



# THE BUZZ

Looking back on 2017



UCR ENTOMOLOGY

## Naoki Yamanaka named a Pew Scholar

Naoki Yamanaka has been named a Pew scholar in the biomedical sciences. Dr. Yamanaka is the first researcher at UC Riverside to receive the honor. He is one of the 22 exceptional early-career researchers named as Pew scholars by The Pew Charitable Trusts for 2017.

“This award is a testament to the excellent quality and significant impact of Dr. Yamanaka’s research,” said Richard Redak. “I know I speak for the whole department in extending our congratulations to Naoki. We are very proud of him.”

Yamanaka’s research group works on identifying chemicals that interrupt the entry of steroid hormones into cells. They are using fruit flies and other systems to understand how hormones control insect physiology and behavior, and how we can control insects by manipulating hormone signaling. His lab recently discovered a transporter in fruit flies that transports the steroid responsible for molting into the insects’ cells. Yamanaka said, “Using state-of-the-art

techniques in genetics, cell and molecular biology, and chemical screening, my team will search for similar steroid transporters in mammalian cells, ascertain whether these transporters are essential for hormone activity, and isolate molecules that can modulate hormone uptake.” These findings have important implications for our understanding of steroid biology and may lead to novel means of manipulating a variety of steroid-related processes ranging from sexual maturation to immune responses and cancer progression.

“I am deeply honored to receive this prestigious award,” said Yamanaka. “I would like to thank my colleagues on our campus who have been very helpful ever since I came here in 2014, especially my fellow entomologists in the department.”



## Ranked #2 Worldwide for Entomology

The Department of Entomology at the University of California, Riverside has been ranked No. 2 worldwide by the Center for World University Rankings (released April 2017). “This is a great honor and reflects the incredible work done by our faculty, staff, and students – graduate and undergraduate” said Rick Redak, “It really says a lot about our faculty and students and the incredible research they do.”



UCR Entomology Department, photographed during Student Seminar day, September 2017

APRIL 2018

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*Letter from the Chair*

Alumni and Friends of UCR Entomology,

Welcome again from sunny Southern California! Since our last newsletter in 2017, the Department continues to flourish with new scientific discoveries, the addition of new faculty members and new students. And of course we continue to be incredibly proud of our graduating undergraduate and graduate students. As I indicated last year, the campus continues to grow. The new Multi-Research Building I is scheduled to open early 2019 providing much needed research space for the College of Natural and Agricultural Sciences and the Bourns College of Engineering. The construction of the new East-Campus Greenhouse facility is supposed to break ground shortly. As most of the current greenhouse space is 20 or more years in age, we are anxiously looking forward to these new growth facilities. Also the Campus's new BSL3 lab specifically designed to work with insect vectors and plant pathogens is about to open this year. This new facility will allow our researchers to work with emerging insect transmitted plant diseases such as citrus greening which has devastated many areas of the world's citrus production.

As a Department we have been very successful avoiding faculty shrinkage and have been able to maintain our size and breadth of expertise. Allison Hansen has joined the faculty as of January. Allison comes to us from the University of Illinois where she was an Assistant Professor and will be working on the evolution of insect symbionts. She is particularly interested in getting involved working with Asian citrus psyllid. Chow-Yang Lee will be joining the Department in October as the Endowed Chair in Urban Entomology. Chow-Yang is currently a professor at the Universiti Sans Malaysia developing new ways to control urban pests. We are also in the process of recruiting a new CE specialist for pest management of subtropical fruits. Clearly we are doing well! I am confident that UCR Entomology continues to be one of the best entomology programs in the country. Indeed, we have been recently ranked this year as the #2 Entomology Department in the world by the Center for World University Rankings (We were right behind the multi-campus University of Florida—never heard of them!). In June of this year, with mixed emotions, we say “good-bye and congratulations” to Brad Mullens who has decided to retire, but not “quit”. Brad intends to keep scientifically active with an office and small lab.

Both graduate and undergraduate Entomology programs remain strong as well as our participation in several interdepartmental graduate programs. In total we are training ~ 90 graduate students and ~40 undergraduates. One piece of exciting news here is that we have proposed a new 4+1 BS/MS program in which students can earn both a BS and a research based MS degree in 5 years. The proposal is currently working its way through the approval process.

