Thoughts for current students? Take course work outside of your core scientific area. I started at MSU in computer science with a heavy dose of mathematics but longed for an application. Looking around, I saw fisheries biology as a better fit for me as the curriculum let me expand my interests. Then, in my master's studies I delved more into benthic invertebrates (lake sediment dwellers). My doctoral studies moved into stream ecology and my post-doc work combined aquatic entomology with microbiology. Every time I took a step in my career, I changed focus a bit to delve into a new area. While that might be uncomfortable to some, by staying too much in your comfort zone, I've found you don't learn nearly as much. Taking a broad curriculum made me a better scientist.

I'm looking forward to being on campus and interacting with the department in October. Pleased to have this opportunity!

MSU Department of Entomology

Michigan State University
Natural Sciences Building
288 Farm Lane Room 243
East Lansing, MI 48824



ENTOMOLOGY INNOVATIVE OUTREACH



Pollinator science “on tap” draws a crowd

Rufus Isaacs’ lab annually hosts a successful National Pollinator Week event, Bee Palooza, that draws families to a fun, educational day in the MSU horticultural gardens. In fact, the June 2016 event drew over 500 people for demonstrations and games based on learning more about pollinators. With an eye on reaching a new, millennial audience, this spring lab technician **Julia Brokaw** proposed and organized Beez and Brewz, held at the Lansing Beer Grotto. This “Science on tap” concept followed the spirit of Astronomy on Tap, a series of events hosted by a group of MSU researchers. Over 100 people attended the new pollinator event, likely launching a new tradition for Pollinator Week.



The evening included three bee experts – **Jason Gibbs, Meghan Milbrath** and **Rufus Isaacs** – who presented factual, light-hearted information about native bees, what Michigan is doing to protect our pollinators and the role of bees in some of our favorite drinks. Following the presentations, graduate students answered audience questions ranging from what flowers to plant for bees, general bee biology, to beekeeping regulations in Lansing. There were also special bee related drinks on tap for the night and many received raffle giveaways including photo prints of wild bees taken by Jason Gibbs, pocket guides for identifying bees and plants that attract them, local honey, native bee hotels, t-shirts and a Beer Grotto gift certificate.