

98<sup>th</sup> Annual Meeting  
**Pacific Branch**  
**Entomological Society of America**



April 6<sup>th</sup> to 9<sup>th</sup>, 2014

**Marriott University Park Hotel**  
Tucson, AZ

*The Changing Landscape of Entomology*  
*In the Pacific Branch*





The Officers, Committee Chairs, and Members of the Pacific Branch of the Entomological Society of America wish to thank our sponsors, without whom our annual meeting would not be possible.

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# 2013-2014 Pacific Branch Entomological Society of America

## OFFICERS

President	Steven Naranjo, USDA-ARS
President-Elect	Lisa Neven, USDA-ARS
Past President	Brian Bret, DOW Agrosiences
Secretary-Treasurer	Jesse Richardson, DOW Agrosiences
Governing Board Rep	Douglas Walsh, Washington State University



## EXECUTIVE COMMITTEE

### MEMBERS AT LARGE

James Bethke, UC-ANR	2011-2014
Vaughn Walton, Oregon State University	2011-2014
Betsy Beers, Washington State University	2012-2015
Silvia Rondon, Oregon State University	2012-2015
Surendra Dara, UC-ANR	2013-2016
Vonnie Barlow, UC-ANR	2013-2016

## 2013-2014 COMMITTEE

Auditing  
Award Canvassing  
Award Selection  
Continuing Education  
Linnaean Games  
Local Arrangements  
Nominations  
Operations  
Program  
Registration  
Resolutions  
Site Selection (2016 meeting)  
Student Employment Opportunities  
Student Symposium  
Student Paper/Poster Competition  
Student Texting Competition  
Student Travel Awards

## CHAIR(S)

Tad Gantenbein  
Larry Godfrey, Vincent Jones  
Eric Natwick  
Pedro Hernandez  
Michael Costello  
Patricia Stock, Kathleen Walker  
Betsy Beers  
Ayman Mostafa  
David Crowder, Ricardo Ramirez  
David Haviland  
Vonnie Barlow  
Helen Spafford, Peter Follett, Russell Messing  
Jimmy Klick, Amber Vinchesi  
Rebecca Schmidt, Garrett Hughes  
Laura Lavine, Jamie Strange  
Rebecca Schmidt, Amber Vinchesi  
Peter Follett



# PBESA 2014 LOGISTICS & BASICS

## REGISTRATION

**All PBESA 2014 attendees must register.** You can continue to register by credit card up through the start of the meeting via the online registration link located on the meeting webpage:

<http://www.entsoc.org/Pacific/2014-esa-pacific-branch-annual-meeting>. For on-site registration credit card payments, cash and check will be accepted. Registration rates available at the same webpage. On-site registration is \$170 for members, \$195 for non-members, and \$60 for students, honorary/emeritus members, and guests. The registration desk will be open:

- Sunday, April 6, 1:00 pm to 5:00 pm in the Atrium
- Monday, April 7, 7:00 am to 4:00 pm in the Atrium
- Tuesday, April 8, 7:00 am to 4:00 pm in the Atrium
- Wednesday, April 9, 7:00 am to 10:00 am in the Atrium

## SCHEDULE

The “meeting-at-a-glance” grid on page 9 shows the overall schedule. Full chronological program with details including speakers, times and event locations, begins on page 10.

## MEETING INFORMATION AND SCHEDULE CHANGES

Schedule changes and other information of general interest will be posted throughout the conference at the PBESA registration desk.

## HOTEL INFORMATION

### Marriott University Park

880 East 2<sup>nd</sup> St

Tucson, AZ 85719

Tel: (800) 228-9290

The hotel is on the edge of the University of Arizona campus. PBESA guests will receive special \$5/day parking and free internet. There are abundant restaurants, cafes, and shopping nearby. Other nearby activities and sights include the Sonoran Desert Museum, Saguaro National Monument, Tohono Chul Garden, Pima Air Museum, hiking, biking, world-class golfing and more.

