



THE BUZZ

Looking back on 2023-2024



DECEMBER 2024

Entomology Faculty Receive \$1.2M Keck Grant to Study Bee Behavior



Keck Grant P.I.s Drs. Boris Baer, Barbara Baer-Imhoof, and Ysabel Giraldo

Decoding how environmental threats are perceived by individuals, processed, and eventually passed on to other members of a society to trigger a coordinated response is a fundamental but still un-solved challenge in sociobiology. To address this, the W. M. Keck foundation awarded \$1.2 M to UCR Entomology researchers Drs. Boris Baer, Barbara Baer-Imhoof, and Ysabel Giraldo to study stress communication in European honeybees (*Apis mellifera*) from the level of odor processing in the brain to whole colony responses.

The research team will compare honeybees from stress-susceptible, domesticated colonies with honeybees from stress-tolerant genotypes found locally in Southern California ("survivor bees"). Compared to domesticated honeybees, these survivor bees are genetically far more diverse and have been under contin-

uous natural selection to manage environmental stressors including extreme urbanization, harsh climatic conditions, and intense agriculture. To begin, the team will compare the neural and behavioral responses of stress-tolerant versus stress-susceptible individual bees to an array of newly identified stress-inducing effector molecules using calcium indicators and imaging under a multiphoton microscope. Next, they will identify how these two types of bees communicate stress to nestmates by recording movement and sound. Thirdly, the team will determine whether this information is passed on differentially at the colony level and compare the success of group responses between the two genotypes, including transmission to new and naïve colony members.

The key aim of this work is to test the hypothesis that survivor bees possess highly sensitized neural responses to key effector molecules and pass on signals of potential threats to the colony more efficiently. This ultimately triggers more effective responses compared to stress-susceptible genotypes, which would explain their better performance and survival. The team will also test whether colonies can transmit information about potential environmental threats for multiple generations of worker bees, which would indicate transgenerational stress priming and can be seen as a basic form of culture. Successful completion of this project will not only expand our understanding of super-organisms, but also benefit efforts to safeguard honeybees, their pollination services, and global food production.



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Letter from the Chair

Alumni and Friends of UCR Entomology,

It is that time of year again! Welcome to 2025 and the 2024 edition (Late as usual!) of the UCR Entomology Newsletter. I hope everybody is in good health and spirits as we move into 2025. I have a hunch this year will be interesting, to say the least. As you thumb through the newsletter, you will see that the Department continues to move forward and grow: many new students, and many successful graduates, excellent teaching and outstanding research. We continue to grow (re-grow?) our faculty with the addition of Drs. Elizabeth Rowen and Luciano Cosme (both on Page 13), and we currently are searching for two new positions: one in Chemical Ecology & Behavior, and one in Conservation Genomics and Biodiversity. I am also delighted to announce the Department received its second Graduate Assistance in Areas of National Need grant from the Department of Education. This \$1M grant provides fellowship support to graduate students in the program. Sadly, I must report the campus has finally decided to demolish both Boyden Lab and the SPI building. I say “sadly” as the coyotes, skunks, raccoons, foxes, rabbits, termites, and roaches will need to find new homes.

Graduate and undergraduate Entomology programs remain strong as well as is our participation in several interdepartmental graduate programs. There are currently 41 Entomology graduate students in the program and approximately 45 undergraduate majors. The 4+1 BS/MS program (5 years to earn both degrees) continues to be a great success in our recruitment efforts and remains as a model for other programs across campus. Currently there are two students finishing up their MS degrees.

As fund raising is becoming more and more important to our success, I would like to again highlight the many ways you can help with these efforts. The Advancing Inclusivity in Entomology Scholarship Fund is my favorite as it allows undergraduate students who normally could not afford time away from a job to work in an Entomology lab. This year four students benefited from this endowment: Brunia Boliscar, Amber Summers, Sharmely Valladolid, and Azariah Lopez. If you prefer to support graduate students, there are a number of ways to do that (see Page 5). Plus, there is the Gilstrap Fund that helps get our students to scientific meetings and workshops, and the Distinguished Speakers Fund which helps to keep the Boyce Speaker Series viable. And do not forget the Entomology Fund for Excellence which has maximum flexibility (student travel, seminar speakers, outreach activities, etc.). I would be remiss if I did not mention our annual UCR Giving Day coming up on Tuesday, March 4, 2025. This will be a great (and easy) opportunity to support UCR Entomology. You should expect to receive an email from campus letting you know the details of this event. Whatever your preference, I urge you to consider making a donation; every dollar helps and is appreciated. If you would like to donate to support any of our programs, please visit <https://entomology.ucr.edu/giving> and choose among the many Entomology funds available. And of course, I am always available to talk to those interested in establishing new endowments; if you have ideas, let's talk. Once again, THANK YOU AND HAVE A GREAT REST OF THE YEAR!!!

Remember to keep up with the activities of the Department and feel free to drop into 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 with me your own story of success, and the role that UCR had in your achievements by emailing me at richard.redak@ucr.edu - perhaps you will be our next featured alumni in the “where are they now” section of the newsletter!

Dr. Rick Redak
Chair of the Department



UCR Entomology Department 2024

A Special Thank you to all of our Contributors in 2024!

