



# THE BUZZ

Looking back on 2024-2025



UCR ENTOMOLOGY

## New Species of Subterranean Termite in Southern California Named After UC Riverside Entomology Professor



Figure 1: *Reticulitermes rusti* (left), Prof Emeritus Michael Rust (right).

When the Southern Californian long summer fades, the first rain marks the arrival of autumn. The rain softens the dry soil and soothes the long drought. That shift in weather pattern excites termite researchers like us. It is time to watch out for swarming subterranean termites. After the first autumn rain followed by a warm and sunny day, thousands of winged reproductives of subterranean termites will come out and fly to look for their mates. These day-time termite swarmers belong to the genus *Reticulitermes*, the most common genus of subterranean termite pest of California.

Subterranean termites of the genus *Reticulitermes* Holmgren, 1913 (Blattodea: Heterotermitidae) include some of the most important structural pests worldwide. Around the world, two species are known for their invasive nature, *Reticulitermes flavipes* and *Reticulitermes grassei*, while in the western US, *Reticulitermes hesperus* is the primary subterranean termite pest species to the pest management industry. Their cryptic, soil-dwelling lifestyle makes them especially challenging to detect and control.

Biologically, *Reticulitermes* occupies an intermediate position between the “higher termites” (Termitidae) and the so-called “lower termites” (the remaining termite families). Like Termitidae, they possess a “true worker” caste whose developmental lines can produce workers and soldiers. However, unlike Termitidae, which have lost their protist gut symbionts, *Reticulitermes* retains these symbionts, as in other lower termites.

This intermediate position is also reflected in their developmental flexibility. As a hemimetabolous social insect, *Reticulitermes* can produce soldiers and imagoes (alates) after different numbers of molts, leading to size variation that is strongly influenced by colony development. In younger colonies, soldiers tend to be small, having undergone fewer molts, whereas in mature colonies with many workers, larger soldiers that have molted more times begin to appear.

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DECEMBER 2025

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## *New Species of Subterranean Termite (Continued...)*

As a result, a single established colony can contain soldiers of multiple sizes. This variation, combined with natural differences in pigmentation, leads to high intraspecific variation in size and color, making members of *Reticulitermes* notoriously difficult to identify based on morphology alone.

Since 1997, our collaborators Drs. Mike Haverty and Lori Nelson of USDA Forest Service used chemotaxonomy (use of cuticular hydrocarbon (CHC) profiles, the chemical fingerprints on the termite cuticle) to sort colonies into distinct phenotypes that did not match the two recognized species, *R. hesperus* and *R. tibialis*. These CHC patterns were the first indirect evidence that there could be multiple cryptic species in Californian *Reticulitermes*.



In addition, the bimodal swarming season that was first described by Banks (1920) for *R. hesperus* is another hint alates flying in spring and those flying in winter are, in theory, unlikely to meet and copulate. This separation in flight timing provides an additional clue that cryptic species may be present in California. However, despite all these, before the advancement of molecular tools, it was not possible to distinguish them.

In a recent study (Chen et al. 2025), we focused on southern California *Reticulitermes*, where a putative lineage with the CHC phenotype SC-B and *R. hesperus* occur side-by-side. Because this lineage is morphologically indistinguishable, we applied an integrative taxonomic approach, adding molecular data to clarify its status. Samples were collected across Southern California, many from Riverside and nearby counties, so we could examine what happens in the contact zone. Contact zones are natural laboratories for testing whether lineages freely interbreed or remain reproductively isolated.

Using three mitochondrial genes (16S, COI, and COII), we built a mitochondrial phylogeny to test whether colonies with the SC-B CHC phenotype formed a distinct lineage. To complement this, we genotyped the same colonies with a set of microsatellite loci and used clustering analyses (PCoA and STRUCTURE) to look for evidence of gene flow where the lineages overlap geographically. Together, the mitochondrial and microsatellite data showed that the SC-B lineage remains genetically distinct from *R. hesperus* even in sympatry, confirming that the cryptic lineage in southern California is, in fact, a true species.

In recognition of Professor Emeritus Michael K. Rust's 50 years research contribution to the science of urban pest management, we name this new species, ***Reticulitermes rusti***. This newly described species swarms from fall to winter and is distributed throughout southern California (from Santa Barbara to San Diego), where it was previously misidentified as *R. hesperus*.

Now that we can distinguish *R. rusti* from *R. hesperus*, it will allow us to ask more pertaining questions to pest management – are they different in ecology, behavior, pest status and responses to termiticides and termite baits? We hope to have the answers to these questions in the next few years, that will ultimately benefit the different Californian stakeholders, ranging from homeowners, building and property managers, and pest management professionals.

### References

Banks N. 1920. A revision of the Nearctic termites. U.S. Nat. Museum Bull. 108:1–228. <https://doi.org/10.5479/si.03629236.108.i>

Chen JTC, L Nelson, PF Rugman-Jones, SP Tseng, AM Sutherland, DH Choe, MI Haverty, CY Lee. 2025. Description of a new species of subterranean termite in the genus *Reticulitermes* (Blattodea: Heterotermitidae) from Southern California. *Annals of the Entomological Society of America* 118: 315–330. <https://doi.org/10.1093/aesa/saaf019>

## *Letter From The Chair*



Alumni and Friends of UCR Entomology,

Welcome to the 2025 edition of the UCR Entomology Newsletter. First, the obvious: you are likely missing the familiar face of Dr. Rick Redak on this page. After approximately 17 years (almost as long as some of us can remember!) of excellent and dedicated service, Dr. Redak stepped down as Chair of the UCR Entomology Department at the end of June 2025. I speak on behalf of the entire Department when I express my deepest gratitude for the countless hours that Rick has invested in making UCR Entomology a better place. Thank you, Rick! The Department is now steered by a team consisting of a systematic entomologist (Chair Christiane Weirauch; at UCR since 2007; systematics and evolution of True Bugs), an invasion ecologist (Vice Chair Erin Wilson Rankin; at UCR since 2013; trophic dynamics and ecosystem services in the contexts of invasions), and a scientist studying plant-insect-pathogen interactions (Kerry Mauck, Chair of the Instruction and Student Affairs Committee; at UCR since 2016), with a lot of help from our wonderful community of faculty, students, and staff. Luckily for us, Rick has not retired yet and has been lending a helping hand during the leadership transition.

community of faculty, students, and staff. Luckily for us, Rick has not retired yet and has been lending a helping hand during the leadership transition.

As always, it has been an exciting year for our Department. We recently welcomed two new faculty members: conservation biologist Dr. Zachary MacDonald (p. 15) and chemical ecologist Dr. Morgan Thompson (p. 16). Because of financial constraints, we have been unable to search for additional new faculty positions this year but hope that this will change in the near future. Dr. Jocelyn Millar and Dr. Alexander Raikhel retired recently; we thank both for their leadership in chemical ecology and the molecular biology of mosquitoes, respectively, and wish them all the best in their retirement.

Our graduate program is strong and has remained stable with 43 students, while our undergraduate program has grown to 55 students in the Entomology Major. Excitingly, in fall 2025 we had the largest incoming cohort of freshmen and transfer students in the history of our program (28). The secret is out that Entomology is an important field with excellent job prospects. We also extend a big thank you to all the undergraduate students active in BEUSA (Botany and Entomology Undergraduate Student Association, p. 11) as well as to our graduate students (EGSA, p. 10). As you read through this newsletter, it will be obvious that our graduate students conduct excellent research (p. 6, 14), are a diverse and integral part of the teaching and mentoring in this department (p. 12) and have received an impressive number and range of Honors and Awards during 2025 (p. 8). Congrats to everyone!

Now, for other highlights. In cooperation with the city, we held the 10th anniversary of the Riverside Insect Fair in 2025. This annual event has grown to welcome a truly spectacular crowd of over 15,000 visitors. Mark your calendar for the 2026 edition, which will be held on April 25, 2026, from 10 AM to 4 PM at the Riverside Main Library. If you want to learn more about insects while driving or cleaning, how about subscribing to “Can I Bug You”? It is a podcast hosted by Dr. Doug Yanega and science communicator Jules Bernstein, often in conversation with our faculty and students. Or, follow UCR Entomology Outreach on Instagram to get your insect facts and bug photos?

A big thank you to all who have been supporting the Department’s fundraising efforts! Our Department now also organizes an annual winter craft fair and a spring plant event that are in support of our Advancing

*Letter From The Chair Continued...*

Inclusivity in Entomology Scholarship Fund. Donations to this fund are always welcome and will continue to allow undergraduate students who normally could not afford time away from a job to work in an Entomology lab. This year, 5 students benefited from this endowment: Maria Mendiola (invasive mosquitoes), Dipen Saravana Prabhu (dung beetle communities), Nicole Salguero (honey bee behavior), Sharmely Valladolid (mosquito behavior), Kelechi Okwuegbe (bumble bees and urbanization). If you feel more strongly about supporting graduate education, the UCR Entomology Museum, or endowed chairs, please go to page 7 and take your pick. Whatever your preference, please consider making a donation by visiting <https://entomology.ucr.edu/giving>. **Give Day 2026** will take place from Tuesday, April 7, 2026, at 12 PM through Wednesday, April 8, 2026, at 12 PM.