## HOTEL MAP

The Marriott’s meeting rooms are located on the 1st floor of the hotel and maps are provided on the back cover of this program. PBESA Mixer, Texting Competition and final rounds of the Linnaean Games are all held in the Arizona Historical Society Museum, across the street. See maps on page 61.

## TRANSPORTATION

- Tucson International Airport (TUS) 9 miles from the Marriott
- Phoenix Sky Harbor International Airport (PHX) 109 miles from the Marriott
- Hotel Shuttles and rental cars are available from both airports

## **SPECIAL MEETINGS AND EVENTS**

### **EXECUTIVE COMMITTEE**

The Pacific Branch Executive Committee will meet Sunday evening, April 6, from 6:30 p.m. to 8:30 p.m. in Ventana.

### **PLENARY SESSION**

We are pleased to present a Plenary Session by Dr. Timothy Swindle titled "Turning Points of Light into Places: 50 Years of Planetary Sciences at the University of Arizona" on Sunday, April 6th from 5:00 pm to 6:00 pm in Sabino/Pima. Dr. Swindle's studies the history of the solar system through noble gases in meteorites and lunar samples and heads the Lunar and Planetary Laboratory in the Department of Planetary Sciences at the University of Arizona.

### **BUSINESS MEETINGS**

The combination opening session/preliminary business meeting will be held from 8 am to 12:00 pm in Sabino/Pima on Monday morning, April 7th with the preliminary business meeting at the end of the opening session. The final business meeting will be held from 7:00 am to 8:00 am on Wednesday, April 9th in Ventana. Please plan to attend and make your voice heard regarding Pacific Branch officers and future meeting sites.

### **STUDENT COMPETITION JUDGES/MODERATORS MEETING**

Those who have volunteered to serve as moderators and judges for the student poster and paper competitions should attend an organizational meeting on Sunday at 6:00 pm in Canyon C. All judges should meet in Canyon C at 5:30 pm on Monday April 7th to finalize the student competition evaluations. Please see Laura Lavine or James Strange if you have any questions.

### **PBESA MIXER/PRESIDENT'S RECEPTION**

**(located next door at the Arizona Historical Society Museum)**

PBESA 2013-2014 President Steve Naranjo will host a reception for all registered PBESA 2014 attendees on Monday evening, April 7th, from 6:00 p.m. to 8:00 p.m. in the Treasures Gallery and Courtyard, Arizona Historical Society Museum. Museum displays will also be open for viewing (please see maps on final pages of the program).

### **TEXTING COMPETITION (located next door at the Arizona Historical Society Museum Auditorium)**

The third annual student texting competition will be held Monday evening, April 7th from 7:30 pm to 8pm as part of the PBESA Mixer in the Museum Auditorium (please see maps on final pages of the program). Test your entomological knowledge and texting skills in this fast and fun competition. Participants earn points for accurately and quickly texting insects' Latin names and the answers to insect trivia questions. There will be 3 rounds with 5 questions per round. The topics will be "Scientific Names", "PBESA Trivia", and "Entomology in the News". With each round, the questions will increase in difficulty and point value. The participant that accrues the most points is the winner. Don't let your auto-correct lead you astray. No points will be given for inaccurate or misspelled answers. Participants must supply their own mobile phone or texting device, and are responsible for text messaging rates that may be incurred. No traditional computer keyboards allowed, this is about texting speed, not typing speed! Registration is open until noon on the day of the competition. To register your mobile phone or other texting device, text your name to: 657-229-BUGS. Prizes are donated by BioQuip Products and BioQuipBugs.

## **LINNAEAN GAMES**

Preliminary rounds will be held in Madera from 10:15-noon on Monday, April 6<sup>th</sup>. The final rounds of the Linnaean Games will be held on Monday evening, April 7th from 8:00 pm to 10:00 pm in the Arizona Historical Society Museum Auditorium (please see maps on final pages of the program) following the reception. The winning PBESA team and runner-up team both qualify to represent the branch by competing in the National ESA Linnaean Games. The winning team also receives \$500 to offset their travel expenses to the national competition (Portland, OR, Nov 16-19, 2014).