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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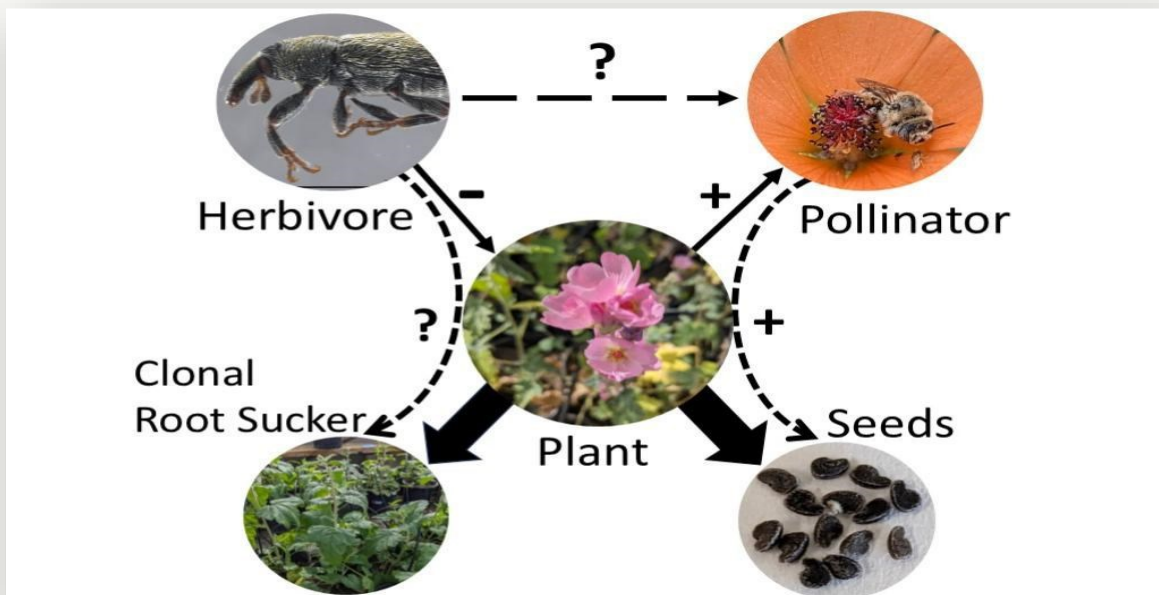
Ms. Hannah Chu

Ms. Julia L. Bernstein

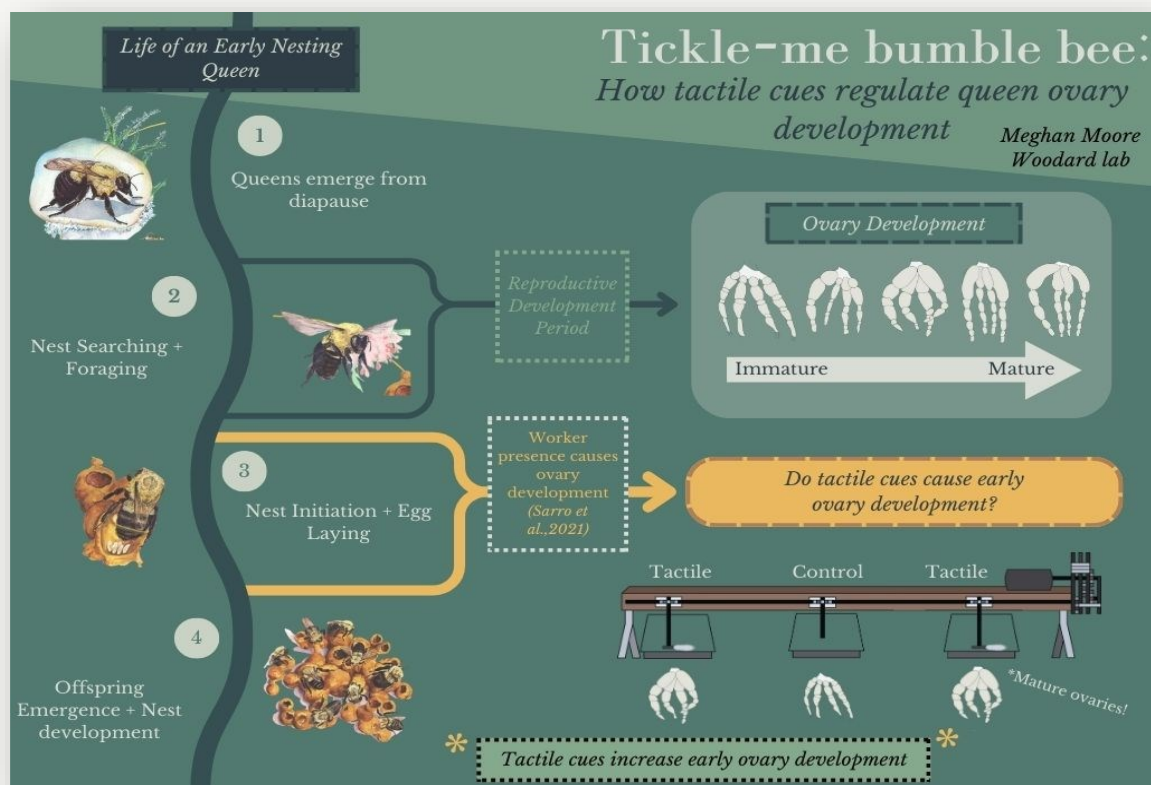
Stacy Philpott

Ms. Elspeth S. Cannell

Graphical Abstracts - A Visual Summary of Graduate Student Research



Herbivore-Plant-Pollinator Interactions Abstract by Molly Barber



Tickle-me Bumble Bee: How Tactile Cues Regulate Queen Ovary Development Abstract by Meghan Moore

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 2024

STUDENTS

Ashley Bui

1st Place, Student Competition Poster, Biogeography -
SysEB Section, ESA Annual Meeting
Dr. Janet M. Boyce Memorial Endowed Scholarship - UCR
Entomology
James Rosenburg Memorial Scholarship - UCR CNAS
Travel Award, Pacific Branch ESA

Caitlyn Campbell

1st Place, Oral Presentation - Undergraduate, SysEB Section,
ESA annual Meeting

Joanne Chen

Carl Strom/ Western Exterminator Company Scholarship in
Urban Entomology, UCR Entomology

Jun-Yin Lum

Carl Strom/ Western Exterminator Company Scholarship in
Urban Entomology, UCR Entomology

Jessica Maccaro

Presentation Award for Young Scientist, International Con-
gress of Entomology
Presentation Award for Woman Scientist, International Con-
gress of Entomology
Graduate Student Service Award for the LGBTQ+ Commu-
nity, UC Riverside
Gluck Fellowship of The Arts Fellowship, UC Riverside

Nagham Melham

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

Sarah Schroeder

Mathias Graduate Student Research Grant - UC Natural Re-
serve System

Emily Ta

Austin Frishman Scholarship, Pi Chi Omega

Sakshi Watts

Dr. Mir S. Mulla & Leila Mulla Endowed Scholarship Fund,
UCR Entomology
Alate Award, Entomological Society of America
First Place, Graduate Oral Presentation, Pacific Branch ESA