At the risk of sounding like a broken record, I cannot thank you, our alumni and friends, enough for generously supporting our programs. Your donations have been important to support our Entomology graduates and undergraduates in pursuing their research activities and allowing them to travel to meetings and conferences to present their exciting results. Additionally, these donations have allowed the Department to continue recruiting the very best students into our programs. If you would like to make a donation to support our programs, please visit [http://www.entomology.ucr.edu/supporting\\_entomology/](http://www.entomology.ucr.edu/supporting_entomology/) and choose among the many Entomology funds that support our students. 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 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](mailto: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

## *A Special Thank you to all of our Contributors in 2017!*

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 [http://www.entomology.ucr.edu/supporting\\_entomology/](http://www.entomology.ucr.edu/supporting_entomology/) and then choose among the many Entomology funds that support our students and programs.

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

Dr. & Mrs. Ring T. Carde  
 Drs. Brian & Claire Federici  
 Justice Barton C. Gaut and Mrs. Merla C. Gaut  
 Mr. Alexander Knysbov  
 Ms. Rachel Levin  
 Dr. & Mrs. Randolph S. Malone  
 Mr. Edward H. Traynor  
 Mr. Gary R. Veeb and Mrs. Kathy Veeb  
 Anonymous  
 Alberta Conservation Association  
 Arborjet Inc.  
 Arysta LifeScience  
 BASF Corporation  
 Bayer  
 Brandt Consolidated, Inc.  
 California Association of Nurseries and Garden Centers  
 California Avocado Commission  
 California Date Commission  
 Caners Foundation  
 Certis USA, LLC.  
 Corkey's Pest Control  
 Covey Farms  
 Dewey Pest Control  
 Dow International Finance  
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 Fidelity Charitable Gift Fund  
 FMC Corporation  
 Hartz Mountain Corporation  
 Imerys Filtration Minerals, Inc.  
 James Lloyd-Butler Family LLC  
 Leavens Ranches  
 Lehigh Agricultural & Biological Services, Inc.  
 Marrone Bio Innovations, Inc.  
 MGK Insect Control Solutions  
 Minn-Dak Farmers Cooperative  
 Mud Creek Ranch Trust  
 NC State University  
 Pestgon, Inc.  
 PL-B Ranch LLC  
 Rees Agricultural Services  
 Rentokil North America, Inc.

### **MONARCH LEVEL continued...**

Shane L. Butler Family Growers, LLC  
 Syngenta Crop Protection, LLC  
 SynTech Research, Inc.  
 Tessengerlo Kerley, Inc. (TKI)  
 Univar USA Inc.  
 USPoultry  
 Vestaron Corporation  
 Westbridge Agricultural Products

### **QUEEN LEVEL (\$500 - \$999):**

Dr. Justin E. Nay and Dr. Elizabeth A. Boyd  
 Mr. & Mrs. Donald Deardorff  
 Mrs. Retha Keenan  
 Brokaw Ranch Co.  
 Durling Nursery, Inc.  
 Finch Family Foundation  
 Harbor Pest Control Inc.  
 Holden Research And Consulting

### **VICEROY LEVEL (\$100 - \$499):**

Mr. Daniel Cabn  
 Dr. Devin P. Carroll and Mrs. Claire Carroll  
 Mr. Patrick L. Clark and Mrs. Penny T. Clark  
 Mr. J. Roger Essick and Mrs. Patricia Essick  
 Mr. & Mrs. Richard M. Francisco  
 Dr. William A. Gregory  
 Dr. Nora A. Hackett  
 Dr. John M. Hash  
 Mr. Henry A. Hespenbeide, III  
 Dr. Michael E. Irwin and Ms. Bonnie J. Irwin  
 Mr. Dirk A. Jenkins and Mrs. Corinne Parker  
 Mr. & Mrs. Kirke Jorgensen  
 Dr. John N. Kabashima  
 Dr. James G. Leesch and Mrs. Carolyn Leesch

### **VICEROY LEVEL continued...**

Dr. & Mrs. E. Fred Legner  
 Dr. John C. Lubman  
 Mr. Ronald W. Lyons  
 Mr. Richard Marrocco and Mrs. Gayle J. Marrocco  
 Ms. Jennifer W. Merchant  
 Dr. Gregg Stephen Nuessly  
 Mr. John Pavela and Mrs. Pamela Pavela  
 Dr. Dale A. Powell and Mrs. Jun R. Powell  
 Mrs. Deidre Kowalczyk-Stowell and Mr. Craig Stowell  
 Mr. Daniel A. Strickman and Mrs. Linda J. Strickman  
 Mr. Carl F. Stucky  
 Dr. Kouichi R. Tanaka  
 Mr. Richard S. Vetter  
 Dr. Rufina N. Ward  
 Arthur Nichols Ranch  
 Beneficial Insectary, Inc.  
 Crystal Cove Farms  
 Donlon Ranch  
 Dudley Ranch Partnership  
 Lofthouse Ranch  
 McEwen Nursery  
 Nishimura Farms, Inc.  
 Premise Keepers Pest Solutions  
 Rancho Largo, LLC  
 Santa Paula Creek Ranch  
 Stehly Grove Management, Inc.  
 Tognazzini Avocado Partnership  
 West Coast Arborists, Inc.