## **AWARDS LUNCHEON**

The PBESA 2014 Awards Luncheon will be held on Tuesday, April 8th, from 12 pm to 1:25 pm in Sabino/Pima. Your full conference registration includes admission to the luncheon.

## **SOCIAL HOUR WITH POSTER PRESENTERS**

Join us for social hour with poster presenters on Tuesday from 5:00-6:00 pm. Grab a drink, check out the posters, and network with colleagues and friends.

## **EMPLOYMENT OPPORTUNITIES**

Pacific Branch Career Fair. Tuesday, April 8th in Sabino/Pima from 6:30 to 8:30 pm Are you looking for a job or interested in furthering your education? Do you wonder what opportunities are available? How should you prepare for your future career? Attend the PBESA Career Fair to get all your questions answered! Experienced and knowledgeable representatives from industry, academia and government sectors will be there to answer your questions, provide advice, and highlight some current openings in entomology. Please bring your questions, CV, and business cards. Appetizers will be provided and there will be fun prizes for students collecting the most employer business cards!

## **CONTINUING EDUCATION CREDITS**

Continuing Education Credits (CEC) will be available for Arizona, California, Idaho, Nevada and Washington. The What's New in Industry session on Monday, April 7th from 5:10-6:15PM in Madera will provide 1 credit and General Paper Session III on Wednesday, April 9th from 8:30AM-noon in Ventana will provide 3.5 credits. A registration table will be set up outside those rooms. Please contact Pedro Hernandez for questions or further information ([Phernandez@nichino.net](mailto:Phernandez@nichino.net))

# Presenter/Moderator Instructions

## POWERPOINT SLIDESHOW PRESENTATIONS

The presentation format will be PowerPoint files using laptop computers and projectors. Laptop computers and projection equipment will be available on site. Please contact Ayman Mostafa (ayman@cals.arizona.edu) with questions about Audio/ Visual operations.

Speakers who present submitted papers (Student Competition or General Session) should bring their PowerPoint files on a CD or flash drive (USB memory stick) to the Operations Committee table in the Vista Boardroom by the day before their scheduled session. Mac users please make sure your presentation file has a .ppt(x) file extension. Members of the Operations Committee will upload the file and you will be provided a chance to look over the presentation and ensure that it transferred correctly. Speakers needing special accommodations, that have very large files, or that plan on using embedded video should contact Ayman Mostafa (ayman@cals.arizona.edu) in advance of the session so that the Operations Committee can ensure that everything runs smoothly. There will be no formal area for students to practice.

Symposia speakers should deliver their presentations to the organizer of their symposium prior to the session. This should be done according to the time line and instructions provided by the organizer of each symposium. Symposium organizers will then compile the talks onto their own laptop computers and bring them to the session.

## POSTER DISPLAY PRESENTATIONS

Student posters will be on display Monday afternoon 1:30 to 5:00 pm in the Foyer. Students are requested to post their competition posters from 8:00 am to 12:00 pm on Monday. Students should be prepared to discuss their poster with judges at these times: from 1:30-3:00 for odd numbered posters and 3:30-5:00 for even numbered posters while judging is underway. Students who are not by their posters will not be judged. Student posters should be removed Monday evening between 5:00 to 6:00 pm. General Posters (non-students) should be posted between 6:00 to 10:00 pm in the Foyer on Monday evening for viewing on Tuesday. Tuesday poster presenters are encouraged to be present at their posters for viewing and interaction with other PBESA members from 5:00-6:00 PM during Social Hour with Poster Presenters. Moreover, breaks are popular times to view posters. All posters should be removed after 12:00 pm on Wednesday. Posting materials will be provided on site.

## MODERATOR RESPONSIBILITIES

Moderators for symposia are responsible for collecting and bringing symposia presentations on a personal laptop. Presentations for student competitions and general session papers will be collected by the **Operations Committee** and will be provided on a laptop for use in the session. Moderators of all symposia and general sessions should report to their meeting room 30 minutes in advance of the session to receive moderator training. If a presentation is completed early or cancelled, the moderator must ensure that the subsequent presentation begins at the scheduled time. Any questions regarding procedures or the roles of moderators can be addressed by contacting Ayman Mostafa (ayman@cals.arizona.edu).