Furthermore, I am always available to talk to those interested in establishing new endowments; if you have ideas, please reach out. Here is one of my ideas: science communication is more important now than it has ever been, and the department's outreach program is doing an excellent job promoting science education in the communities around us. However, Entomology Outreach needs its own endowment; let's work on this together!

Finally, a big announcement. With the appointment of our first Chair in 1915, the Department of Entomology began a legacy now spanning more than a century. What better moment to gather than at a uniquely fitting milestone. **UCR Entomology Department's 111th anniversary, to be celebrated on Friday, May 29, 2026, and Saturday, May 30, 2026.** Celebrations will include public events on both Friday afternoon/evening and Saturday, as well as a public lecture on Friday evening and a symposium on Saturday featuring alumni and current members of the departmental community, as well as social gatherings on Friday and Saturday for invited guests (=you!). Please **save the date** and stay tuned!

Please keep up with the activities of the Department via the Entomology Department News website at <https://entomology.ucr.edu/department-news>. It is constantly updated with new items about the Department and the people that make it special. And don't forget, I would like to hear from you, our alumni and friends. Please share your own story of success, and the role that UCR had in your achievements, by emailing me at [christiane.weirauch@ucr.edu](mailto:christiane.weirauch@ucr.edu); perhaps you will be our next featured alum in the "where are they now" section of the newsletter!

Dr. Christiane Weirauch, Chair of the Department of Entomology



## *A Special Thank You to All of Our Contributors in 2025!*

The UCR Entomology Department would like to thank the many supporters of our students and departmental programs. The number of individuals and companies that have provided financial gifts is remarkable, and the funds provided are used to keep the Entomology Department one of the best in the world! If you would like to give a tax deductible donation to UCR Entomology, please visit our website at <https://entomology.ucr.edu/giving> and then choose among the many Entomology funds that support our students and programs.

### **MONARCH LEVEL (\$1000 and above):**

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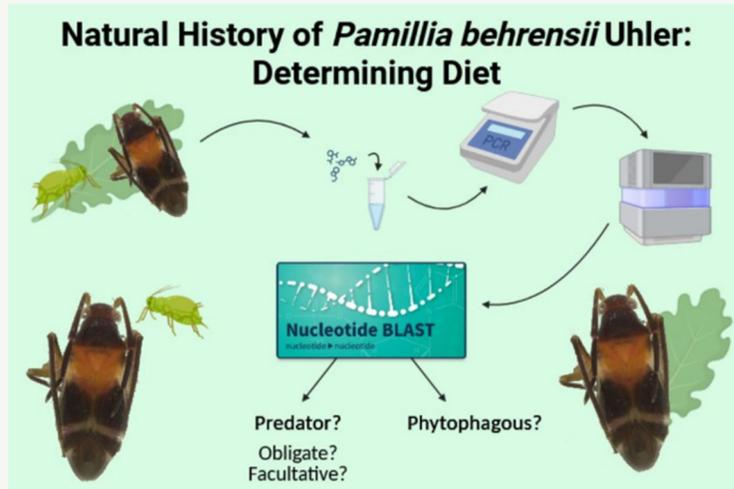
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### **ADDITIONAL DEPARTMENT SUPPORTERS:**

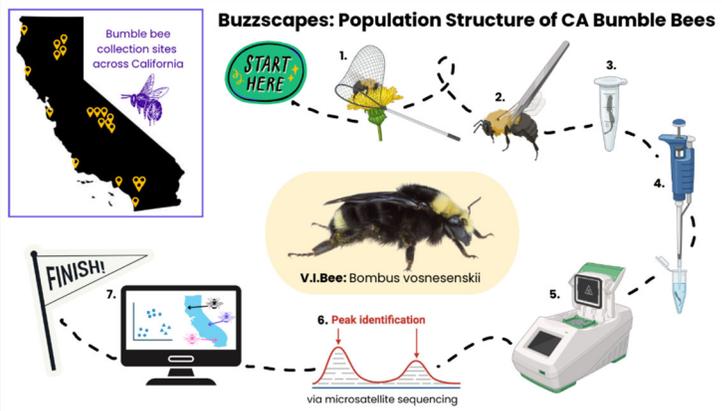
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Mr. Jason Y. Chou  
Mr. Xingwei Feng  
Ms. Chrysalyn Dominguez  
Bruce James*



Graphical Abstracts - A Visual Summary of Graduate Student Research



Natural History of *Pamillia behrensii* Uhler: Determining Diet Abstract by Fox (Weirauch Lab)



Buzzscapes: Population Structure of CA Bumble Bees by Blanca Peto (Woodard Lab)

**ROWEN INSECT-SOIL AGROECOLOGY LAB**

How do we build agricultural systems that maximize ecosystem services delivered by insects\* and reduce insect\* pest risk?

Current goals

1. Optimize cover crops to reduce pest risk and increase biocontrol
2. Reveal the roles manure fertilizers have in arthropod pest suppression and biological control
3. Identify livestock management that increases dung beetle populations and ecosystem services like dung incorporation, nutrient cycling, and parasite control

*Onitis alexis*

How do we build agricultural systems that maximize ecosystem services delivered by insects\* and reduce insect\* pest risk? by Rowen Lab

*Targeted Opportunities for Giving to UCR Entomology*

Visit: <https://entomology.ucr.edu/giving>

**Advancing Inclusivity in Entomology Scholarship Fund** - supports undergraduate students who experience social, cultural, and financial barriers with a scholarship that will support their ability to participate in laboratory research.

**Kenneth W. Gilstrap Endowed Memorial Fund** - established by Frank Gilstrap and Marilyn McLaughlin to honor their brother Kenneth W. Gilstrap (November 25, 1947 – December 11, 2011). This perpetual legacy fund provides support for students in their professional activities including travel expenses for meetings.

**Distinguished Speakers Fund** - supports invitation of notable scientists to present their research at a formal seminar to the students and faculty. Distinguished speakers include an eminent scholar selected jointly by students and faculty to pre-sent the “Boyce Lecture” each spring since 1977.

**Endowed Faculty Chairs**

**Alfred M. Boyce Endowed Chair in Entomology** - honoring the memory of professor emeritus Alfred M. Boyce, this chair is currently held by professor Kerry Mauck.

**Mir S. Mulla Endowed Term Chair in Entomology** - honoring professor emeritus Mir S. Mulla, this chair furthers instruction in entomology and research in arthropods affecting human and animal health.

**Urban Entomology Chair Fund** - gifts to this fund will support faculty chairs in the field of urban entomology. This chair is currently held by Professor Chow-Yang Lee.

**Departmental Scholarly Activities Funds**

**Entomological Museum and Insect Collection** - supports programs and activities of the UCR Entomological Museum and Insect Collection.

**Entomology Fund for Excellence** - supports educational activities for both graduates and undergraduates.

**Endowments for Student Support**

**Lauren & Mildred Anderson Endowed Graduate Assistantship in Immature Insects** - supports graduate students studying immature insects.

**Theodore Fisher Family Endowment Fund in Entomology** - provides research, curatorial, and student support for the UCR Entomology Museum and Insect Collection.

**Francis A. & Jane Davies Gunther Endowed Scholarship** - supports graduate pursuing research in pesticide chemistry.

**Ian & Helen Moore Endowment for Marine Entomology** - supports graduate students pursuing research on aquatic insects.

**Dr. Mir S. Mulla & Lelia Mulla Endowed Scholarship Fund** - supports students in entomology, bioagricultural, and biomedical sciences.

**Harry H. Shorey Endowed Scholarship Fund** - supports graduate students who are pursuing research on pheromones in entomology.

**Harry Scott Smith Endowed Fund in Entomology** - supports graduate students studying biological control.



*Honors and Awards Received During 2025***STUDENTS****Melissa Arellano**

Shipley Skinner Endowment Fund , UCR CCB

**Molly Barber**

Shipley Skinner Endowment Fund , UCR CCB  
NSF GRFP Honorable Mention

**Ashley Bui**

Harry Scott Smith Scholarship, UCR Entomology  
SysEB Student Travel Award, Entomological Society of America  
CUSP Scholar, UCR

**Joanne Tzu-Chia Chen**

Jeffery P. LaFage Graduate Student Research Award, IUSI-NAS  
Emeriti Association Graduate Student Travel Award, UCR Human Resources  
1st Place, Student Oral Competition, International Termite Course  
Best Paper Award, Myrmecological News  
Carl Strom/Western Exterminator Scholarship, UCR Entomology

**Hannah Chu**

John Henry Comstock Award, Entomological Society of America

**Rattanan Chungswat**

Alate Award, Entomological Society of America

**Fox**

J.E. and Jean M. McPherson SysEB Award, Entomological Society of America

**Jenni Garcia Quiceno**

1st Place, Student Competition Poster, Entomological Society of America

**Jun-Yin Lum**

Student Recognition Award in Medical, Urban & Veterinary Entomology, Entomological Society of America  
1st Place, Oral Presentation, Entomological Society of America  
Alain VanRyckeghem Memorial Scholarship, Pi Chi Omega

**Maria Mendiola**

Advancing Inclusivity in Entomology Scholarship, UCR Entomology

**Naghham Melham**

Ian and Helen Moore Marine and Aquatic Entomology Award, UCR Entomology

**Megan Moore**

Dissertation Completion Year Fellowship  
Harry Shorey Scholarship, UCR Entomology