### **DEPARTMENT SUPPORTERS:**

Mr. Harold Doshier  
 Ms. Carol L. Engelhardt  
 Mr. Glen W. Forister and Mrs. Ann C. Forister  
 Mr. Mazin M. Kasbou

**Continued on page 11...**

## *The Current Huanglongbing/ Asian Citrus Psyllid Situation in California*

Huanglongbing (HLB) is a bacterial disease that has devastated Florida citrus in just one decade. The vector, Asian citrus psyllid (ACP), was first detected in California in 2008 and the first HLB-infected tree was removed from a Los Angeles residence in 2012. During 2008-2012 the psyllid established itself throughout southern California and can now be found fairly easily, especially in the fall months. In the San Joaquin Valley, psyllids are more rarely found, probably because of greater extremes of temperature and the higher use of pesticides in this region.

The disease situation began to escalate in 2016 and 232 infected trees have been removed to date from residences in Los Angeles, Orange and Riverside counties. The regulatory activities that California enacted in the early days significantly slowed the spread of ACP and HLB relative to other citrus growing regions of the United States, but did not stop their spread because of limitations of ACP management in residential areas (60% of residences have citrus) and limitations of HLB detection early in the infection process (it takes 9 months or more to detect positive trees with PCR).

Mark Hoddle's and Richard Stouthamer's research teams are studying biological control and sterile insect techniques for managing ACP. Matt Daugherty studies the spread of ACP and its survival in retail nurseries. Frank Byrne is determining how best to use neonicotinoid insecticides to manage ACP in nurseries

and is monitoring for pesticide resistance. Beth Grafton-Cardwell's research team is evaluating the impact of pesticides on ACP and developing psyllid management strategies for commercial citrus. See <http://ucanr.edu/sites/ACP/> for maps and <http://ucanr.edu/sites/scienceforcitrushealth/> for the latest technologies for managing the disease.

**By Beth Grafton-Cardwell**



## *Pacific SW Regional Center of Excellence in Vector-Borne Diseases.*

In August 2017, the U.S. Centers for Disease Control and Prevention announced an \$8 million grant. Researchers at UC Riverside and UC Davis used this grant to launch the Pacific Southwest Regional Center of Excellence in Vector-Borne Diseases. The Center's funding continues through the end of 2021.

The Center has three goals: to conduct applied research to develop and test effective prevention and control tools for vector-borne disease outbreaks; to train vector biologists, entomologists, and physicians to address vector-borne disease concerns; and to strengthen and expand collaboration among academic communities and public health organizations at federal, state and local levels. "This Center of Excellence will bring together researchers using the latest

cutting-edge approaches in the laboratory and field with practitioners protecting public health," said Center Co-Director William Walton. "[This will allow us] to develop a community of practice and provide new technologies to prevent the occurrence of vector-borne diseases."

"This Center of Excellence in Vector Biology that ourselves and our colleagues at UC Davis will spearhead will greatly enable the integration of multiple approaches to vector control that our faculty are researching with training and implementation in the public health arena in our region. We have a very, very strong team," said Peter Atkinson, who was involved with the coordination and submission of the proposal to the CDC last Fall.

UC Davis and UC Riverside already have strong collaborations with the

California Department of Public Health (CDPH) and Mosquito and Vector Control Association of California (MVCAC), who will be critical partners in the Center.

"The southwestern U.S. is facing many new challenges in recent years from invasive mosquitoes and emerging pathogens, such as Zika virus, and we urgently need better options for their control," said UC Davis epidemiologist and Center Co-Director Chris Barker. "Funding for this center will enable important research to optimize the tools we have and to look for new ways forward, while training the next generation of public-health scientists."

You can find out more about the center at [pacvec.us](http://pacvec.us) or follow them on twitter @PacVecCenter

*Recent Honors and Awards***FACULTY**

**Ring Cardé:** Fellow of the California Academy of Sciences

**Alec Gerry:** Lifetime Achievement Award - Livestock Insect Workers Conference

**Beth Grafton-Cardwell:** 2017 Association of Applied IPM Ecologists Lifetime Achievement Award

**Kerry Mauck:** 2017 Early Career Award from the International Society for Chemical Ecology

**Timothy Paine:** Inaugural Holder of the Chair, Tokujii and Bettie L. Furuta Endowed Chair

**William Walton:** 2017 UCR Academic Senate Distinguished Teaching Award

2017 Western Region Award for Excellence in College and University Teaching in the Food and Agricultural Sciences, Western Academic Program Section, Western Region Agricultural Experiment Stations, USDA/NIFA