FACULTY

Ring Carde

Highly Ranked Scholar - Lifetime, ScholarGPS

Allison Hansen

Plant-Insect Ecosystem Award, Pacific Branch ESA

Chow-Yang Lee

Fellow, Entomological Society of America

Kerry Mauck

A.M. Boyce Endowed Chair, UCR Entomology

Quinn McFrederick

Commitment to Graduate Diversity Award, UC Riverside

Naoki Yamanaka

Physiology, Biochemistry, and Toxicology Award, Pacific
Branch ESA



Entomology receives GAANN Fellowship Funding to support Graduate Students

Graduate Assistance in Areas of National Need Program

The Department of Entomology was one of 7 departments at UC Riverside that recently received funding from the U.S. Department of Education's Graduate Assistance in Areas of National Need (GAANN) Program to fund graduate fellowships. Students with strong academic records and who have demonstrated financial need and intent to pursue the highest degree available in their field of study at the institution are eligible for these fellowships. The successful GAANN proposal was led by Drs. Kerry Mauck, Erin Rankin and Christiane Weirauch. Fellowships under the new GAANN program will be available to students starting in fall of 2025, with support anticipated to be available for 5-6 graduate students each year.

The GAANN fellowships are designed to recruit, retain, and matriculate top graduate students, especially from underrepresented backgrounds, to pursue research, teaching, and mentorship. "This grant will help our department support our graduate students financially in the face of shrinking resources for graduate education within the UC system," said Professor Mauck. "It will also address a projected shortfall in qualified applicants for jobs in the agricultural sciences. Students participating in the program will receive top quality training in teaching, research, and professional development."

This is the second consecutive GAANN award received by Entomology. The Previous GAANN awarded to Entomology in 2020 (to PIs Rankin, Weirauch, and Redak) provided financial support to 26 entomology graduate students during the funding period. Our first GAANN funded students who are anticipated to graduate in 2025, and many credit the GAANN fellowships for assisting with their academic success.

Quotations from graduate students:

"GAANN funding allowed me to cover urgent research expenses, ensuring my research can be completed in a timely manner. I am deeply grateful for this support." - Jacqueline Holquinn

"The GAANN fellowship was vital in providing financial support and allowing me to properly explore my research topic without financial constraints and stresses." - Leon Katan

"The GAANN fellowship provided me with a stable financial resource during my first year as a PhD student, which helped take away some financial burden from my PI, and it opened up a professional connection with the graduate advisor who reached out to me about the fellowship program." - Emily Ta

"The GAANN is a great relief of financial restraint and allows me to complete my research! I am so grateful for the opportunity to have the freedom to completely focus solely on my research in the late stages of my PhD." - Meghan Moore

Peter Atkinson selected as Dean

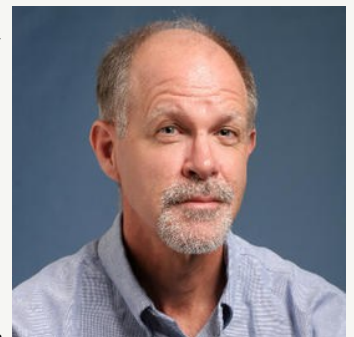
Professor Peter Atkinson selected as Dean of the UCR College of Natural and Agricultural Sciences (CNAS)

Our congratulations to Professor Peter Atkinson on selection as the new Dean of UCR's College of Natural and Agricultural Sciences!!

Professor Atkinson's appointment as Dean followed a highly competitive national search. Professor Atkinson was selected as the best candidate to lead CNAS through its current challenges and into its next period of growth.

Professor Atkinson received his BS and PhD in genetics from the University of Melbourne prior to postdoctoral training at Syracuse University in New York. Professor Atkinson joined the UCR Entomology Department in 1997 following his previous appointment as a Research Scientist at the Commonwealth Scientific and Industrial Research Organization (CSIRO) in Australia. Professor Atkinson has served in numerous administrative and leadership positions at UCR including Divisional Dean of Life Sciences, Interim Director of the Genomics Institute / Institute for integrative Biology, Director of the Interdepartmental Graduate Program in CMDDB, Director of the Center of Disease Vector Research, Chair of the IBC, Chair of the Senate Planning and Budget Committee, and as the CNAS Interim Dean for the past 16 months.

The Entomology Department is excited to see one of our own selected for this critical campus leadership position. Professor Atkinson has already made numerous positive impacts to our campus, including to student instructional opportunities, faculty mentorship, and capital projects. We look forward to his continued leadership to steer the College toward meeting campus goals in education, research, and outreach to the community.



News From Entomology Graduate Student Association (EGSA)

Our department continues to thrive, and we are excited to welcome many new faces to our community! This year, we kicked off the Fall quarter with our Welcome Back Picnic, enjoying great food and even better company. We re-connected after the summer months and welcomed our new school year together.

This past month, many of our students presented their research at Entomology 2024 in Phoenix, Arizona, with several earning awards. We are proud to represent our department and showcase our contributions to the field of entomology in a multitude of ways.

Our graduate students are not only committed to advancing their academic pursuits but also to fostering a vibrant and supportive community. Through various social events, we've built shared experiences and strengthened bonds, creating much-needed moments of camaraderie. We look forward to many more opportunities to connect and grow together!

Looking ahead, we're thrilled about our favorite event, the Insect Fair in April. This annual event gives us the chance to connect with the Riverside community and share the exciting science of insects with people of all ages. Additionally, on a smaller scale, our outreach efforts enable us to engage with the public and inspire curiosity about entomology.

As we continue through the year, EGSA is dedicated to supporting our community and creating an inclusive, welcoming environment for everyone passionate about insects. Here's to another fantastic year of learning, connection, and discovery!



EGSA Halloween Social Event

News From Botany and Entomology Undergraduate Student Association (BEUSA)

The Botany and Entomology Undergraduate Student Association (BEUSA) gathers under-graduate students from both fields to learn and bond with one another! However, we encourage people from all majors to participate in the opportunities and activities that spark their interest in Botany and Entomology.

Some of our notable guest speakers this quarter were Dr. Karthik Chandrasegaran and UCR Plant Biology PhD candidate Ally Richards. Dr. Chandrasegaran went over some tips on how to craft the perfect CV and Ally Richards gave a lecture on the symbiotic relationship between ants and the extrafloral nectaries on barrel cacti. BEUSA is very grateful to have had both of them speak at our meetings and looks to have more guest speakers in the future.