**Kelechi Okwuegbe**

Advancing Inclusivity in Entomology Scholarship, UCR Entomology

**Dipen Saravana Prabhu**

Advancing Inclusivity in Entomology Scholarship, UCR Entomology

**Joshua Reger**

2nd Place, Student Competition Paper, Pacific Branch of the Entomological Society of America  
Golden Apple Award, Orchard Pest and Disease Management Conference

**Alejandra Rocha**

Davis Gunther Scholarship, UCR Entomology  
Dennis D. Focht Endowed Scholarship, UCR  
2nd Place, Student Competition Poster, Entomological Society of America

**Yadira Romero Diaz**

1st Place, Student Competition Poster, Entomological Society of America

**Sarah Schroeder**

Mildred E Mathias Graduate Research Grant, UCR Natural reserves  
Ursula Göllner-Scheiding Travel Award, International Heteropterists' Society

*Continued on page 8*

*Honors and Awards Received During 2025 Continued...***Nicole Salguero**

Advancing Inclusivity in Entomology Scholarship, UCR Entomology

**Emily Ta**

Alate Award, Entomological Society of America  
Dr. Norm Ehamm Scholarship, Pi Chi Omega  
Cal Strom Western Exterminator Scholarship, UCR Entomology

**Melissa Thayer**

Davis Gunther Scholarship, UCR Entomology  
1st Place, Student Competition Poster, Entomological Society of America  
1st Place, Student Competition Paper, Pacific Branch of the Entomological Society of America

**Veronika Tyts**

Ursula Göllner-Scheiding Travel Award, International Heteropterists' Society  
Entomological Collections Network Student Travel Grant

**Sharmely Valladolid**

Advancing Inclusivity in Entomology Scholarship, UCR Entomology

**Sakshi Watts**

Dr. Mir S. Mulla & Leila Mulla Endowed Scholarship Fund, UCR Entomology  
Earle C. Anthony Graduate Student Travel Award, UCR Grad Division

**Dong-Hwan Choe**

Entomology Teamwork Award, Pacific Branch of the Entomological Society of America

**Alec Gerry**

Recognition Award in Medical, Urban & Veterinary Entomology, Entomological Society of America

**Allison Hansen**

Plant-Insect Ecosystems Award, Pacific Branch of the Entomological Society of America

**John Heraty**

Fellow of the Entomological Society of America, Entomological Society of America

**Chow-Yang Lee**

Fellow of the Entomological Society of America, Entomological Society of America

**Quinn McFrederick**

Commitment to Graduate Diversity Award, UC Riverside Grad Division

**Amy Murillo**

Recognition Award in Medical, Urban & Veterinary Entomology, Pacific Branch of the Entomological Society of America

**Houston Wilson**

Distinguished Achievement in Extension Award, Pacific Branch of the Entomological Society of America

**Naoki Yamanaka**

Physiology, Biochemistry, and Toxicology Award, Pacific Branch of the Entomological Society of America



**FACULTY**

## *News From Entomology Graduate Student Association (EGSA)*

The department has continued to thrive and grow this year, as we were fortunate to welcome 12 new graduate students! We kicked off the fall quarter with the annual Welcome Back Picnic, where we ate burgers, reminisced about our summers, and built excitement for the year ahead.

This past month, our graduate students absolutely crushed it at the Entomological Society of America national meeting in Portland, Oregon. From symposia to student competitions, we had students speaking in all ESA sections. In fact, five of our students were winners in their categories: Alejandra Roja, Jenni Garcia Quinceno, Yadira Romero Diaz, Melissa Thayer, and Jun-Yin Lum. We are so proud of how they represented our department at the meeting!

Additionally, our students have been tireless in conducting stellar research and were honored with several awards this year, including: Alejandra Rocha—Dennis D. Focht Endowed Scholarship and Davies Gunther Award; Ashley Bui—ESA SysEB Student Research Travel Award; Harry S. Smith Biological Control Award and the CUSP Scholar (Career Mentoring of the Underrepresented STEM Student for the Professoriate); M.C. Fox—J.E. and Jean M. McPherson Entomology Biodiversity Award; Sakshi Watts—Earle C. Anthony Graduate Student Travel Award; Jun-Yin Lum—Pi Chi Omega Scholarship and ESA MUVE Student Recognition Award; Joanne Tzu-Chia Chen—Jeffery P. LaFage Graduate Student Research Award, Emeriti Association Graduate Student Travel Award, and Myrmecological News Best Paper Award; Carl Strom—Western Exterminator Scholarship; Meghan Moore—Dissertation Completion Fellowship Award; and many more!

Outside of research, the departmental outreach committee has been committed to spreading the good word of entomology within the Riverside community. The graduate students organized two major outreach events this year: the Riverside Insect Fair and the Entomology Day Camp.

The annual Insect Fair, planned in collaboration with the City of Riverside, welcomed over 15,000 people to downtown Riverside to learn about the wonderful world of insects and the research being done at UCR. The week-long Entomology Day Camp welcomed 15 high school students to UCR. From systematics and genetic techniques to IPM and medical/veterinary entomology, these students had the opportunity to learn about all areas of entomology and try lab techniques otherwise unavailable to them at school. We had a blast teaching the next generation of entomologists, who are bright, innovative, and eager to learn!

We are looking forward to many more social and outreach events in the year to come. Thank you to all members of the department, past and present, who have shaped our UCR entomology community!

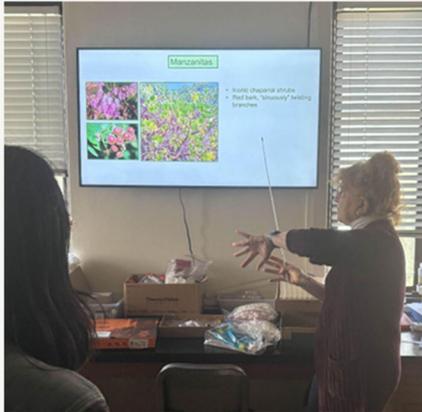
Sarah Schroeder

EGSA President



## *News From Botany and Entomology Undergraduate Student Association (BEUSA)*

The Botany and Entomology Undergraduate Student Association is an on campus organization focused on teaching undergraduate students about plants, insects, and their interactions. Botany and entomology students gain guidance of their majors through the various meetings and our officers. All majors are welcome to join in on the activities and learning opportunities, especially since these fields inform almost all areas of our day to day life.



Experts are a key part of BEUSA's goal to teach members about these fields and research. Guest speakers from this quarter include Dr. Choe with termite biology and control, Dr. Amy Litt and their work on the manzanita genus, and Jennifer Castellon of the West Valley Mosquito and Vector Control District on vector control. Tours of the Herbarium and Entomology Museum were also given by Dr. Andrew Sanders and Dr. Yanega, respectively. We appreciate the time our guest speakers took to inform and interact with our members, and hope to see them again in the coming quarters.

Other meetings focus on hands-on activities. This includes insect collecting, insect pinning, plant pressing, and plant mounting. All of which teach members about the basics of preserving insects and plants either academically or for personal use.

BEUSA is proudly run by officers: Matthew Shan (Co-President), Carter Keyworth (Co-President), Camila Hernandez (Vice President), Ollie McCall (Secretary), and Mark Sandey (Treasurer) with help from the previous years officers: Theodore Adams (former Co-President), Joshua Santos (former Co-president), Abigail Griffin (former Secretary), and Bethany Johnson (former Treasurer). BEUSA would not be possible with the extensive help of Dr. Heraty (Entomology Undergraduate Student Advisor) and Dr. Yanega (Senior Museum Scientist of the Entomology Museum).



Meetings occur twice a week with times shifting to accommodate our members every quarter. We hope to see new and returning students year round to enjoy the world of botany and entomology and to build lasting friendships.

- BEUSA Officers

## *A Message From The New Graduate Student Cohort*



This year was overwhelmingly positive for the cohort of 2024! Students appreciated the opportunity to work closely with faculty and built foundational knowledge in the field of entomology with many of them while taking the core curriculum. Starting with morphology and physiology and ending the year with ecology and IPM, the core not only strengthened the academic capabilities of the cohort, but also played a major role in bringing them together. Studying together, collaborating on projects, and spending so much time hearing each other talk about their research fostered a supportive community that was extremely beneficial in navigating early PhD challenges.

In terms of personal growth, students noted becoming much more comfortable asking questions, seeking help, and participating in discussions in the classroom. These discussions throughout the year let the students explore diverse perspectives and shaped how they now think about their own work.

Some highlights of the year include a class field trip to Boyd Deep Canyon, a ceviche competition, and Student Seminar Day. The Boyd Deep Canyon trip, a yearly trip done during ENTM 202L, exposed the cohort to field work, date shakes, and the UC reserve system. The trip built a sense of camaraderie within the group, which inherently comes with camping and making meals together. The students learned how to trap insects as well as how to make S'mores John Heraty-style, or as he calls it a "super s'more". Off campus, the 2024 cohort held a ceviche contest, which pitted some of the cohort's diverse members into representing their respective cultures' ceviche. The event not only showcased how culturally diverse our cohort is but also the connections formed outside of academics. The year culminated with the "dreaded" Student Seminar Day which can be daunting for many first year cohorts, but it didn't feel that way according to the 2024 cohort. The students got together to practice their talks, which prepared us for the real thing.