2017 Distinguished Service Award, Society for Vector Ecology  
President of the American Mosquito Control Association (beginning March 2018)

Pacific Southwest Center of Excellence in Vector-borne Diseases at UC Davis and UC Riverside

**Hollis Woodard:** Excellence in Early Career Award. (Pacific Branch, ESA)

**Naoki Yamanaka:** Pew Biomedical Scholar from the Pew Charitable Trusts

**Mark Hoddle, Joseph Morse, Richard Stouthamer (Asian Citrus Psyllid Biocontrol Taskforce):** Department of Pesticide Regulations Innovation in IPM award

**STUDENTS**

**Congratulations to the Linnaean Team.** They placed 1st at Pac Branch and went on to compete at the national meeting in Denver. The Pac Branch team was Austin Baker, Sarah Lillian, Amelia Lindsey, Kaleigh Russel, Jacqueline Serrano, and Tessa Shates.

**Austin Baker:** Robert and Peggy van den Bosch Memorial Scholarship

1st place: Ph.D. student presentation competition (Pacific Branch, ESA)

2nd place: Student presentation competition (national Meeting, ESA)

**Christine Dodge:** Ernest Propes Endowed Graduate Fellowship

**Amanda Hale:** Robert Lee Graduate Student Research Grant at Joshua Tree National Park

Mayhew Award for Graduate Research at Boyd Deep Canyon Shipley-Skinner Reserve Research Grant

Mildred E. Mathias Graduate Research Grant

NSF GRFP Honorable Mention

**Amelia Lindsey:** Ernest Propes Endowed Graduate Fellowship (UCR)

John Henry Comstock Graduate Student Award (Pacific Branch, ESA)

1st Place Graduate Student Presentation (National Meeting, ESA)

2nd Place Ph.D. Student Presentation (Pacific Branch, ESA)

Donors & Scholars Recognition Luncheon Selected Student Speaker (UCR)

Best Insect Photograph, Cellphone Category (Pacific Branch, ESA)

**Rachel Norris:** UCR NRT Integrated Computational Entomology (NICE) Fellowship

**Ryan Perry:** Robert van den Bosch Scholarship in Biological Control

Harry Scott Smith Biological Control Scholarship

**Kelsey Schall:** Charles W. Coggins Jr. Endowed Scholarship  
Robert and Peggy van den Bosch Scholarship in Biological Control

UCR Entomology Graduate Student Association Member of the Year

Robert O'Neil Award for Outstanding Ph.D. Student, International Organization for Biological Control

2nd Place Graduate Student Oral Competition for Biocontrol (National Meeting, ESA)

**Jacqueline Serrano:** 1st place for the Graduate Student TMP Competition: General Physiology at ESA 2017

**Tessa Shates:** Shipley-Skinner Reserve - Riverside County Endowment

**Samantha Smith:** UCR NRT Integrated Computational Entomology (NICE) Fellowship

**Robert Straser:** Milton D. and Mary M. Miller Plant Science Award (UC)

**Alexandra Vanecek:** 2017 Bernarr J. Hall Agricultural Scholarship

**Mari West:** Alberta Conservation Association's Grant in Biodiversity

UCR NRT Integrated Computational Entomology (NICE) Fellowship

**Alumni and Associates  
Tell us your News!**

Email us at

[richard.redak@ucr.edu](mailto:richard.redak@ucr.edu)

*Entomology Research Museum News*

2017 was a very busy year for the Museum, thanks mostly to several workers processing specimens; Stephanie Kim and Denzel Cardenas have been doing point-mounting, while Kristine Ziadie has been doing labeling. As is typical, there have been many donations, mostly from the usual donors - Gevin Kenney, John Pinto, Mark Hoddle, Gordon Pratt, and Greg Ballmer. Serguei and Doug had a few trips which added a small amount of material. In particular, a Malaise trap was installed by Serguei at the University of California, Santa Barbara Kenneth S. Norris Rancho Marino Reserve in the native Monterey pine forest (picture). It was kindly maintained by the reserve's Director, Don Canestro, during the summer of 2017. It was also found for the first time that the native Monterey pine aphid is present there on its native host tree, Monterey pine, in very low numbers whereas it is very abundant on the introduced Canary pines surrounding the Entomology Research Museum in the spring (Triapitsyn et al. 2015. *Boletín de la Asociación española de Entomología* 39 (1-2): 175-183). All told, we added some 10,000 specimens from either recent donations, vouchers, or processed backlog, in the past year.