The BEUSA club would not have been possible without the help of our current team of officers to continue its legacy: Teddy Adams (Co-President), Joshua Santos (Co-President), Abigail Griffin (Secretary), Bethany Johnson (Treasurer), Emilia Burnham (former Co-President, alumni C/O 2024), and Jaden Kim (former Co-President, alumni C/O Co-President).

BEUSA continues to meet weekly and adjusts its time every quarter to accommodate the schedule changes of its members. Regardless of your major, students who share a passion for insects and plants are welcome to come to the meetings to enjoy pizza, forge friendships, and socialize about their interests!

-Theodore Adams, Joshua Santos & the BEUSA Team



Invited Speaker presentation to the Botany-Entomology Undergraduate Student Association (BEUSA) during their lunchtime meeting.



Department Faculty Leading the Response to Multiple Recent Insect Invasions

Introduction

With ever-increasing levels of global trade and tourism, the accidental introduction of non-native plants and animals (including invertebrates) continues to pose a serious threat to California agriculture and rangeland, as well as urban environments and natural ecosystems. In fact, it is estimated that approximately nine nonnative invertebrates establish in the state each year, and of those at least three will become problematic and need management (Dowell et al. 2016). When one of these problematic invasive insects is detected, department faculty are frequently called upon by Federal, State, and industry partners to help develop mitigation responses. Here, we share highlights from a few department faculty who are working to address some newly arrived invasive insects.



Bodil Cass, Asst. Cooperative Extension Specialist in Subtropical IPM Fig Wax Scale Under Eradication in San Diego County

A reproductive population of an exotic wax scale, *Ceroplastes rusci* (Hemiptera: Coccidae), was detected in California for the first time this past summer. This insect is commonly intercepted at ports of entry, especially on shipments of ornamental palms, but had not previously established in the environment. Fig wax scale adults are oval-shaped, approximately 4-5 mm in length and have a distinctive thick, waxy, pinkish-gray covering of plates (Fig. 1); nymphs have waxy star-like projections. They are considered a potentially devastating agricultural and environmental concern due

to their high potential to lower fresh fruit yield, increased production costs, disrupt export markets, and vector plant virus-es including *grapevine leaf-roll virus*. Polyphagous phloem feeders, they can infest high-value crops including almond, grape, citrus, pistachio, avocado, cotton, fig, palms, pear, and ornamentals. They are established in Florida and distributed throughout much of the rest of the world, frequently affecting citrus and fig production in Europe. The environmental conditions throughout much of California are considered favorable for this scale to establish.

The scale is currently under eradication, with treatment and continued monitoring of the heavily infested orchard. Multiple nearby sites in the area were surveyed as well as other fig-growing sites throughout San Diego County and it has not yet been found elsewhere. The Subtropicals team at UCR has been working to raise awareness at industry meetings and public events regionally to help find any additional points of spread. There are other *Ceroplastes* spp. wax scales in the environment that are not easily distinguished morphologically from fig wax scale but can be situationally screened as they only occasionally reach pest status on ornamentals such as gardenia, Australian willow, mayten, California bay, coyote brush, holly, and pepper tree. If you find wax scales at pest status on new host plants, especially fruit trees, please report them to us or CDFA for taxonomic identification.



Figure 1. Fig wax scale adult females and crawlers.
Credit: Tyler Tkachuk, County of San Diego.

Wrapping Up a Record Year for Tephritid Fruit Flies

The UCR campus was inside a >500 square mile quarantine for *Bacerocera dorsalis* (Diptera: Tephritidae) for much of the past year. Hundreds of adult flies were found in the Redlands area, and emergency teams were sent in to eradicate the infestation, including via a large-scale, coordinated fruit removal operation. This was the worst of seven separate Tephritid fly quarantines statewide, including the first ever quarantine for *B. tryoni*, which was found in Ventura/Los Angeles counties. Exotic Tephritid fruit flies feed on many types of fresh fruit as larvae (maggots), making the fruit unfit for consumption. We worked with the multi-agency response team to determine management and proactive approaches for affected commercial farms and spread the word to residents about safe disposal of host fruit. You can learn more about the situation on the [UCR website](#) and [a recent podcast from NPR](#).

Continued on page 11

Department Faculty Leading the Response to Multiple Recent Insect Invasions Continued...



Houston Wilson, Assoc. Cooperative Extension Specialist in Orchard IPM
Black Fig Fly Impacts Commercial and Hobby Fig Growers Alike

Native to the Mediterranean and Middle East, the black fig fly (BFF), *Silba adipata* (Diptera: Lonchaeidae), uses unripe figs for reproduction. There are no other known host plants for this fly. Adult females deposit their eggs near the eye (ostiole) of the fig (Fig. 2) and larvae that emerge from eggs feed just below the fruit surface. Infestation by BFF can lead to premature fruit drop which reduces crop yield and quality.

California accounts for a majority of commercial fig production in the United States, and most commercial orchards are located in the San Joaquin Valley between Fresno and Madera. There are also many hobby growers throughout the state who are growing rare and unique fig varieties. BFF was first reported in 2021 infesting residential figs near Pasadena and Goleta. Since then, BFF populations have steadily expanded throughout Southern California and along the Central Coast up to the San Francisco Bay Area. Over the past year infested figs were reported in both Sacramento and Bakersfield. The invasion of BFF into key fig producing regions of the San Joaquin Valley appears imminent.



Figure 2. An adult female black fig fly depositing eggs into the ostiole of the fig.
 Credit: Houston Wilson, UC Riverside

Monitoring for BFF currently relies on the use of McPhail-type traps baited with yeast. While BFF are attracted to this bait, so are numerous species of other small black flies! The high amount of non-target bycatch makes it very difficult to sort out BFF. Therefore, our lab is working to develop a new lure that is more selective for BFF. At the same time, we have evaluated chemical control strategies that are compatible with certified organic production, since there are many organic fig growers in California. Finally, since there is a diverse range of people growing figs in the state, we have been conducting outreach about BFF through both UC Cooperative Extension and UC Master Gardeners, as well as the California Fig Institute.