SUNDAY	MONDAY	TUESDAY	WEDNESDAY
<b>2014 PBESA Meeting at a Glance</b>	Registration Desk Open 7 am to 4 pm		7 to 10 am
	8:00 am to 12:00 pm Opening Session/ Prelim Bus Mtg	8:00 am to 11:35 pm Orch. BioCont. Symp.  8:00 am to 6:00 pm General Posters	7:00 am to 8:00 am Final Bus Mtg.
	8:00 pm to 12:00 pm Hang Student Posters  10:15 to 12:00 pm Linnaean games (preliminary rounds)	8:15 am to 12:00 pm Student Symp. Vectors Symp. Landscapes Symp.  8:30 am to 12:00pm General TMP	8:00 am to 12:00 pm Symbiosis Symp. Marking Symp. Molecular Symp. Regulatory Symp. General TMP
	12:00 pm to 1:30 pm Lunch on your own	Noon to 1:25 pm Awards Luncheon	Noon Adjourn
Registration Desk Open 1 pm to 5 pm	1:30 pm to 5:35 pm Invasive Pest Symp. Pollination Symp.	1:30 pm to 5:00 pm General TMP Big Data Symp. Honey Bee Symp. Communicating Entomology Symp.	<b>This Meeting-at-a- glance grid is provided for your convenience.</b>  <b>For more details, including location of each event, refer to the full program starting on page 10.</b>
5:00 pm to 6:00 pm Plenary Session	1:30 pm to 5:00 pm Student Competition		
6:30 pm to 8:30 pm Exec Board Meeting	5:10 to 6:15 pm Industry Symp. 5:30 pm Remove posters Hang General posters 6:00 pm to 8:00 pm PBESA Mixer 7:30 pm to 8:00 pm Texting Comp. 8:00 pm to 10:00 pm Linnaean Games	5:00 pm to 6:00 pm Social Hour with Poster Presenters  6:30 pm to 8:30 pm Employment Fair	

# PBESA 2014 Program

***Marriott University Park***

Meeting Rooms Located on 1st Floor

PBESA Mixer Located at Arizona Historical Society Museum

(See maps on back cover)

## **Sunday, April 6**

### **REGISTRATION**

1:00 p.m. to 5:00 p.m.

*Atrium*

### **PLENARY SESSION**

Dr. Timothy Swindle

Turning Points of Light into Places:

50 Years of Planetary Science at the University of Arizona

5:00 p.m. to 6:00 p.m.

*Sabino/Pima*

### **STUDENT COMPETITION JUDGE & MODERATOR MEETING**

6:00 p.m. to 6:30 p.m.

*Canyon C*

### **EXECUTIVE BOARD MEETING**

6:30 p.m. to 8:30 p.m.

*Ventana*

**Sunday, April 6**

**Plenary Session:**

**“Turning Points of Light into Places: 50 Years of Planetary Science at the University of Arizona”**

**Dr. Timothy Swindle**

Department of Planetary Sciences

University of Arizona

5:00 p.m. to 6:00 p.m.

*Sabino/Pima*



Timothy D. Swindle has been studying the history of the solar system, primarily by analyzing noble gases in meteorites and lunar samples, for 30 years, beginning as a graduate student at Washington University in St. Louis, where he received his PhD. He is currently Professor of Geosciences and Planetary Sciences, Head of the Department of Planetary Sciences, and Director of the Lunar and Planetary Laboratory (LPL) at the University of Arizona in Tucson, Arizona, and Director of the Arizona Space Grant Consortium. He has published more than 75 scientific articles, and managed more than \$5 million in grants. He is also a collaborator on OSIRIS-REx, a NASA mission being managed through LPL that will return a sample of a near-Earth asteroid in the early 2020s. The University of Arizona produced the most publications about planetary exploration of any academic institution in the world in the first decade of the 21<sup>st</sup> Century, most of them from LPL. LPL has participated in dozens of interplanetary spacecraft missions, and also has two asteroid search programs, one of which has found more than half of the near-Earth asteroids currently known.