The museum personnel have been involved in several projects, some of which resulted in acquisition of important, well-curated, databased, and voucher specimens identified to species by Serguei, such as almost 4,400 egg parasitoids of the Virginia creeper leafhopper, an invasive pest of cultivated grapes in Mendocino Co. and some other counties in northern California, and of many other leafhoppers in grape agroecosystems. Also of notice are hundreds of voucher specimens of the identified and nicely curated parasitoids of the cactus mealybugs from Argentina, Brazil, Puerto Rico, and Paraguay.

Adriean Mayor was around for the majority of the year working on our melyrid beetles, and especially vigorous about field work, with dozens of different collecting trips all over California. As with the material from previous decades, these will all play a part

in his revisionary work on the Dasytinae, and ultimately be deposited here.

A few significant loan returns came back this year. One of them, a loan of *Timema* walking sticks, had been on loan for 17 years, and the person who borrowed them had never even opened the boxes to examine them - which was a shame, as the material, upon careful examination, contains a few undescribed species, which may now form the basis for a new revision of the genus! This year, as last, a number of potential loans were avoided by sending database information or photographs instead of physical specimens, or tissue samples only. The number of new loans being generated by non-targeted requests via social media (mailing lists, FaceBook, etc.) continues to increase. As is usual, Doug gave several newspaper and magazine interviews and several tours, and continues to help manage traffic in the FaceBook groups that involve insect ID services, with help from former Entomology SRA Rob Velten.

The Museum's regular database has massively grown, to roughly 560,000 records, ~180,000 of which are IDed to genus-level or better, and georeferenced, which is fantastic for a collection of about 4 million.

For outreach, particularly notable was the exclusive tour of the Entomology Research Museum for Chancellor's Associates members on March 23, 2017.



Malaise trap used in native Monterey pine forest.

*Targeted Opportunities for Giving to UCR Entomology*

**New: 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 present 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 distinguished professor Ring Cardé.

**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.

**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.

**Visit** [http://www.entomology.ucr.edu/supporting\\_entomology/](http://www.entomology.ucr.edu/supporting_entomology/)

*New Alumni (Students graduating during 2017)*

Congratulations to our recent graduates!

We wish you the best as you pursue new opportunities!

**Graduate Students:**

Robert (Max) Collignon  
Amelia Lindsey  
Sarah Lillian  
Colin Umeda  
Kevin Welzel  
Kristin Wolfe  
Aviva Chaya Goldmann  
Chris Shogren  
Eric Gordon  
Sarah Frankenberg  
Jessica Coolidge

**Undergraduate Students:**

Blake Miles  
Iris Chien  
Seth Feitas  
Jose Alvarado Rojas  
Steve Truong  
Natalie Wong  
Christina Luu  
Timothy Dang  
Laura Leger  
Brian Wishart  
Lindsay Mo  
Michelle Sen

*Recently Retired...***Faculty**

Joseph Morse

**Staff**

Chris Hanlon

*24th annual UC Riverside  
Dept. of Entomology  
Student Seminar Day*

**Oral Presentation:**

1st: Chrissy Dodge  
2nd: Mari West

**Poster Presentation:**

1st: Austin Baker  
2nd: Kelsey Schall

**Undergraduate**

Andy Ta

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

Stephanie Castillo  
Genesis Chong  
Natalie Fischer  
Do Hyup Kim  
Robert Kresslein  
Laura Leger  
Gabrielle Martinez  
Rachel Norris  
Daniel Perry  
Madison Sankovitz  
Erica Sarro  
Samantha Smith  
Robert Straser  
Margaret Thairu  
Julie Tsecouras  
Xinmi Zhang

**Undergraduate Students:**

Tatiana Nicole Bush  
Anthony Michael Davari  
Benning Duc-Nguyen Le  
Jacob Christopher Hans  
Ana Victoria Mendez  
Jamie Han  
Colt Steven Bellman  
Juyung Yoo  
Benjamin Daniel Zeissner  
Steven Rodriguez

Picture by Amelia Lindsey.  
Winner for Best Insect Photo-  
graph, cellphone category At  
Pacific Branch, Entomology  
Society of America.

A dragonfly catching some sun  
in Ocala National Forest, dur-  
ing the ICE 2016 Meeting.