Figure 3. Feeding by carpophilus beetle larvae produces a fine white powdery frass, as seen here in an almond.
 Credit: Houston Wilson, UC Riverside.

Carpophilus Beetle: A New Threat to Tree Nuts

California tree nuts are currently under threat from a new invasive pest, the carpophilus beetle, *Carpophilus truncatus* (Coleoptera: Nitidulidae). This small beetle was first found by our lab in September 2023 infesting almonds and pistachios near Fresno. Adult female beetles deposit eggs directly onto new crop nuts and emerged larvae feed on developing kernels, which lowers crop yield and quality (Fig. 3). There is currently no trap or lure available to monitor carpophilus beetle populations, and little is known about its phenology in California. Furthermore, there are no known biological control agents for this pest, and chemical controls are especially challenging due to limited product coverage since beetles develop inside the nuts.

Our lab has partnered with colleagues at UC Cooperative Extension (UCCE), the UC Statewide Integrated Pest Management (IPM) Program and the USDA Agricultural Research Service (ARS) to develop a multifaceted response to this newly invasive pest. Efforts are currently under-way to improve monitoring by testing new pheromone lures and developing a degree-day model for carpophilus beetle, as well as evaluating novel chemical and cultural control strategies. The carpophilus beetle has been a major pest of almonds in Australia for >10 years, and we now working closely with collaborators in Australia to develop new monitoring and management strategies.

Continued on page 12

Department Faculty Leading the Response to Multiple Recent Insect Invasions Continued...



Mark Hoddle, Cooperative Extension Specialist in Biological Control
South American Palm Weevil: Attract and Kill in San Diego County and Foreign Exploration for Natural Enemies in Brazil

South American palm weevil (SAPW), *Rhynchophorus palmarum* (Coleoptera: Curculionidae) (Fig. 4), established in San Diego County sometime around 2014. This notorious palm pest has killed >20,000 palms in urban areas (Fig. 5) and there is significant concern that this weevil may establish in the Coachella Valley where it would threaten commercial date production areas.

Insecticide options for managing SAPW in dates are minimal. Therefore, we are proactively assessing attract and kill for

management of SAPW in urban areas with the longer-term view that this technology, if efficacious, could be used by date growers.



Figure 4. An adult female South American palm weevil.
 Credit: Mike Lewis UC Riverside.



Figure 5. Ornamental Canary Islands date palms in San Diego that have been killed by the South American palm weevil.
 Credit: Mark Hoddle, UC Riverside.

Attract and kill (A&K) is elegant in its simplicity. Weevils are attracted to an inert matrix that is infused with the weevil's aggregation pheromone and a contact insecticide.

Upon contact with the dollop, curious male and female weevils are killed. Lab bioassays indicated that ~3 sec of contact with an A&K dollop is sufficient to kill weevils. Additionally, field trials suggest that, depending on the time of the year, the pheromone and insecticide in A&K dollops maintain bioactivity for 3-6 months. Our lab recently completed large-scale field evaluation of A&K for SAPW control in San Diego County.

We ran large replicated field plots, ¼ square mile (i.e., 161 acres or 65 hectares) in size, spanning 12 square miles that evaluated different densities of dollops (i.e., 0, 40, 100, and 250 dollops per ¼ square mile) for suppressing weevils. Results clearly indicated that dollop densities of 100 and 250 per ¼ square mile significantly reduced the numbers of adult weevils attracted to monitoring traps. In 2025, we will continue to refine A&K for managing SAPW.

In April 2024, foreign exploration for a parasitic fly, *Billaea rhynchophorae* (Diptera: Tachinidae), was undertaken in Brazil. This little studied fly reportedly parasitizes up to 70% of SAPW pupae. Incredibly, we found parasitized weevil pupae and weevil cocoons were stuffed full of fly puparia, with one cocoon holding 31 fly puparia (the average was 19 puparia per weevil cocoon) (Fig. 6). Unfortunately, we were unable to keep the flies alive in the lab in Brazil for more than 5 days and there was no oviposition onto weevil larvae. We need to do a lot more work on this fly and the good news on this front is that a former UCR Entomology student, Gaby San Jose, is doing her MS work on SAPW management in Brazil, and part of her research will be on the biology of this fly!



Figure 6. South American palm weevil cocoons full of puparia of the parasitic fly *Billaea rhynchophorae*.
 Credit: Mark Hoddle, UC Riverside.

Do Your Part – Report Invasive Pests!

Early detection is critical for preventing the establishment of invasive pests. If you find an insect matching the description of any pest not known to be present in California, or a newly heavy infestation of an insect on any plant please reach out to your local University Cooperative Extension team, or report the observation to the CDFA Pest Hotline via their phone or 1-800-491-1899 or online form <https://www.cdfa.ca.gov/plant/reportapest/>, and encourage your friends, family, neighbors and colleagues to do the same. Most importantly, do not pack a pest! It is illegal to move plant material interstate without phytosanitary certification. Instead, purchase plants only from reputable nurseries that practice safe plant hygiene to prevent the spread of pests and disease.

*Welcome to Our New Faculty***Dr. Luciano Cosme**

I am thrilled to join the Department of Entomology at UCR as an Assistant Professor, where my research focuses on the genetic and environmental factors shaping critical mosquito traits, such as vector competence, photoperiodic diapause, and insecticide resistance. By leveraging tools like genome-wide association studies (GWAS), I aim to uncover natural genetic variation associated with these traits to understand better the ecological and evolutionary processes that drive mosquito adaptation. My academic journey began in Agricultural Sciences in Brazil, and I earned my Ph.D. at Texas A&M University, where I investigated mosquito genetics. Before UCR, I worked as a Research Scientist at Yale University, developing genomic tools to study mosquito populations worldwide and contributing to advancements in vector biology. At UCR, my lab integrates field studies, genomics, and bioinformatics to explore how mosquitoes adapt to environmental pressures and the implications for disease transmission and vector management. Outside of research, I enjoy swimming, lifting weights, practicing yoga, and spending time with my two Pomeranians, Luna and Sol. I am passionate about fostering an inclusive lab environment and mentoring the next generation of scientists, especially those from underrepresented backgrounds.