# Monday, April 7

## REGISTRATION

7:00 a.m. to 4:00 p.m.

Atrium

## OPENING SESSION AND PRELIMINARY BUSINESS MEETING

8:00 a.m. to 12:00 p.m.

*Sabino/Pima*

- 8:15 Welcome and Opening Remarks, Steve Naranjo, President Pacific Branch ESA
- 8:30 National ESA Report, Frank Zalom, President ESA
- 8:45 National ESA Governing Report, David Gammel, Executive Director, ESA
- 9:00 The Legacy of C.W. Woodworth, Brian Holden, Great grandson of C.W. Woodworth.
- 9:15 2014 C.W. Woodworth Winner presentation – James R. Carey  
*“Insect Demography: Emerging Concepts, Methods and Applications”*
- 9:35 2014 John Henry Comstock Award Winner presentation – Kelly Hamby  
*"Applications of Drosophila-Yeast Interactions to IPM."*
- 10:00 BREAK

### 10:30 Preliminary Business Meeting

Governing Board report, Douglas Walsh

Pacific Branch Executive Committee report, Steve Naranjo

Secretary/Treasurer report, Jesse Richardson

ESA Section reports, Section representatives

ICE 2016 Update, Walter Leal

Nominations, Betsy Beers

Announcements/New business, Steve Naranjo

12:00 LUNCH

## LINNAEAN GAMES (Preliminary rounds)

10:15 a.m. to 12:00 p.m.

*Madera*

## 12:00 to 1:30 pm—Lunch on Your Own

Student Competition Posters should be posted before 1:30 pm in the Marriott Foyer



Monday, April 7, 2014

## INVASIVE PESTS IN THE LANDSCAPE: BIOLOGY, ECOLOGY AND MANAGEMENT

1:30 p.m. to 5:35 p.m.

Sabino

Moderators and Organizers: Lori R. Spears<sup>1</sup>, Mark S. Hoddle<sup>2</sup> and Kent M Daane<sup>3</sup>, <sup>1</sup>Utah State Univ., Logan, UT, <sup>2</sup>Univ. of California, Riverside, CA, <sup>3</sup>Univ. of California, Berkeley, Berkeley, CA

**1 1:30 The tephritid fruit fly invasion of California: insidious cancer, bubbling cauldron or both?.**

**James R. Carey**, jrcarey@ucdavis.edu, Univ. of California, Davis, CA

**2 1:50 How did red palm weevil invade southern California and where did it come from?.**

**Mark S. Hoddle**, mark.hoddle@ucr.edu, Univ. of California, Riverside, CA

**3 2:10 Research on key invasive pests affecting ornamental plant production and the landscape industry.**

**James A. Bethke**, jabethke@ucdavis.edu, Univ. of California Cooperative Extension, Riverside, CA

**4 2:30 Invasions and outbreaks of *Bemisia tabaci* in optimum environments.**

**Steven J. Castle**, steven.castle@ars.usda.gov, USDA, Agricultural Research Service, Maricopa, AZ

**5 2:50 Tamarisk biocontrol: the introduction, rapid spread and impact of the leaf beetle *Diorhabda* spp. in North America.**

**Dan W. Bean**, dan.bean@state.co.us, Colorado Dept. of Agriculture, Palisade, CO

**6 3:10 Light brown apple moth: what can we learn from this unusual invader?.**

**Nicholas J Mills**, nmills@nature.berkeley.edu, Linda P. Buergi and Julie V. Hopper, Univ. of California, Berkeley, CA

**3:30 Break**

**7 3:35 The polyphagous shot hole borer: an invasive ambrosia beetle in southern California.**

**Timothy D. Paine**, timothy.paine@ucr.edu, Univ. of California, Riverside, CA

**8 3:55 Biology and management of an invasive stink bug, *Bagrada hilaris*, on desert cole crops.**

**John C. Palumbo**, jpalumbo@ag.arizona.edu<sup>1</sup>, Thomas M. Perring<sup>2</sup>, Jocelyn G. Millar<sup>2</sup>, Darcy A. Reed<sup>2</sup>, Nilima Prabhaker<sup>2</sup> and Ta-i Huang<sup>1</sup>, <sup>1</sup>Univ. of Arizona, Yuma, AZ, <sup>2</sup>Univ. of California, Riverside, CA