*Introducing Our Newest Faculty...*

**Boris Baer.** Professor for Pollinator Health, studied Ecology at the University of Zurich and earned my Ph.D. at the Swiss Federal Institute of Technology (ETH Zurich). My research interests include the immunity, reproduction and ecology of social insects, especially honeybees. I'm part of an international network of partners in Australia, China and Panama to develop solutions to counter recent declines in insect pollinators, which has become of global concern given our dependence on these animals for food production. To do this, I use classical field based approaches from evolutionary ecology and behavioral ecology in combination with lab based techniques such as proteomics to unravel the molecular basis of traits of interest. These include research programs that unravel the functioning of the insect immune system with the idea to find bees that are better able to resist widespread and damaging parasites or the study of the reproductive biology of bees to support breeding programs for increased health. I conduct research in close collaboration with industry partners such as beekeepers to facilitate the transfer of research outcomes in order to provide novel tools of integrative bee health management.



**Houston Wilson.** As an agricultural entomologist and extension specialist, I conduct applied research to reduce the impacts of insect and mite pests on California orchard crops, specifically tree nuts and stone fruits. My goal is to develop management programs that minimize pesticide use and/or impacts on people and the environment. Our lab's approach is rooted in the fundamentals of agroecology and integrated pest management. By leveraging our understanding of crops, insects and environment, we aim to develop alternatives practices that are practical and cost-effective for growers. I'm particularly interested in the development and evaluation of biological control strategies with an emphasis on plant-insect interactions, landscape ecology, insect movement, and regional population dynamics. Some of my current projects involve the use of pheromones and plant volatiles to improve pest trapping and mating disruption; cultural practices to increase overwintering mortality of soil-borne pests; area-wide sterile insect technique; and use of cover crops and trap crops to increase biological control.



**Lauren Ponisio.** With continued degradation of ecosystems, we need to know how to restore biodiversity, both for conservation and to ensure the provision of essential services provided by nature. To manage and restore diversity in human-modified systems, however, we need to understand the mechanisms that originally maintained biodiversity. The Ponisio lab studies the mechanisms operating in plant-pollinator communities that underlie diversity maintenance. We currently have three main projects in the lab: 1) we are investigating the long-term consequences of promoting native pollinators in agriculture (specifically almond) landscapes by examining how management practices affect the interacting risks of inadequate nutrition, parasites and pesticide exposure on native and managed bees; 2) in the Madrean Sky Islands, we are studying how community history affects interaction patterns, and 3) we are hoping to build flight cages in Ag. Ops. To examine how community disassembly (of plants) affects the interaction patterns of pollinators.



### *Timothy Paine is Inaugural Holder of the Tokuji and Bettie L. Furuta Endowed Chair*

The Tokuji and Bettie L. Furuta Endowed Chair was approved by the president of the University of California to further the study of the control and eradication of insects and diseases relating to natural pests in an allied field, including entomology, plant pathology, and plant sciences. Timothy Paine was appointed as the Inaugural Holder of the Chair in March 2017.

An endowed chair is one of the most important and honored spots in higher education, because it fosters academic excellence and recognizes superior faculty,” Chancellor Kim A. Wilcox explained. Established with significant donor gifts to an academic area, an endowed chair provides invaluable financial support to a professor for research, teaching, or service activities.

Dr. Tokuji Furuta was a University of California Cooperative Extension Specialist in UCR’s Department of Plant Science. Furuta joined the U.C. Cooperative Extension in 1965 after many years as a horticulture professor at Auburn University, in Alabama. He conducted and participated in myriad research projects and authored over 200 technical papers.

Bettie Furuta, Tokuji’s second wife, was an Ohio native who spent her early years as a horticulturist in the greater Cleveland area where she lectured on horticultural topics and flower arranging. She then moved to the island of Kauai, Hawaii, where she converted a plantation manager’s estate into the beautiful Olu Pua Botanical Garden and Plantation with her first husband. After her marriage to Dr. Furuta, her interest in horticulture and botany continued when they moved to Fallbrook. As a result of her husband’s work at UCR, she too became involved with the campus. She was an active member of UCR’s legacy group - the Watkins Society, and served as its chair. She passed away in December 2007 and generously bequeathed her entire estate to the UC Riverside Foundation.

The Tokuji and Bettie L. Furuta Endowed Chair, Dr. Timothy D. Paine is widely recognized for his work in landscape and forest entomology and the IPM of woody ornamentals. Paine’s research focus is to improve pest management through a better understanding of the biology, ecology, and physiology of herbivorous insects and their interactions with host plants, competitors, and natural enemies.

### *Keck Foundation award for research of membrane transporters hormones*

A team of researchers (Naoki Yamanaka (Entomology), Sachiko Haga-Yamanaka (Cell Biology) and Frances Sladek (Cell Biology)) seeking to upend a long-held theory explaining how hormones freely enter and exit cells, has received a a \$1 million award from the W. M. Keck Foundation.