When asked about what advice they would give to the first-year graduate students, two themes emerged: **Be curious** and **have fun**. Ask questions, participate in class discussions, make use of the world renowned experts around you and never be afraid to ask for help. At the same time, make time for yourself and do things that are fun. A PhD goes by quickly, but the memories made with friends last a lifetime.



Best regards,  
Cohort of 2024

Alejandra Rocha, M.C. Fox, Jorge Mora, Melissa Thayer, Mellisa Musekwa, Tom Nonacs, Jenni Garcia Quiceno,  
Leon Kataw

## Faculty Spotlight - Amy Murillo & Alec Gerry



Figure 1. Adult screwworm fly. Photo credit: USDA

### Entomology Faculty Receive CDFA Grant to Prepare for a Potential Reinvasion by Screwworm

The New World screwworm (*Cochliomyia hominivorax*) is an invasive fly species of critical importance to animal health (**Fig. 1**). The larva (maggot) of this fly infests open wounds in living warm-blooded animals (a condition called myiasis) (**Fig. 2**). When untreated, these infestations can be fatal to animals as wounds become infected. Screwworm is a particularly important pest of cattle, sheep, horses, dogs, and other warm-blooded animals.

Screwworm was introduced to the United States by the late 1800s, likely from Central or South America. Screwworm was such a significant problem for animal producers in the United States that the US Department of Agriculture initiated a Screwworm Eradication Program in the 1950s using the newly developed “Sterile Insect Technique” to produce sterile male screwworm flies. The Sterile Insect Technique proved so successful that screwworm was eradicated from the United States by 1966, and subsequently from Mexico and Central America by the 1990s. Currently, the Panama-United States Commission for the Eradication and Prevention of Screwworm (COPEG) maintains this screwworm quarantine by weekly release of 100 million sterilized male flies.

In 2023, screwworm escaped the Panama Canal quarantine zone, rapidly moving northward through Central America and Mexico. In 2025, this fly had been detected just 70 miles south of the US border! California is one of the US states at greatest risk for screwworm reintroduction given the number of animals (including wildlife and pets, particularly dogs) that cross the border into the state each year. An outbreak of screwworm in California would result in significant economic costs for animal producers and state agencies.



Figure 2. Screwworm larvae infesting animal hoof. Photo credit: USDA

The California Department of Food and Agriculture (CDFA) is providing just over \$500,000 in grant funding to UCR Entomology faculty (Dr. Amy Murillo and Dr. Alec Gerry) to help the state prepare for a potential reinvasion by this fly. The grant titled *SCREWworm: Surveillance, Control, Research, and Education Working group for IPM of a critical invasive threat to California* supports screwworm surveillance efforts near the California-Mexico border, as well as the development of educational and extension materials to help identify and manage screwworm should it successfully invade the state. The project will include creation of a Screwworm Advisory Board with state and federal partners and utilizes UC Davis extension veterinarians (Dr. Gabriella Maier and Dr. Sharif Aly) to assist with development of educational tools for veterinarians. Screwworm surveillance led by Drs. Murillo and Gerry will rely on fly trapping efforts conducted by UCANR Farm Advisors (Brook Latack and Dr. Eric Middleton) and zoo veterinary staff in Los Angeles and San Diego counties.

Project goals also include the creation of guidance documents for the integrated management of screwworm, including fly surveillance and identification, detection reporting requirements and processes, animal handling methods to reduce or prevent infestation, and treatment options for infested animals. Ultimately, this project will serve to develop local, state, and federal agency partnerships for improved detection and management of screwworm and to support new eradication efforts should the fly indeed make its way back into the United States.

## Student Spotlight - Meghan Moore



### Meghan Moore, Ph.D. Candidate, Woodard Lab Bumble bee males help the nest too!

Brood care is a core component of some social animal systems and has likely been important in the evolution of more complex sociality within some groups. This care is often displayed as parental care, in which female and/or male parents take care of their offspring. Within more complex social groups, care can also be provided by siblings. This is true for more socially complex insects, such as bumble bees, which have overlapping generations and cooperative brood care (Figure 1). Previously, the dominant paradigm within bumble bees was that workers and queens are the sole caregivers for developing brood. However, males may play a more important role than initially thought.

My research shows that males not only incubate brood in bumble bee nests, but that male incubation has multiple positive effects through both queen reproduction and overall nest development. Males exhibit the same incubation posture and similar temperature regulation as queens (Figure 2). Males incubate at lower temperatures than queens and further maintain lower abdominal temperatures than queens. Thus, males might restrict heat flow to the abdomen to protect sperm during incubation. This would allow males to increase their inclusive fitness by contributing incubation labor in their natal nest, while possibly protecting their direct fitness by minimizing heat flow to the abdomen. Still, male presence and male incubation events were associated with more total brood in the nest.



Figure 1. Bumble bee nest with brood. The queen (pictured top right) and workers take care of developing brood within the nest.

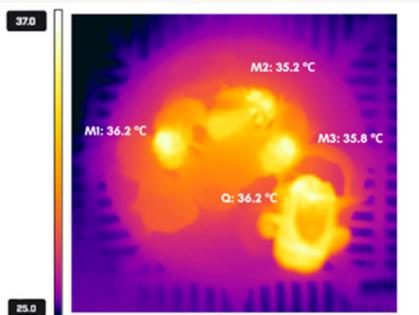


Figure 2. Thermographic image of nest. Both queens and males display characteristic incubation posture

Research on brood care within social nests has been historically female-centric, not because males do not exhibit brood care behaviors, but more likely that male brood care has yet to be sought out and examined. Males only exist within the context of these social nests for a short period of time before reproductive dispersal. My research directly seeks to resolve this large gap in our knowledge of male brood care dynamics and function in bumble bees. We are now able to document these behaviors the use of novel and emerging thermal imaging techniques, allowing us to uncover emergent properties of organisms.

### Why does this matter?

Around 30% of the world's 260 species of bumble bees are declining. Human-mediated factors largely drive this decline through habitat degradation and loss, use of pesticides, and rising temperatures. Now, more than ever, it is important to examine mechanisms that affect fertility and the production of future nests to support conservation efforts. Queens are often considered the catalyst of nests. However, production of future nests and reproductives, particularly future queens, depends on the success of male mating and the successful transfer of viable sperm. Thus, research on male fertility provides insights into nest production.

## Meet Our New Faculty



### Dr. Zachary MacDonald

Zachary MacDonald is a conservation biologist focusing on the intersection of genomics, ecology, and the philosophy of conservation to determine when and how to guide the management of wild populations facing rapid land-use and environmental change. His work across a wide diversity of taxa, most often insects, using whole-genome sequencing, species distribution modeling, and forward-in-time climate analyses. Projects often begin with high-resolution environmental modeling to identify habitat suitability and connectivity under current and projected conditions, followed by population-level genomic analyses that quantify structure, gene flow, local adaptation, inbreeding, and demographic history. These combined datasets clarify which populations represent genomic strongholds, which are vulnerable, and whether interventions such as genetic rescue, moving individuals between populations to augment lost gene flow, are viable conservation strategies.

A major focus of Zac's research program is building large, standardized datasets that allow robust conservation inference across many species while also developing the foundational conservation genomic theory and practice that has been largely absent for insects. His new lab at the University of California, Riverside is working to generate one of the most comprehensive multi-species genomic datasets ever assembled for insect conservation, including chromosome-level assemblies for dozens of species and whole-genome resequencing for thousands of individuals. Through initiatives such as the California Conservation Genomics Project (CCGP) and collaborations with the US Fish and Wildlife Service, US National Parks, and Parks Canada, his work has substantially expanded insect representation in large genomic programs. These datasets span ecological gradients from coastal scrub and deserts to old-growth forests and alpine peaks above 14,000 feet (e.g., recent discoveries of *Oeneis chryxus* on the summits of Mt. Whitney and Langley, marking highest known butterflies in North America). When paired with fine-scale climatic layers and standardized bioinformatic pipelines, these datasets provide high-resolution maps of genomic diversity, connectivity, and vulnerability that guide conservation planning. This work has informed federal and provincial management strategies, including recognition of distinct conservation units and, when deep genomic and ecological divergence is evident, the formal description of new, critically endangered species.

A growing component of his research extends beyond state and national borders to capture the full demographic and adaptive context of species across their ranges in the US, Canada, and Mexico. Through collaborative work with a large diversity of conservation agencies, national parks, and zoos, his lab provides data-driven recommendations that link ecology and evolution to real-world management. In parallel, they also work to refine the philosophy of conservation itself by questioning assumptions that ecosystems, species, and genotypes must be managed toward historical reference conditions, emphasizing instead that accelerating land-use and environmental change will generate novel genomic diversity and that conservation goals must adapt accordingly. Across all projects, the MacDonald lab's overarching goal is to build the genomic and ecological foundation required for conservation strategies that remain effective and philosophically defensible.