**9 4:15 Synergy and antagonism between reporting, surveying, and the media in the search for brown marmorated stink bug in Oregon.**

**Nik G. Wiman**, nik.wiman@oregonstate.edu<sup>1</sup>, Vaughn Walton<sup>1</sup>, Peter W. Shearer<sup>2</sup> and Silvia I. Rondon<sup>3</sup>, <sup>1</sup>Oregon State Univ., Corvallis, OR, <sup>2</sup>Oregon State Univ., Hood River, OR, <sup>3</sup>Oregon State Univ., Hermiston, OR

**10 4:35 Containing urban infestations of the Asian citrus psyllid: how effective are residential and nursery treatments?.**

**Matt Daugherty**, matt.daugherty@ucr.edu, Mark S. Hoddle, Elizabeth E. Grafton-Cardwell, Adam Olguin and Adam Zeilinger, Univ. of California, Riverside, CA

**11 4:55 *Drosophila suzukii*, an invasive pest of stone and small fruit: current impact and possible solutions.**

**Vaughn Walton**, waltonv@hort.oregonstate.edu<sup>1</sup>, Nik G. Wiman<sup>1</sup>, Samantha L. Tochen<sup>1</sup>, Daniel T. Dalton<sup>1</sup>, Jimmy Klick<sup>1</sup>, Jana C. Lee<sup>2</sup>, Betsey Miller<sup>1</sup>, Hannah J. Burrack<sup>3</sup>, Claudio Ioriatti<sup>4</sup>, Gianfranco Anfora<sup>4</sup>, Alberto Grassi<sup>4</sup>, Peter W. Shearer<sup>5</sup>, Kent M. Daane<sup>6</sup>, Xin-geng Wang<sup>6</sup>, Bernadine Strik<sup>1</sup>, Chuleui Jung<sup>7</sup> and Jeffrey C. Miller<sup>1</sup>, <sup>1</sup>Oregon State Univ., Corvallis, OR, <sup>2</sup>USDA ARS, Corvallis, OR, <sup>3</sup>North Carolina State Univ., Raleigh, NC, <sup>4</sup>Fondazione Edmund Mach (FEM) - IASMA, San Michele, Italy, <sup>5</sup>Oregon State Univ., Hood River, OR, <sup>6</sup>Univ. of California, Berkeley, CA, <sup>7</sup>Andong National Univ., Andong, South Korea

**12 5:15 Environmental limitations to spotted wing drosophila outbreaks in the Intermountain West.**

**Lori R. Spears**, lori.spears@usu.edu, Ricardo A. Ramirez and Diane G. Alston, Utah State Univ., Logan, UT

**Monday, April 7, 2014**

**POLLINATION BIOLOGY: ECOLOGICAL, EVOLUTIONARY, AND BEHAVIORAL PERSPECTIVES**

1:30 p.m. to 5:35 p.m.

*Pima*

Moderators and Organizers: Anne Leonard, Univ. of Nevada Reno, Reno, NV

**13 1:30 Pollinators influence ecological impacts of invasive Hymenoptera.**

**Erin E. Wilson-Rankin**, eewilson@ucsd.edu, Univ. of California Riverside, Riverside, CA

**14 1:50 Bringing Big Data to Small Bees.**

**Avery Russell**, averyrussell@email.arizona.edu and Daniel Papaj, Univ. of Arizona, Tucson, AZ

**15 2:10 Contrary Perspective to Native Bee Declines in Agricultural Landscapes: The Western Oregon Experience .**

**Sujaya Rao**, sujaya@oregonstate.edu, OSU, Corvallis, OR

**16 2:30 Distasteful or desired? Mechanisms of salt foraging in bees.**

**Anne Leonard**, anneleonard@unr.edu, Univ. of Nevada Reno, Reno, NV and Pavel Masek, Univ. of Nevada, Reno, Reno, NV

**17 2:50 What are the effects of honeybees on a plant-herbivorous pollinator mutualism?.**

**Andrew Mccall**, mccalla@denison.edu, Denison Univ., Granville, OH and Judith L. Bronstein, Univ. of Arizona, Tucson, AZ