Steroid hormones, chemical messengers derived from cholesterol in the body, regulate immune response, sexual maturation, cancer progression, metabolism, and inflammation. Despite their importance, little is known about how they cross cell membranes. Researchers in the field have long believed that diffusion explains the process. Yamanaka and his colleagues have found that membrane transporters are involved, facilitating the transport of steroid hormones across cell membranes. Importers are transporters that allow material into the cell.

The Keck Foundation grant will allow the researchers to characterize the transporter Ecdysone Importer (EcI) in the fruit fly, a model organism, and also to identify and characterize similar transporters in mammals using mouse models and human cells.

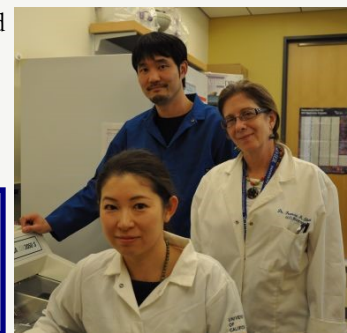
If successful, the UCR research, which impacts processes from pest control to cancer, would be the first to show the function and significance of a steroid hormone importer in vivo in any organism. It would facilitate the development of drugs that are more specific and less likely to result in resistance.

Transporters similar to EcI exist in all animals, including

humans. Largely responsible for uptake of drugs, they can be detected at many blood–tissue interfaces and have the potential to be functionally highly specific.

“We expect our work will show for the first time that membrane transporters serve as efficient conduits in mammalian cells, facilitating the entry of steroid hormones in their target tissues,” said Yamanaka, whose lab first identified EcI. “In preliminary studies on the fruit fly, we found transporters that can transport ecdysone in vitro and in vivo. Further research on mice and human cells will show that distinct EcI-like transporters regulate steroid hormone entry into different tissues, and that this uptake can be manipulated. Not only would this dramatically change our fundamental understanding of how steroid hormones function, but it also could lead to a new class of drugs and pest control reagents.”

Sachiko Haga-Yamanaka (seated), Naoki Yamanaka, and Frances Sladek (right). **Photo credit: I. Pittalwala, UCR.**



## *Invasive Ambrosia Beetles Threaten California Trees*

Southern California forests are under attack. The polyphagous and Kuroshio shot hole borers, two invasive ambrosia beetles from Southeast Asia, are contributing to the death and destruction of over fifty local tree species via an emerging plant disease called Fusarium dieback. Ambrosia beetles, a clade of wood-boring weevils, are known for their obligate mutualistic relationships with specific species of fungi: the beetles bore galleries into a host tree and inoculate the gallery walls with these fungi. Both larvae and adult beetles feed exclusively on the fungi. These fungi can also invade the host tree vascular system and block transport of water and nutrients, causing branch wilt and dieback.

The polyphagous shot hole borer was discovered in Los Angeles County in 2003, and symptoms of Fusarium dieback began to emerge in 2012. The Kuroshio shot hole borer was found later in San Diego County in 2014, and in a relatively short time both species have spread far from their ports of entry. Several groups at UC Riverside and UC Cooperative extension are collaborating to fight these beetles.

The Stouthamer lab is working on a wide variety of shot hole borer projects. Dr. Richard Stouthamer heads collecting trips to Southeast Asia to hunt for shot hole borers in their native range, with collaborator Dr. Akif Eskalen (UCR Department of Plant Pathology and Microbiology). Dr. Paul Rugman-Jones, associate project scientist, is looking into mitochondrial diversity and hybridization rate among different shot hole borer genotypes. 4th year PhD student Chrissy Dodge is also looking into shot hole borer population genetics, specifically rate and effects of outbreeding, as well as associations between the beetles and their fungal symbionts. 2nd year PhD student Deena Hussein is focusing on rearing strategies for potential biological control agents for shot hole borers that were collected in Taiwan. Lab assistants Veronica Fernandez and Iris Chien are performing field studies testing the efficacy of various lures and repellents. Iris is additionally performing flight studies on shot hole borers in a self-made flight chamber.

The Paine lab is also involved in shot hole borer research. The lab has focused on host preference for the beetle, interac-

tions with water stress and beetle development. Dr. Colin Umeda, who finished his PhD in Fall 2017 focused on temperature effects on beetle development, and developed climate models to predict the spread of the beetle in California. The Paine lab has also been responsible for testing many potential control options, including biorational pesticides as well as sanitation for infested wood.

So far, the extensive list of suitable host trees for shot hole borers include the agriculturally-important avocado; common landscape trees such as California sycamore, box elder, and King palm; and over a dozen native species, including several willows that dominate the fragile riparian ecosystems near the Mexican border. These beetles are therefore destructive pests in a range of urban, agricultural, and natural settings. Control options available at this time will only partially control the beetle. These invasive shot hole borers will continue to be a serious threat to both urban and wildland trees.