**Welcome to the UC Riverside Entomology Department!**

*Meet Our New Faculty***Dr. Morgan Thompson**

My name is Morgan Thompson, and I am a new Assistant Professor of Chemical Ecology and Behavior of Insects. Born and raised in central New Jersey, I completed my undergraduate studies in biology at The College of William & Mary. As an undergraduate student, I was fortunate to work with outstanding mentors who encouraged me to pursue research and graduate education. I went on for my MS in entomology at the University of Maryland where I worked with Dr. Bill Lamp on plant-microbe-insect interactions in agricultural systems. During this time, I discovered a passion for teaching and mentoring students in scientific research. I received my PhD from Texas A&M University where I worked with Dr. Anjel Helms on plant defense against insect herbivory. Most recently, I completed post-doctoral training at the University of Maryland with Dr.

Karin Burghardt, where I collaborated with scientists at the Smithsonian Environmental Research Center on a long-term biodiversity-ecosystem functioning experiment to examine how neighboring tree species diversity impacts insects, microbes, and plant chemistry. Outside of work, I enjoy spending time with friends and family, traveling, hiking, and skiing, and my hobbies include teaching group fitness classes and training my dog for agility competitions.

I look forward to establishing a vibrant research team and pursuing new collaborations at UC Riverside. My research program will integrate chemical, molecular, and community ecology to understand plant-insect interactions. More specifically, we will pursue outstanding questions on ecological and evolutionary drivers of plant defense against insect herbivory including: 1) What are the chemical mechanisms and ecological consequences of plant defense against aboveground or belowground insect herbivory? and 2) How do plant-associated microbes modulate plant-insect interactions? Overall, our goal is to examine local and systemic plant defense against insect herbivory and effects on surrounding ecological communities. We aim to ultimately reveal sustainable and environmentally friendly strategies for altering insect pest behavior and enhancing plant protection in natural and agricultural ecosystems.

**Welcome to the UC Riverside Entomology Department!**

*Fun in Entomology*



Karthikeyan Chandrasegaran and Alec Gerry collecting mosquitoes from underground storm drains as part of a mosquito control project in urban environments.



Students enrolled in the “Bees and Beekeeping” course taught by Boris Baer in Fall 2025.



Lidya Chala and German Camacho (Wilson Lab) processing pistachio hulls to measure their volatiles.



Mark Hoddle in Mexico collecting avocado fruit infested with avocado seed weevils.

*Fun in Entomology*



Reva Scheibner, Nathalie Baena-Bejarano and German Camacho (Wilson Lab) collecting carpophilus beetles in an almond orchard.



Caleb Hubbard (Murillo Lab) applying motion sensors to cattle to monitor for behaviors related to the activity of biting flies.



Amy-Anna Hoang, an undergraduate researcher from the Hansen Lab, studies psyllid micro tissues to investigate the dynamics of symbionts in *Bacterivera cockerelli*, the potato psyllid.



Blanca Peto (Woodard Lab) collecting bumble bees in Alaska

*1990s UCR Entomology Department Reunion*

This past August, the UCR Entomology Department hosted a reunion for students, staff, and faculty who were part of the Department during the 1990s. The reunion was held at the home of Alec and Cheryl Gerry who live close to the UCR campus. There were over 60 members of the Department during that great decade who attended the reunion - traveling from as far away as Argentina! We all enjoyed seeing old friends and reliving our memories of that time. Be sure to stay in touch with the Department for the next reunion!



Don Reiersen, Brad Mullens, Teresa Mullens, Mike Rust, Mary Rust



Mark Breidenbaugh, Ken Osborn, Andrea Joyce, Alec Gerry



Mike Adams, Ken Osborn, Greg Kund, Kathleen Campbell

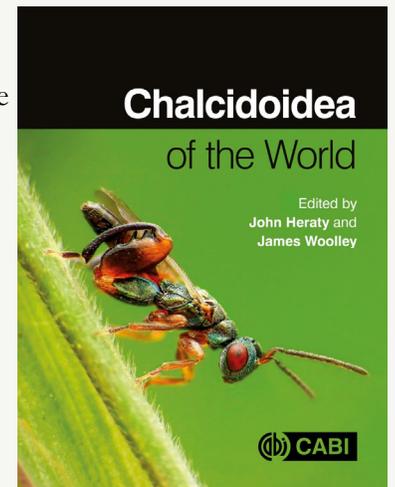


Andrea Joyce, Alec Gerry, Jutta Berger

*New Releases From Faculty***Chalcidoidea of the World (CABI, March 2025)**

*Chalcidoidea of the World* is an important new reference that brings together the latest knowledge on the tiny but remarkably diverse group of insects known as chalcidoid wasps. These insects play a major role in ecosystems and agriculture, with many species used in biological control.

The book explores their diversity, classification, evolutionary history, and biology, and includes clear identification guides and family overviews that explain where these insects are found and why they matter. It also highlights practical techniques for studying and preserving specimens, making it useful for both researchers and applied professionals. Edited by **John M. Heraty** of the University of California, Riverside, and **James B. Woolley**, Professor Emeritus at Texas A&M University, the volume brings together contributions from leading experts around the world. Their combined expertise ensures this publication serves as a timely and accessible resource for scientists, students, and practitioners interested in insect biodiversity and biological control.



[Purchase book here](#)

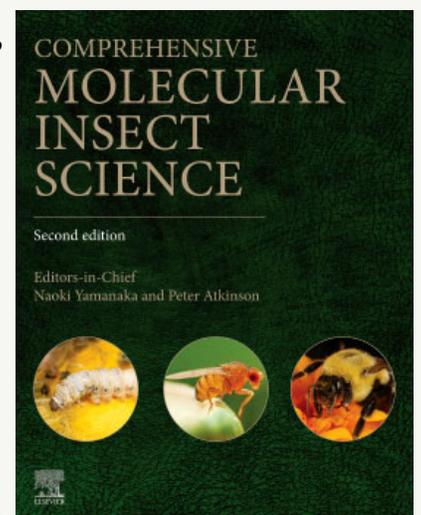
**Comprehensive Molecular Insect Science, Second Edition (Elsevier, Nov. 2025)**

We are excited to highlight the recent publication of *Comprehensive Molecular Insect Science, Second Edition* (Elsevier), edited by **Naoki Yamanaka** and **Peter W. Atkinson**. This major reference work provides an up-to-date and authoritative overview of advances in insect molecular biology, physiology, genetics, and ecology.

*Comprehensive Molecular Insect Science, Second Edition* is a unique resource that provides extensive review articles on contemporary topics in insect science and entomology. It covers crucial new subjects such as genetic control, pollinators, and the effects of climate change and environmental shifts on insect physiology and molecular biology. Every section includes thorough discussions on the influence of genomics, proteomics, metabolomics, and bioinformatics in the field, which has seen significant advancements since the previous edition. The book bridges gaps between disciplines, helping readers grasp the fundamentals of insect science and appreciate its applications, such as in environmental control.

Structured chapters guide readers, offering references and practical resources like methods. This authoritative reference is vital for understanding and managing the future of our civilization, intertwined with the fate of insects and flora on our planet.

[Purchase Book Here](#)



*Entomology Research Museum News*

The Entomology Research Museum had two undergraduates, Jessica Simons and Hana Mancina, to assist with the mounting and labeling of specimens. Jess graduated, and we hired Caitlyn Campbell to take her place. Cole Watson curated the Greg Ballmer larval lepidopteran collection, funded through a grant for which Doug was the PI, followed by another grant to process more than 3,000 California mymarids, from the same funding agency but with Serguei as PI, and then yet another grant from the same agency (also with Serguei as PI) to process material salvaged from Redak lab surveys from 20-30 years ago. There was also an undergraduate who was databasing calliphorid flies for a project. All told, we added roughly 33,000 specimens to the database, from either recent donations or processed backlog, in the past year, so the Museum's regular database has grown to roughly 650,000 records, with ~190,000 that are IDed to genus-level or better, georeferenced and available online.

Adriean Mayor has continued as a volunteer, working on melyrid beetles. Over the past year, most of the sorting and processing of bulk samples has been done by Greg Ballmer (mostly incoming material from his Malaise trap samples). Many of these specimens are from remote areas in California, such the Owens Valley and Carrizo Plain. Greg's samples from this and previous years, plus Ricky Lara's Taiwan samples and Serguei's samples from the Kenneth Norris Rancho Marino UC Reserve, presently comprise most of the curatorial backlog, and it will be a very long time before they are all mounted, labeled, and incorporated. Doug have added a fair amount of material from student collections (from Ent 100 and Ent 109) into the research, teaching, and outreach collections, and with Cole's assistance, extracted a significant number of specimens for the teaching collection out of the Redak lab materials, some of which have already been dehydrated and



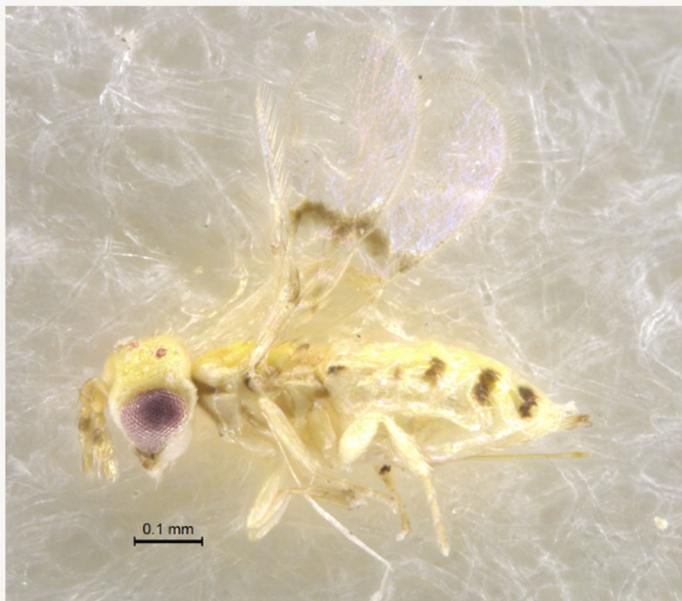
*Paracentrobia mira* (Trichogrammatidae)

mounted. There have also been a few more recent additions to the outreach drawers, by students in the Natural History Museum Club. We have also had visiting curators from outside the US, working with our weevil and encyrtid wasps.