**18 3:10 When is a cooperator a cheat? Facultative nectar robbing in a bee pollination mutualism.**

**Jessie Barker**, jlbarker@email.arizona.edu and Judith L. Bronstein, Univ. of Arizona, Tucson, AZ

**3:30 Break**

**19 3:35 Minute pollinators? Investigations into the role of thrips in manzanita.**

**Dorit Eliyahu**, dorit.eliyahu@gmail.com, Univ. of Arizona, Tucson, AZ

**20 3:55 The Evolution and Distribution of Floral Sonication Behavior Among the Anthophila (Hymenoptera:Bees) of the World.**

**Stephen Buchmann**, buchmann.stephen@gmail.com, Univ. of Arizona, Tucson, AZ and Sophie Cardinale, Agriculture Canada, Ottawa, ON, Canada

**21 4:15 Bumblebee foraging on complex floral rewards.**

**Jacob Francis**, jacob.franci@gmail.com, Univ. of Nevada, Reno, Reno, NV and Anne Leonard, Univ. of Nevada Reno, Reno, NV

**22 4:35 Learning and pollen foraging in bumblebees.**

**Felicity Muth**, fmuth@unr.edu, Univ. of Nevada, Reno, Reno, NV

**23 4:55 The role of uncertainty in foraging by pollinators.**

**Daniel Papaj**, papaj@email.arizona.edu, Univ. of Arizona, Tucson, AZ

**24 5:15 Bumblebee patch departure decisions at two spatial scales.**

**Carla Essenberg**, essenberg@email.arizona.edu and Daniel Papaj, Univ. of Arizona, Tucson, AZ

**Monday, April 7, 2014**

**UNDERGRADUATE**

1:30 p.m. to 2:15 p.m.  
Canyon A/B

Moderators: Chris Looney<sup>1</sup> and James Strange<sup>2</sup>, <sup>1</sup>Washington State Dept. of Ag., Olympia, WA, <sup>2</sup>USDA-ARS, Logan, UT

**25 1:30 The impacts of floral features on pollinator landing success.**

**Michael Rivera**, mrivera662@email.arizona.edu, The Univ. of Arizona, Tucson, AZ and Anna Dornhaus, Univ. of Arizona, Tucson, AZ

**26 1:42 Trap Design & Bait Preferences for *Drosophila suzukii*.**

**Monica Marcus**, marcusm@onid.orst.edu and Amy J. Dreves, Oregon State Univ., Corvallis, OR

**MASTERS**

2:15 p.m. to 4:00 p.m.  
Canyon A/B

Moderators: Chris Looney<sup>1</sup> and James Strange<sup>2</sup>, <sup>1</sup>Washington State Dept. of Ag., Olympia, WA, <sup>2</sup>USDA-ARS, Logan, UT

**28 2:15 Picky caterpillars: feeding choices and adaptation to Bt crops by cotton bollworm (*Helicoverpa zea*).**

**Robert Orpet**, rorpet@email.arizona.edu, Xianchun Li, Bruce Tabashnik and Yves Carriere, Univ. of Arizona, Tucson, AZ

**29 2:27 Evaluation of cross-resistance between Bt toxins produced by transgenic Bt cultivars in the bollworm (*Helicoverpa zea*).**

**Kara Welch**, kwelch@email.arizona.edu, Gopalan Unnithan, Xianchun Li, Bruce E. Tabashnik and Yves Carriere, Univ. of Arizona, Tucson, AZ

**30 2:39 Forty years biological control of Canada thistle in the western United States: Post-release efficacy assessment of *Urophora cardui* and *Hadroplontus litura*.**