**By Christine Dodge (Stouthamer lab) and Michele Eatough Jones (Paine lab)**



*Top left:* A polyphagous shot hole borer female, with forceps for scale. *Bottom left:* A braconid parasitoid (*Simuatothorus* sp.), one of the potential biological control agents recovered from Taiwan. *Top right:* Shot hole borer galleries penetrate a log, showing growth of symbiotic (white) and contaminating (black) fungi. *Bottom right:* Iris Chien checks for parasitoid wasp emergence from logs in the UCR I&Q Facility.

*In Memoriam*

**Professor Emeritus and Entomologist James “Jim” Allen McMurtry** passed away peacefully at his home in Bend, Oregon, on 28 July 2017. Born in Lodi, California, on 21 September 1932, Jim’s early years were spent in farming communities of central California. In 1960, he joined the faculty of the Division of Biological Control, Department of Entomology, University of California Riverside (UCR). His professional career was largely devoted to the control of phytophagous mites using biological control agents.

His research focused on various aspects of the biology, ecology, and use of predatory phytoseiids for biological control of pest mites. Jim collaborated with numerous researchers nationally and internationally working on diverse crops worldwide. After his retirement in 1993, he continued to conduct taxonomic work on predatory mites, maintained collaborations worldwide, and routinely published his findings. He assisted UC Riverside Cooperative Extension Specialists in the development of a key to the phytoseiids of California and contributed towards instructing UC Farm Advisors on use of the key. Considered by many to be a most kind and generous individual, he will be missed by family, friends, and colleagues.

*Continued from page 3: A Special Thank you to all of our Contributors in 2017!***DEPARTMENT SUPPORTERS:  
Continued....**

*Ms. Cathleen M. Konyk  
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*Where are they now?*

I received both an MS and a PhD in entomology from UCR (last one in 1997!). My path in life (or education) has never been narrow nor direct. Before arriving at UCR, I earned degrees in microbiology and agriculture, but it was at UCR where I found my true love – symbiosis between fungi and insects! As a nontraditional first generation student, it was not just the excellent program that helped me succeed, but some very special mentors.

From UCR, I headed to UC Berkeley to work on the chemical ecology bark beetles. However, my time there was short-lived. I was hired within weeks to the position I still hold 20 years later – professor of forest entomology/pathology at the University of Montana, Missoula.

I still work on my ‘dream system’ – bark beetles and their symbionts, but within a fairly broad context - by choice. The research in my lab spans basic and applied research of bark beetle systems. My breadth in background and the solid foundation I gained at UCR in entomology and mycology have provided me the opportunity to conduct research and train students in just about every aspect of bark beetle systems imaginable from ecosystems to genomes. And, this has been good. We have learned a great deal by operating at

several levels of inquiry and everyone from the high school students to the postdocs in my lab ‘get the bigger picture.’ We have also managed to crack some of the bigger nuts (or should I say cones) in these important systems.

My work has taken me to many places around the globe including work in Africa for the last 13 years and has brought people from other lands to my lab to study as well. This diversity helps crack cones, too.

And no, my path hasn’t managed to narrow or straighten out! I am now almost done with a MS in Journalism and I have become extremely active in science communication – a critical part of education and promoting science.

Thank you UCR Entomology for your support in my winding (but very successful!) path and what you continue to give to students in your program so that they too succeed!

Diana L. Six



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### UCR Entomology Outreach



Our graduate student-led outreach program continues to inspire interest in entomology and science throughout the Inland Empire. In 2017 we presented at over 80 events, ranging from elementary school visits to science fairs.

Our outreach booths were packed with visitors at regional events such as the March for Science. Graduate students presented to nearly 30 schools and organizations such as the Humane Society.

Our most successful event was the second annual Riverside Insect Fair, organized by UCR Entomology students and the Riverside Metropolitan Museum. The third year of this fair proved to be even more popular than previous years, with an estimated 14,000 attendees! Undergraduate students, graduate students, staff, postdoctoral researchers, and faculty presented our research to the public, while vendors and an insect cooking demonstration entertained the crowd.

On campus, we presented at events such as CNAS Highlander Day, the UCR family housing dinner, and the fall and spring plant sales at the Botanic Garden.

The Entomology Outreach Program is a valuable tool for communicating the importance of entomology to the public. Our students are fantastic ambassadors, and deserve a big thank you for their service.

**By Quinn McFrederick  
Outreach Committee Chair**



Find out more at <http://entomology.ucr.edu/outreach/>