Dr. Elizabeth Rowan

I grew up in Santa Cruz, CA, but headed east for a BA in Biology at Wellesley College, in Massachusetts, before spending two summers working for the Bureau of Land Management in Bishop CA as a Conservation and Land Management Intern. I realized I was passionate about pursuing new ecological knowledge and went on to an MS in Entomology at Purdue University working with Ian Kaplan on volatile communication in tomatoes. I then worked with Dr. John Tooker at Penn State University for my PhD, also in Entomology, where I studied on the effects of soil health management practices on pests and beneficial insects in corn and soybeans. I started a faculty position at West Virginia University in 2020 where I taught Principles of Entomology, Insect Ecology, and Data Analysis in Natural and Agricultural Sciences. My research at WVU focused on manure as a fertilizer in organic field crops, and how to support dung beetles across the state. I started a new position in the Entomology department at UC Riverside in October. My lab will focus on Agroecology, and will include work on dung beetles in California, and the interaction of sustainable soil management practices like cover crops with insect pest regulation.

Welcome to the UC Riverside Entomology Department!

California's Insect Biodiversity

“CHECKING OUT” CALIFORNIA’S INSECT BIODIVERSITY

UCR entomologists are helping to build a DNA barcode reference library for all species of insects in California. California is a biodiversity hotspot, with an estimated 30,000 described insect species, but global trends suggest that arthro-pod species are dying at an alarming rate. Wildfire, climate change, water and air pollution, pesticide use, habitat loss, and a host of other factors are driving profound change, pushing some ecosystems to the point of collapse. Equipped with \$12 million of state funding, the California Insect Barcoding Initiative (CIBI), is an ambitious project that is using DNA barcoding to identify, catalog, and monitor the vast array of insect species inhabiting California. DNA barcoding is a molecular technique that uses the DNA sequence of a short, standardized fragment of DNA. Those sequences are analogous to grocery store barcodes and every organism has its own unique barcode built into the DNA of each cell. In the case of most animals, including insects, the barcode is a section of a mitochondrial gene, commonly referred to as COI. The project is a collaborative effort involving several other California institutions. UCR’s contribution is led by Professors John Heraty and Christiane Weirauch, with key personnel Julia Perez, Jacob Jones, Paul Rugman-Jones and several undergraduates.

The project requires the input of sequences from two critical sources. The first of those are museum specimens that have already been identified by an expert taxonomist. The UCR Entomology Research Museum holds a vast collection of named specimens and some of these are being targeted for sequencing. In some cases, only a body part such as a leg is used for sequencing. If the specimen is too small, then a non-destructive (whole body) approach is used for sequencing with the specimen retained for future taxonomic purposes. This is key to the project, since this process essentially attaches species names to DNA barcodes, creating a reference library of authoritatively named barcodes. The other source is from a series of fresh collections that were made over the course of 2023 and 2024, across multiple locations, targeting California’s varied ecoregions (e.g., coastal ranges, deserts, forests, and Mediterranean ecosystems), and including many of the southern California UC Nature Reserves. Over the last two years, Julia and Jacob made regular monthly visits to seven field sites (observatory sites) to retrieve malaise trap collections (Figure 1). Additional “snapshot” collection methods (e.g., sweep netting, yellow pan trapping, light trapping) were employed at these and other sites. Observatory collections were directed to the Barcode of Life center in Guelph, Canada for imaging and sequencing. Each snapshot collection was sorted to “morphospecies”, and a subset of each morphospecies used to generate DNA barcodes. Each specimen was first photographed, and importantly, the DNA from the specimen extracted using non-destructive techniques, retaining the intact insect carcass. The extracted DNA was amplified, sequenced, and assigned to a Barcode Index Number (or BIN). Each BIN consists of a collection of very similar sequences (clustered using well-established algorithms), effectively representing an operational taxonomic unit or species. In some cases, the BINs are already identified to species in the Barcode of Life Database (BOLD), but if no match is found, a new BIN is created and the specimen(s) that produced that barcode/BIN can be retrieved and passed to a taxonomic expert for morphological identification. In this way, a positive feedback loop is created that in time will hopefully lead to every BIN being associated with a specific species name. As of December 2024, the combined efforts of UCR and the other institutions have processed over 900,000 freshly collected specimens and identified over 31,000 BINs. Currently, only 2,300 BINs have a specific name, but as sequencing of museum material catches up with that of the field sites, this will improve



Observatory and snapshot sites surveyed by UCR entomologists over the last two years.

As the California insect barcode reference library grows, this resource will enable researchers and practitioners to quickly identify species in a given area, and provide an invaluable tool for monitoring biodiversity and protecting California’s natural environment

Fun in Entomology

Collecting Trip



Entomology Graduation Day



Falon Butcher with former ESA President Jessica Ware



SIT against Asian citrus Psyllid field cage trials

Fun in Entomology



Entomology Outreach



EGSA Halloween Social



EGSA Halloween Social



Entomology Graduation Day

Entomology Research Museum News

The Museum has been very busy this past year, with the help of some undergraduates - Jessica Simons, and Hana Mancina - assisting with the mounting and labeling of specimens. Using funds from the California Institute for Biodiversity, Cole Watson has remained on as a temporary assistant curator, and has been sorting, dehydrating and mounting specimens, in addition to other minor curatorial duties. All told, we added roughly 30,000 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 670,000 records, with ~190,000 that are IDed to genus-level or better, georeferenced and available online via DiscoverLife and SCAN. Adriean Mayor has continued as a volunteer, working on melyrid beetles.

A considerable amount of the new material is from donations of numerous malaise trap samples from Greg Ballmer and Mike Irwin, out of which the museum contributed hundreds of thousands of specimens to the large barcoding project at the Christiane Weirauch and John



Heraty labs, also sponsored by the California Institute for Biodiversity, as well as many thousands of specimens from these bulk samples directly into the Museum collection.