Doug has been a co-author on a number of publications this past year, plus some more manuscripts either in press or submitted, plus one grant report. The most notable was a description of a new genus of planthoppers, including 14 new species, in collaboration with the Hoddle lab, as part of work on biocontrol for Spotted Lanternfly. Doug has also restarted a project that was put on hold for several years, to revise the phasmid genus *Timema*, and is collaborating with Patrik Nosil, who has been doing research (mostly ecological and genetic) with this genus for almost 20 years. The hope is to obtain fresh material for DNA analyses over the next two field seasons, and spend another year or so to complete the revision. There are approximately 20 taxa in the genus at present, it appears this number will roughly double.

*Entomology Research Museum News*

Doug has also been co-hosting a podcast produced by UCR's Media Relations; there are 38 episodes completed, in a little over a year, many of which spotlight faculty and student researchers at UCR. Doug gave two presentations in the late 2024 meetings in Phoenix, one at ECN, and an invited symposium talk at ESA. Doug has been very active with the International Commission on Zoological Nomenclature (ICZN) over the past year, along with a large volume of external requests for me to assist with ICZN-related concerns, including development of an Official List of the genders of all available genus-rank names in zoology.



*Paracentrobia fusca* (Trichogrammatidae)

Besides completing the aforementioned projects funded by the California Institute for Biodiversity and adding more than 8,000 mounted and curated specimens to the collection, Serguei sorted at least to family (and some groups to genus or species) more than 25,000 specimens of miscellaneous parasitic Hymenoptera. Numerous specimens were also coming as vouchers from various bio-control projects and requests for identifications

of parasitoids and their hosts, particularly of grape and other leafhoppers in Oregon and Washington in the USA and South Korea and Taiwan, leafhoppers from Japan, oak lace bug from the eastern USA, which is invasive in Europe, etc. In 2025, Serguei made 5 presentations (including two as a keynote speaker) and published 11 scientific articles. Among them is a review article on egg parasitoids as important natural enemies of auchenorrhynchan insect pests in East Asia (Journal of Taiwan Agricultural Research 74 (3): 221-235) and redescription and new records of two trichogrammatid egg parasitoids of rice leafhoppers and planthoppers which are partially based on the world-largest collection of the family in the Entomology Research Museum (Triapitsyn, S. V. 2025. Redescription of *Paracentrobia* (*Paracentrobia*) *mira* (Girault) (Hymenoptera: Trichogrammatidae), with two new synonyms. Journal of Asia-Pacific Biodiversity 18 (1): 118-124; and Triapitsyn, S. V. & H. Kusuhara. 2025. A new record of *Paracentrobia* (*Paracentrobia*) *fusca* (Hymenoptera: Trichogrammatidae) from Japan as an egg parasitoid of the rice pest *Nephotettix cincticeps* (Hemiptera: Cicadellidae). Applied Entomology and Zoology, <https://doi.org/10.1007/s13355-025-00934-8>). Due to surveys in southern Japan and Taiwan conducted during 2019-2025, the Museum now has the world's largest collection of the identified egg parasitoids of the okra leafhopper (aka cotton jassid), *Amrasca biguttula*, which is a recent and rapidly spreading invasive pest in Puerto Rico, Florida, and some other states in the southeastern USA threatening several agricultural crops such as okra, eggplant, and cotton.

*New Alumni*

Congratulations to our recent graduates!  
We wish you the best as you pursue new opportunities!

**Graduate Students:**

Hannah Chu (Murillo Lab)  
Rebecca Keim (Redak Lab)  
Lyna Ngor (McFrederick lab)  
Tobias Moyneur (Choe Lab)  
Jessica Maccaro (Baer lab)  
Nicholas Poulos (Choe Lab)  
Jessica Webb (Baer Lab)

**BS+MS Students**

Xingwei Feng (Lee lab)  
Soon Kwon (Hoddle Lab)  
Karla Lemus Portillo (Gerry Lab)

**Undergraduate Students:**

Ryan Campos  
David Canseco Vielma  
Abigail Griffin  
Jair Mendez  
Paulo Padilla  
Sophia Reddy  
Joshua Santos  
Jessica Simons

*New Students*

Welcome to our newest students!  
We are so excited to have you join our community!

**Graduate Students:**

Teddy Adams (Hoddle Lab)  
Joseph Akolgo (Chandrasegaran Lab)  
Winnifred Opio Aool (Park Lab)  
Melissa Arellano (Woodard Lab)  
Kristi Gladem (Park Lab)  
Bethany Johnson (Hoddle Lab)  
Wenbo Li (Choe Lab)  
Jina Malone (Baer Lab)  
Bhawana Regmi (Rowen Lab)  
Jordan Reyes (Chandrasegaran Lab)  
Helen Vo (McFrederick Lab)  
Tallisker Weiss (McFrederick Lab)

**Undergraduate Students:**

Isaac Roque  
Abigail Kent  
Ella Jones  
Luke Monsen  
Emily Da Silva  
Alexander Grizzell  
Eleanor Finn  
Aurora Sandoval  
Anastasius Ntiasagwe

## Where Are They Now?



### Dr. Emily McDermott

Emily completed her dissertation on *Culicoides* biting midges under Dr. Bradley Mullens in 2016. She was then awarded a National Research Council Postdoctoral Fellowship to study the co-infection dynamics of Zika and Dengue viruses in *Aedes* mosquitoes at Walter Reed Army Institute of Research (WRAIR) in Silver Spring, MD. In 2018, Emily was hired as the Senior Scientist of the Vector Control Department, Entomology Branch at WRAIR, where she developed novel control tools and surveillance strategies for Force Health Protection. At WRAIR, Emily was also active in mentoring local high school students in research through the Army Educational Outreach Program.

In 2020, Emily was hired to the faculty of the University of Arkansas Department of Entomology and Plant Pathology as an Assistant Professor of Medical and Veterinary Entomology. Her current research focuses on the transmission and ecology of livestock diseases affecting cattle and sheep in the southeast, including blue-tongue virus, Cache Valley virus, theileriosis and anaplasmosis. After identifying Panola Mountain *Ehrlichia*, an emerging pathogen related to the exotic disease, heartwater, in ticks from a cattle herd in Arkansas, she was able to show for the first time that it can also infect cattle. Emily has been active in investigating outbreaks of livestock vector-borne disease in Arkansas, including collaborating with USDA to identify the vectors of BTV and CVV at an endemic focus in the Arkansas River Valley, and in state-wide surveillance for bovine theileriosis after the first cases were reported in July 2024.

Emily and her husband, Nick welcomed their son, Milo in 2022. When not in the lab, she enjoys cooking and traveling. On the weekends (in between football games), Emily and her family often take advantage of the great hiking in the Ozarks with their dogs, Finn and Shae. Emily can be reached at [emcdermo@uark.edu](mailto:emcdermo@uark.edu).



### Dr. Korie Merrill

After completing her master's degree in Entomology, during which she investigated effective monitoring and control methods for Argentine ants in wildland areas in the Choe and Wilson-Rankin labs, Korie continued applying her results on California's Channel Islands. There she initiated and led the Argentine ant control program on San Clemente Island for the benefit of native ant assemblages. Continuing to focus on applied ecology in conserved landscapes, she then moved to work at Beale Air Force Base in their Natural Resources Department to enhance and protect natural communities on the base. Deciding to move her conservation focus from military lands to the private, nonprofit sector, in 2017 she became a preserve manager with the Center for Natural Lands Management (CNLM). She quickly advanced to a Regional Manager position and now leads CNLM's South Coast Region with a portfolio of preserves that covers four southern California counties.

CNLM is a non-profit land trust organization with a mission to protect endangered or rare species and their habitats such as critical insect habitat and taxa, including but not limited to: Quino checkerspot butterfly, Delhi Sands flower-loving fly, and Crotch's bumblebee. Korie works across southern California overseeing the management of open space preserves serving to protect habitat for focal species including the coastal California gnatcatcher, coastal cactus wren, least Bell's vireo, and the Pacific pocket mouse. Through stewardship of these lands, she continues to study Argentine ant impacts in wildland areas and the possible implementation of control methods that were successful on the Channel Islands on the mainland. In addition to conservation of focal species and their habitats, monitoring and management of pest species is critical for successful conservation in these areas. Most recently Korie has worked with the conservation community to survey and manage for invasive shot-hole borer species and goldspotted oak borer. She still spends time working on the Channel Islands conducting ant surveys with The Nature Conservancy, California Institute of Environmental Studies, and the University of California San Diego.