This year, most of our potential loans were avoided by sending label data, or database information, instead of physical specimens. Several of these were generated by non-targeted requests via social media (mailing lists, FaceBook, etc.), rather than direct solicitation; many were by direct e-mail contact requesting material. As in past years, loan material was included in revisions by external authors, including several new species. The demand for things like data sharing, crowdsourcing, social media, and remote ID is considerable; it is also very important to note that many of these contacts are resulting in loan/data requests, donations, acknowledgments in publications, or even co-authorship. Doug also returned a major loan of *Catocala* moths to the California Academy of Sciences, with help from Dave Hawks and Bob Zuparko, in addition to the de-patriation of Dave Hawks' personal collection of the genus, resulting in the collective removal of some 80 drawers of specimens. More recently, we repatriated a massive personal loan of meloid beetles from John Pinto, as well as several drawers of his miscellaneous donated specimens.

Serguei and Doug have both been author or co-author on several publications this past year, with more in press or submitted. One of Doug's papers was a description of a new genus of planthoppers, *Scaralina*, including 14 new species from Arizona, Texas, and Central America. Two of the recently described new species by Serguei are *Phymastichus nudusdraco* Triapitsyn & Rugman-Jones (Hymenoptera: Eulophidae, pictured here)

Continued on page 18

Entomology Research Museum News

from Taiwan that is a parasitoid of adult shot-hole borers (*Eumwallacea* spp.), which are invasive in California, and as such is being evaluated as a classical biological control agent, and *Platystethynium apteron* Triapitsyn (Hymenoptera: Mymaridae) from the Veneto Region in Italy which is a wingless (pictured here), gregarious egg parasitoid of Tettigoniidae (Orthoptera) in soil. The latter is a particularly rare and remarkable find.

The museum scientists have each completed a rapid collection rescue grant from the California Institute for Biodiversity: Serguei to mount, label, identify, and database a large collection of Mymaridae from all over California (previously stored in ethanol, more than 3 thousand specimens), and Doug to integrate and database an important collection of immature Lepidoptera generously donated by Greg Ballmer. This collection contains well curated specimens from California and all over the world, particularly from Thailand. It is a nice addition to the existing vast collection of immature insects in the museum. The grants have provided funding for salary for a curatorial assistant, Cole Watson, who is largely finished working on these projects.

Doug's activities with the International Commission on Zoological Nomenclature (ICZN) have been heavy over the past year, as he is now on the editorial board of the BZN. The number of external requests for assistance with ICZN-related concerns was quite significant this past year. Also, the Commission has seen a high level of activity over the past year and into the foreseeable future, due to ongoing controversies over scientific names, the upcoming election of 8 new Commissioners, and the impending release of a new Code edition. Doug has also been working with students in both the Natural His-



tory Museum Club (NHMC) and the Botany Entomology Undergraduate Student Association (BEUSA). Most notably, Doug has been co-hosting a 30-minute podcast, titled "Can I Bug You?", produced by Jules Bernstein with UCR's Media Relations, twice a month.

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- Triapitsyn, S. V., C. Dominguez, G. Ortis, M. Uliana. 2024. A remarkable new species of *Platystethynium Ogloblin* (Hymenoptera: Mymaridae) with apterous females from Italy. *Journal of Natural History* 58 (45-48): 2207-2217.
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New Alumni and Students

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

Graduate Students:

Magda Argueta Guzman
Lakshmi Paloma Dadlani
Jaimie Kenney
Robert Kresslein
Laura Leger
Julie Tsecouras
Benjamin Nyman

BS+MS Students

Sydney Wilson

Undergraduate Students:

Emilia Burnham
Ryan Campos
Jay Chang
Xingwei Feng
Madison Julien
Jaden Kim
Karla Lemus Portillo
Troy Manzano
Kambrie Miller
Trang Nguyen Hoang
Lisa Woo

*Welcome to our newest students!***Graduate Students:**

Emilia Burnham: **(Baer/ Mauck Lab)**
Rattanan Chungswat: **(Lee Lab)**
Xingwei Feng: **(Lee Lab)**
Matthew Fox: **(Weirauch Lab)**
Jenni Daniela García Quiceno: **(Cass Lab)**
Leon Kataw: **(Murillo Lab)**
Karla Lemus Portillo: **(Gerry Lab)**
Jorge Mora: **(McFrederick Lab)**
Thomas Nonacs: **(Purcell Lab)**
Alejandra Rocha: **(Cass Lab)**
Melissa Thayer: **(Wilson Lab)**

Undergraduate Students:

Autumn Anderson
Samantha Berry
Falon Butcher
Cory Butterfield
Andy Garcia
Amaya Keeton
Henry Kilbury
Kai Klein
Christian Lopez
Maximo Marrufo
Gwenivere Martin
Aidan Osorio
Dipen Saravana Prabhu
Zoe Vernon
Aric Vootkur



Where are they now?**Dr. Christine (Chrissy) Dodge**

Chrissy completed her Ph.D. in Entomology from UCR in Fall 2019. Her dissertation research focused on invasive shothole borers (SHB) in the *Eumallacea fornicatus* species complex in California, including trapping and lure development, fungal symbiont associations, and population genetics.

In 2020, Chrissy began work as a Faculty Research Assistant at Oregon State University working with Dr. Rory Mc Donnell on biocontrol and IPM of invasive snails and slugs. In 2021, she “returned” to UCR Entomology as a remote Postdoctoral Scholar working with her former Ph.D. advisor, Dr. Richard

Stouthamer, and then with Dr. Paul Rugman-Jones after Richard’s retirement.

Chrissy did her postdoc at the USDA APHIS Plant Protection and Quarantine (PPQ) Science and Technology (S&T) Forest Pest Methods Laboratory (FPML) in Buzzards Bay, Massachusetts, where she was co-advised by Dr. Juli Gould. Her research focused on classical biocontrol of SHB, including rearing and assessment of three parasitoids discovered in Taiwan. During her postdoc, Chrissy developed rearing methods for *Phymastichus nudusdraco*, a eulophid parasitoid of SHB, which enabled continuous laboratory rearing, a significant milestone that allows her to continue evaluating this species as a potential biocontrol agent of SHB.

Chrissy joined the USDA APHIS PPQ as a Biological Scientist in March 2024. She continues to work at the S&T FPML, where she is co-head of the Biocontrol Lab. She leads research on classical biocontrol of SHB, box tree moth (BTM), and emerald ash borer (EAB). Chrissy continues to work with Paul on SHB biocontrol, including research and foreign exploration trips taken to Taiwan and Thailand. With collaborators at CABI Switzerland, she helped to initiate and develop a BTM biocontrol program and is currently assessing the host specificity of an ichneumonid parasitoid. Her most recent undertaking is the EAB biocontrol program, which she inherited after Juli’s retirement and which has been in operation for over twenty years. She is presently focusing on field evaluation of four introduced EAB parasitoids across climate gradients in the United States and development of EAB IPM strategies.