If you would like to learn more about CNLM, conservation, or land management and stewardship please feel free to contact Korie at [Kmerrill@CNLM.org](mailto:Kmerrill@CNLM.org) or visit [www.CNLM.org](http://www.CNLM.org).

## Alumni and Associates, Tell us your News!

Please share your note-worthy happenings, we'd love to spot-light you in "The Buzz"

Email us at [christiane.weirauch@ucr.edu](mailto:christiane.weirauch@ucr.edu)

*Saluting This Year's Retirees***Jocelyn G. Millar**

I came to UCR in 1988 with some trepidation because I had no real entomology background. My background was in organic chemistry, and I just happened to have worked on insect chemical ecology, or how insects use odors and tastes to communicate, for my PhD and some of my postdoctoral work. In the event, it could not have worked out better, because there were numerous opportunities for collaborations with other entomology faculty, and more broadly, entomologists nationally and worldwide. Over the years, we have worked with moths, flies, wasps, beetles, mosquitoes, true bugs, scales and mealybugs, ants, bees, the list goes on. My group has published >400 papers, and collaborated with >500 people everywhere in the world, many of whom I have been able to visit. I have had a tremendously enjoyable career, and I still regard it as a great privilege that the US taxpayers have paid me to follow my research interests wherever they led. It has been a lot of hard work, but I looked forward to going to work every morning because it never ceased to be fun, and I always enjoyed the intellectual challenge of trying to solve knotty problems.

**Alexander S. Raikhel**

Alexander Raikhel was born in Berlin, Germany, to a surgeon family. Eventually, the family was relocated back to the Soviet Union. Alexander's childhood was spent in the depths of frozen Siberia. Later, he moved to Leningrad (St. Petersburg), where he received his higher education in biology. In 1979, Raikhel and his family emigrated from the Soviet Union to the USA. In this country, Raikhel worked at several universities, becoming a Distinguished Professor, and he was elected to the National Academy of Sciences in 2009. Raikhel's research has been supported by funds from the National Institutes of Health (NIH) for over 40 years. Raikhel has dedicated his research career to studying mosquitoes that transmit human diseases. In 2002, he received the 10-year NIH Merit Award for distinguished research in mosquito molecular biology (~ \$14 million). Mosquitoes represent an enormous problem in the world, causing about a million deaths and 400 million illnesses annually. Just imagine that every five minutes, a child dies of malaria in Sub-Saharan Africa. One key discovery that Raikhel's laboratory made is the bioengineering of a mosquito that, upon taking a blood meal, activates its immune system and kills pathogens. Thus, such genetically modified mosquitoes were incapable of transmitting a disease. Other scientific accomplishments include the understanding of the mechanism of egg development, hormonal regulation of mosquito reproduction, and the role of small RNAs in mosquito physiology.

Raikhel is a proud father of two sons. His oldest, Eugene, lives in Chicago. He is a Professor of Medical Anthropology at the University of Chicago. The second son, Vincent, resides in Seattle. He is a medical doctor and Professor who works and teaches at the University of Washington School of Medicine. Raikhel has fine grandchildren of different ages, ranging from 3 to 18. They are a joy in his life.

Aside from his busy academic life, Raikhel enjoys classical music, opera, and visual arts. He loves cooking and is skilled in French cuisine.

## *In Memory of Marshall Johnson*



On 29 June 2025, Marshall Wain Johnson passed away in Fresno, CA. Dr. Johnson was an *emeritus* University of California Cooperative Extension Specialist and a respected member of the UC Riverside Department of Entomology. His laboratory was based at the Kearney Agricultural Research and Extension Center in Parlier, CA, where he conducted research on integrated pest management and biological control of orchard pests. During his 12 years in retirement from University service, Marshall honed his extraordinary skills in photography with many trips to Yosemite and Carmel, two of his favorite locations.

Marshall was born in Virginia in 1950 and maintained a gentle touch of those roots in his voice throughout his life and his interest in that region's history. He attended North Carolina State University where he earned both his B.S. and M.S. degrees in Entomology. In 1974, he joined Dr. Earl Oatman's biological control laboratory in the Entomology Department at UC Riverside and received his Ph.D. degree in Entomology in 1979. Like many early career academics, Dr. Johnson held appointments at a number of institutions, including an assistant professor of entomology at

Kansas State University (1979-1980) and a research entomologist, at UC Riverside (1981-1983). In 1983, he was appointed as assistant professor of Entomology at the University of Hawai'i at Manoa, eventually rising to the rank of professor and Department Chair. Of particular note, he received the University of Hawai'i Regents' Medal for Excellence in Research (Junior Faculty) and was recognized as one of *Ninety Fabulous Faculty* over the 90- year history of the University of Hawaii at Manoa (1907 - 1997).

At the University of Hawai'i, Dr. Johnson's integrated pest management research focused on reducing pesticide use on insect pests of vegetable crops, including leafminers, whiteflies, spider mites, thrips, and diamondback moth, through population monitoring of pests and natural enemies, establishing economic thresholds, intercropping, conservation of natural enemies, and managing insecticide resistance. The research included fundamental studies of plant yield responses to insect feeding and determining non-target impacts of pesticides on crop physiology and yield.

Marshall returned to the UC Riverside Department of Entomology in 2002 as a UC Cooperative Extension Specialist and Agricultural Experiment Station Entomologist based in the Central Valley, where he contributed to international research on the olive fruit fly and regional efforts against the glassy-winged sharpshooter and ten-lined June beetle. In this position, Marshall brought this same interdisciplinary approach to his research on reducing the impact of insect pests on tree crops. His efforts to obtain effective and sustainable control practices focused primarily on invasive species including olive fruit fly, glassy-winged sharpshooter, oriental fruit moth, olive psyllid, and spotted wing *Drosophila*. Marshall also developed a unique management program on the ten-lined June beetle, an insect native to the western US that is a significant pest of perennial tree crops, including almonds, growing in sandy soils. The results of his innovative research program were shared with the academic, industrial, and agricultural communities through an extensive and highly popular Extension education program.

The impact of Dr. Johnson's research and outreach programs can be documented by various metrics. He published more than 200 papers that have a cumulative 11,000 citations. The list of awards he received is extraordinary and includes many that are the highest offered in his area of expertise. These include Honorary Lifetime Member of the Global International Organization for Biological Control, Distinguished Scientist of the Year Award from the International Organization for Biological Control, Award for Excellence in Research from the Western Association of Agricultural Experiment Station Directors, Elected Fellow of the American Association for the Advancement of Science, Elected Fellow of the Entomological Society of America, C. W. Woodworth Award from the Pacific Branch of the Entomological Society of America, and Entomological Society of America Recognition Award for Contributions to Agriculture.

Dr. Johnson was a model academic colleague. He was an outstanding member of the academic community dedicated not only to research and mentorship, but also to service. He received numerous well-deserved awards and took great joy in shepherding the award nomination process for the recognition of colleagues. He was an active participant in scientific societies and served in important leadership roles. For example, in addition to chairing numerous scientific society committees, Marshall was an editor for two scientific journals, President of the Hawaiian Entomological Society and a member of the Governing Board of the Entomological Society of America. Whether it can be properly classified as service or as altruism, he was Chair of the Department Entomology at the University of Hawaii and, subsequently, a newly established Department of Plant and Environmental Protection Sciences [PEPS] that combined the disciplines of entomology, plant pathology, weed science, nematology, and toxicology.

A list of accomplishments, as outstanding as it is, does not measure the impact of Dr. Johnson on the lives and careers of those around him. Marshall was a man of character. He listened and he mentored. He engaged, and he encouraged. His laugh was as infectious as it was uniquely his own. He had curiosity and rigor of a scientist and the soul of an artist. More often than not, his research collaborations led to life-long friendships. For living a full and valued life, role models like him are uncommonly rare.

## *In Memory of Anthony "Alan" Urena*



Anthony (Alan) Urena, of Riverside, died peacefully at his home, June 17<sup>th</sup>, 2025. He was born November 5, 1953, to Tony and Isabel Urena, and attended Eisenhower High School, Rialto, before earning his Entomology degree from UC Riverside in 1976. For many years, Alan was a part of the UC Riverside Entomology lab of Dr. Joseph Morse, working on pest management problems in citrus and avocados. Having worked for several years as a Laboratory Assistant, in 1991, he was promoted to Staff Research Associate (SRA), continuing in that position until retiring in 2015. Alan was passionate about his work and would regularly travel to the Lindcove Citrus Research Station near Exeter, and to other locations in the San Joaquin Valley. He also worked with grower cooperators and pest control advisors on both citrus and avocados in the Coachella Valley, San Diego County, and Ventura County. Major pest problems dealt with included citrus thrips, Fuller rose beetle, Asian citrus psyllid, avocado thrips, perseia mite, and imported armored scales on avocados.

As well as working hard, Alan liked to play hard. Most weekends, he played soccer matches, and he was an avid runner. He was also a fisherman, and for more than 20 years he would spend a week each year fishing in Mexico on a small boat out of San Felipe. From sunup to sundown, he would fish the Sea of Cortez for yellowtail, grouper, cabrilla, white seabass, dorado (mahi-mahi), and several other species. At night, he would fish under lights for bait mackerel and giant squid. On many of these trips, Alan fished with his brother Don Urena and close friend Jack Mangan, with the three staving off any threat of dehydration with a mandatory hourly beer. A highlight on one trip was Alan catching a 110-pound gulf grouper, a very tasty fish and quite a battle; 95% of fishermen would lose a grouper of that size in the rocks.