Chrissy supervises several technicians and a postdoc and manages cooperative agreements with academic, government, and state institutions. In addition to her role at the USDA, she volunteers with the Eastern Branch of the Entomological Society of America as co-chair of the student competition and as an active member of the Insect Detection, Evaluation, and Prediction (IDEP) Committee. In her spare time, she enjoys reading, gaming, and yoga. Chrissy can be reached at Christine.Dodge@usda.gov.

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 richard.redak@ucr.edu

Alfred M. Boyce Lecture**Dr. Maydianne CB Andrade**

The 2024 Alfred M. Boyce Lecture was delivered by Dr. Maydianne CB Andrade (Professor, Department of Biological Sciences, University of Toronto Scarborough). The title of the lecture was “Control, Context & Choosiness: Flipping the lens to see female plasticity in widow spiders”. During this lecture, Dr. Andrade discussed how adaptive developmental plasticity (ADP) may evolve when traits that confer reproductive success vary with context, and context is indicated by cues available during development. ADP cues trigger developmental changes, resulting in phenotypes matched to the challenges experienced as adults. Dr. Andrade specifically focused her lecture on plasticity in female mating preferences for male traits is affected by juvenile social experience in other species.

Professor Andrade sits on the Scientific Advisory Committee of the Council of Canadian Academies, and is Chair of the National (Canadian) Killam Program selection committee, which adjudicates one of Canada’s most prestigious interdisciplinary career awards- the Killam Prize. She is a co-founder and inaugural President of the Canadian Black Scientists Network. Named a ‘Community Champion’ by the Black North Initiative, this interdisciplinary coalition of professionals and trainees in STEMM (Science Technology, Engineering, Mathematics, Medicine and Health) works across sectors and with government to increase Black inclusion in STEMM fields, from programs for Black youth through to leadership development. In 2016, Professor Andrade founded the Toronto Initiative for Diversity and Excellence (TIDE), a multi-disciplinary group of faculty volunteers that has delivered data-informed talks, workshops, and practical advice on increasing representation and inclusion in the university to thousands of colleagues. Her work as a sought-after speaker has been extended through a long history of public outreach that includes a podcast on navigating the pandemic lockdown (The New Normal) and creative work as cast, host, and story editor on nature documentaries (The Nature of Things).

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

Our department has a thriving public outreach program to bring the science of entomology to local children and adults through booths and presentations with live insects on campus, in K-12 school classrooms, regional libraries and nature centers, fairs and expos, campus recruiting day tables and research museum tours. This program is an integral part of our role as researchers at a public university, helping to share research results and raise awareness about insect issues of concern to the broader community. In the 2023-24 academic year, we hosted several live insect demonstrations each month, in addition to the annual Riverside Insect Fair, speaking events like Science Nights at Back to the Grind, and the many honeybee-specific outreach events run by the Center for Integrative Bee Research ([CIBER](#)).

At these events we cover general arthropod biology, which helps familiarize people with this underappreciated phylum of animals, covering topics such as What is an insect? Why are insects important? and Why are insects so successful? We also communicate specific topics where we need to get actionable information out to the public, such as new invasive pest alerts or updated urban entomology practices. Sometimes we share translations of awe-inspiring scientific advances, such as how plants use volatiles to collectively respond to herbivore attack. These topics reach the insect-fearful to the insect-curious, inviting everyone to be mindful of the tiny-but-mighty critters cohabiting our shared urban, natural and agricultural environments. At a time when many of ecosystems are under increasing environmental strain, we really need everyone to be a local insect advocate.



Scotty Highlander learns about the B.Sc. Entomology Major and some backyard insects at Discovery Day.

Some highlights from the past year included a new podcast, ‘[Can I Bug You?](#)’ by UCR Science Correspondent Jules Bernstein and Entomology Museum Scientist Dr. Doug Yanega, and a full-day [STEM sustainability event](#) for local middle school students in collaboration with other College of Natural and Agricultural Sciences departments. The addition of new display drawers from the Riverside Museum of Natural History, and the Natural History of Insects class were celebrated at the weekly department pre-seminar afternoon tea.

Continued on page 23

Our largest event, the 2025 [Riverside Insect Fair](#) will be held on April 26th from 10 a.m. – 4 p.m. at the Riverside Main Library and will feature themed booths and activities from research groups in the department, along with displays of our Living Insect Collection, and with materials developed by the Outreach and Science Communication in Entomology course offered in the Spring Quarter. This general audience communication is also an essential part of the training program for our undergraduate and graduate entomology students, providing an opportunity to refine the skill of talking about insects to diverse audiences, in addition to receiving feedback and a broad variety of questions about the impacts of campus research and ground truthing of research outcomes. It is often through these interactions we learn of unexpected insect sightings and generate new ideas.



Dr. Ikju Park with the insect petting zoo at a school outreach event in the Entomology Court-yard.

The outreach program is currently funded only through small donations from participating audiences that help maintain the insect display colonies, and donations of time by students and staff. Students who complete 30 hours of outreach are provided with a small stipend from the Department towards travel to present their research at a professional conference, such as the Annual Meeting of the Entomological Society of America. We are currently exploring options for increasing the funding support to a level that better reflects the impact and inputs of the Outreach program. Over the past year, undergraduate students and staff have assisted with coordinating events (Aleja Anderson and Emilia Burnham) and maintaining our Living Arthropod Collection (Leah Breeze, Elspeth Cannell, Karla Lemus, Troy Manzano, and Rachel Phillips). Thank you to these students, the Outreach Committee for steering program improvements, the administrative staff for assistance with event booking and supplies, cooperating outreach groups – [EGSA](#), [BEUSA](#), [SciComm](#), and [CNAS SISTERS](#) – and all of our event volunteers!

Bodil Cass, Outreach Committee Chair

Find out more: <https://entomology.ucr.edu/engagement/outreach/outreach-program>

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