## *In Memory of William "Bill" Carson*



Bill Carson passed away peacefully on June 11<sup>th</sup>, 2025, with his beloved family by his side. Born in Riverside, California, to William Carson and Barbara Marsden, Bill was the eldest of three brothers. Growing up in Riverside, Bill was witness to the significant growth of both the city and UCR. He absorbed much of his surroundings and received his bachelor's degree in history from UCR.

If there ever was a "people person" who could captivate an audience with his wit and fun facts, it was Bill Carson. Bill worked at UCR for over 35 years in the entomology lab of John Trumble as his senior SRA. He retired in 2015 from UCR and moved to Bishop, CA in the Sierras to be with nature. He was a true renaissance man with multiple interests and hobbies such as Formula 1 racing, classic WWII planes, trains, and motorcycles. Bill was a historian and an encyclopedia of knowledge that he loved to share with his friends and co-workers, always with a captivating and endearing manner. He was the lifeblood of the entomology department at UCR and was always willing to help with social gatherings; something he particularly enjoyed. Everyone knew Bill, and his unique ability to bring people together helped make the department such a fun place to work. Whether it was setting up the local "Circle T" (the lab snack bar that all could partake - for a small fee), attending grad-student functions, departmental functions, lunchtime running clubs, assisting with an occasional faculty member prank, epic holiday party gatherings, or the Friday "Getaway" to the watering hole, Bill was there.

After retirement, Bill and his wife, Theresa, moved to Bishop, California, where Bill continued with his historical interests by becoming a docent at the Manzanar National Historic Site. Despite being diagnosed with Parkinson's Disease, he didn't slow down much, and he continued to do day hikes in the Sierras with his wife, making many new friends along the way.

***SRAs are integral to a research team's success, providing essential technical and administrative support. Al and Bill will be missed and remembered by faculty, staff, and students who worked with them.***

*Alfred M. Boyce Lecture***Dr. Marlene Zuk**

The 2025 Alfred M. Boyce Lecture was delivered by Dr. Marlene Zuk (Professor, Department of Ecology, Evolution and Behavior, University of Minnesota). The title of the lecture was “Rapid Evolution in Silence: Adaptive Signal Loss in the Pacific Field Cricket”.

During the lecture, Dr. Zuk explained how conspicuous sexual signals can create a conflict between natural and sexual selection, using the Pacific field cricket (*Teleogryllus oceanicus*) as a striking example. In Hawaii, where an acoustically-orienting parasitoid fly locates calling males, natural selection favored the rapid emergence of a novel silent male morph known as “flatwings,” controlled by a single sex-linked gene and appearing within only about 20 generations. While these silent males avoid parasitism, they face challenges in attracting and courting mates, and their establishment may have been supported by pre-existing behavioral flexibility and pleiotropic gene effects. Dr. Zuk also highlighted the recent discovery of additional morphological variants, which raises broader questions about phenotypic integration and how morphology, behavior, and fitness interact to shape the evolution of sexual signals.

Professor Zuk is a Regents Professor of Ecology, Evolution, and Behavior at the University of Minnesota whose work spans behavioral ecology, evolutionary biology, and gender in science. She earned her B.A. from UC Santa Barbara and her M.S. and Ph.D. from the University of Michigan, later holding faculty positions at the University of California, Riverside, and visiting appointments in Sweden, Australia, and New Zealand. Her research focuses on sexual selection, acoustic communication, and host–parasite interactions, and she has received numerous prestigious honors, including election to the National Academy of Sciences, the American Academy of Arts and Sciences, and fellowships and lectureships across several countries. Zuk has secured extensive grant funding from the National Science Foundation, National Geographic Society, and international programs to support studies on behavioral evolution, parasitism, sexual signaling, and ecological resilience.

The Boyce Lecture series was established in honor of Dr. Alfred M. Boyce who served the UC Citrus Experiment Station and later UC Riverside campus from 1927 to his retirement in 1968. During this time, Dr. Boyce served as Chair of the Department of Entomology and as Director of the Citrus Experiment Station. Dr. Boyce conducted world-renowned research in across a wide range of entomological subfields including biological control, insect toxicology and physiology, and insecticide resistance. You can find more information on Dr. Boyce in his autobiography “Odyssey of an Entomologist – Adventures on the Farm, at Sea, and in the University”.



Department of Entomology  
College of Natural and Agricultural Sciences  
University of California, Riverside



Alfred M. Boyce

## *CIBER Outreach: A Record-Breaking Year of Community Engagement*

In 2025, the Center for Integrative Bee Research (CIBER) delivered its most active outreach year ever, with more than 30 public events, tens of thousands of people reached in person or online, and unprecedented collaborations between scientists, students, and Southern California's beekeeping community. Outreach is a core mission of CIBER and a vital way UCR Entomology brings science directly to the public. Honey bees pollinate one out of every three bites of our food, yet over the last ten years, U.S. beekeepers experienced increasingly unsustainable losses culminating at 62% of managed colonies this year. At UCR, our research focuses on a promising solution to this impending pollination crisis: the potential use of locally adapted Californian honey bees that have survived without human intervention for decades. Our research over the last eight years found that these bees not only possess natural resistance to *Varroa* mites and the intestinal parasite *Nosema* but are capable of coping with climatic stressors as well. Our outreach success is built on close partnerships with five regional beekeeping associations representing more than 1,400 beekeepers. In 2025, we launched the CIBER Advisory Board, made up of representatives from clubs across Southern California to ensure that research outcomes are shared rapidly and that the community directly benefits from new findings.

These collaborations dramatically expanded our outreach footprint. At the Riverside Insect Fair, which drew 12,000 visitors, CIBER researchers and club members jointly hosted a highly popular booth. During the Orange County Fair, which was attended by more than 1.1 million visitors, CIBER students supported club-led beekeeping outreach. We also joined a team representing two local beekeeping clubs in a day-long competition in Long Beach. Together we pitched a proposal to convert unused city lots into sustainable community gardens with apiaries. Beyond these high-visibility events, we delivered three online talks and twenty-two in-person research updates at monthly club meetings. At each event, we typically engaged between 30 to 50 attendees, fostering an ongoing science-based dialogue between researchers and practitioners. Our Fifth Annual CIBER Bee Health Conference was the largest, yet. It brought 150 participants to UCR for a full day of training on hive defensiveness.

CIBER's educational outreach also reached hundreds of young learners in 2025, building awareness for pollinator health while inspiring future entomologists and environmental scientists. Together with CNAS Ambassadors, we developed a five-station honey bee biology relay that engaged 144 fifth- and sixth-grade students. We additionally hosted our first hands-on apiary visit for students from the Art and Wilderness Institute and collaborated with CNAS Marketing to support the "Pivotal Moments" field trip for Parkridge Elementary School.

National and international visibility of CIBER's research expanded significantly this year. Through coordinated efforts with UCR's media relations team, our work was featured in several major outlets. *BeeCraft*, the largest beekeeping magazine in the United Kingdom, published a series of eight articles highlighting CIBER's unique community-research nexus. Nationally, an article in *Lawn Starter* reached more than 300,000 readers, and coverage of our hive sensor research in *The California Aggie* reached 230,000 subscribers. Our own social media presence grew dramatically as well: weekly posts featuring original content on research, outreach, and local bees helped expand our Facebook audience to 2,100 followers and generated nearly 55,000 post views. This is a 400% increase from 2024. Our Instagram and X/Twitter communities also continued to

grow, reaching 339 and 312 followers, respectively.

CIBER remains committed to engaging the public, supporting beekeepers, training the next generation of scientists and advancing UCR's leadership in pollinator health research. We look forward to building on this momentum in 2026.



We collaborate closely with the Beekeepers Association of Southern California, Long Beach Beekeepers, Los Angeles County Beekeepers Association, Orange County Beekeepers Association, and San Diego Beekeeping Society. Thank you, your partnership is essential for our work!



### **Barbara Baer-Imhoof**

Associate Specialist Pollinator Health  
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Learn more: <https://ciber.ucr.edu/>

*ENcore: Strengthening Administrative Support for Entomology and Nematology*

We are excited to share important updates regarding the evolving administrative structure supporting our scientific community. Effective January 2026, the Department of Nematology will now be formally integrated into our administrative portfolio, joining the Department of Entomology under a newly unified unit: **ENcore** - Entomology and Nematology Core. Emphasizes a central, integrated focus of both disciplines.

This development reflects months of thoughtful planning and collaboration, and it showcases the strength, adaptability, and exceptional dedication of our current administrative team. Their work has been nothing short of outstanding, innovative, dependable, and remarkably resourceful - in other words, genuinely *awesome*. Their professionalism and commitment to service have created a foundation that makes this transition not only possible, but exciting!

With ENcore, our goal is to establish a central, cohesive, and fully integrated administrative hub that supports both Entomology and Nematology with equal attention and expertise. We will strive to reinforce our shared mission: advancing world-class research, supporting our faculty and students, and strengthening the interdisciplinary ties that make UCR a leader in life sciences.

We look forward to the continued growth that ENcore will foster and to the ongoing excellence of the administrative team that makes all of this possible. Thank you for your support as we begin this exciting next chapter.



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