**Joel R. Price**, pric4169@vandals.uidaho.edu and Mark Schwarzländer, Univ. of Idaho, Moscow, ID

**31 2:51 Surveillance of Tick-borne Diseases in Grand Canyon National Park.**

**Carter Hranac**, crh244@nau.edu<sup>1</sup>, Stephanie Cinkovich<sup>1</sup>, Cory Mosby<sup>2</sup>, Marlene Gaither<sup>3</sup> and Nathan Nieto<sup>1</sup>, <sup>1</sup>Northern Arizona Univ., Flagstaff, AZ, <sup>2</sup>National Park Service, Grand Canyon, AZ, <sup>3</sup>Coconino Health Dept., Flagstaff, AZ

**32 3:03 Surveillance and perceptions of Chagas disease (*Trypanosoma cruzi*) burden in Mexico.**

**Ellen Shelly**, ellenshelly@email.arizona.edu, Univ. of Arizona, Tucson, AZ

**33 3:15 Exploration of refuge preferences in the bark scorpion *Centruroides sculpturatus*.**

**Christopher Bibbs**, csbibbs@email.arizona.edu, Univ. of Arizona, Tucson, AZ and Dawn Gouge, Univ. of Arizona, Maricopa, AZ

**34 3:27 Understanding colony level prevalence and intensity of honey bee gut parasite, *Nosema ceranae*.**

**Cameron Jack**, cameronjeromejack@gmail.com, Oregon State Univ., Corvallis, OR

**35 3:39 A phylogenetic revision of *Minyomeres* Horn, 1876, and *Piscatopus* Sleeper, 1960 (Coleoptera: Curculionidae: Entiminae: Tanymecini).**

**Michael Andrew Jansen**, entoansen@gmail.com, Arizona State Univ., Tempe, AZ

Monday, April 7, 2014

PHD I

1:30 p.m. to 4:10 p.m.

Madera

Moderators: Loys Hawkins and Christeen Abbott, Suterra LLC

- 36 1:30 **Impact of increased insulin signaling in the fat body of *An. stephensi* and *Ae. aegypti* mosquitoes on lifespan and reproduction.**

Lewis Hun, Lewisvibulhun@email.arizona.edu, Univ. of Arizona, Tucson, AZ

- 37 1:42 **The Relationship Between Age, Wing Size, and Parity in *Aedes aegypti* Populations.**

Eileen Jeffrey Gutierrez, ejeffrey@email.arizona.edu, Teresa Joy, Kacey Ernst, Kathleen R. Walker and Michael A. Riehle, Univ. of Arizona, Tucson, AZ

- 38 1:54 **Functional analysis of a dual detector: Taking apart the mosquito receptor for CO<sub>2</sub> and skin odor.**

Genevieve Tauxe, genevieve.tauxe@email.ucr.edu and Anandasankar Ray, Univ. of California, Riverside, CA

- 39 2:06 **Ovipositional responses of *Culex tarsalis* to infochemicals produced by aquatic taxa in different guilds.**

Adena Why, why001@ucr.edu and William E. Walton, Univ. of California, Riverside, CA

- 40 2:18 **Heritable variation in the sensitivity of *Anopheles gambiae* to DEET.**

James Ricci, jricc001@ucr.edu<sup>1</sup>, David Turissini<sup>2</sup>, Raissa Green<sup>2</sup> and Bradley White<sup>3</sup>, <sup>1</sup>Univ. of California, Riverside, Riverside, CA, <sup>2</sup>Univ. of California Riverside, Riverside, CA, <sup>3</sup>Univ. of California, Riverside, CA

- 41 2:30 **Molecular evolution of key Notch-signaling components and the loss of antenna pseudosegmentation in paussine beetles.**

Cole Eskridge, peskridge@email.arizona.edu, Wendy Moore and Lisa Nagy, Univ. of Arizona, Tucson, AZ

2:42 Break

- 42 2:54 **A Taxonomic Revision of *Perdita* subgenus *Heteroperdita* (Hymenoptera: Andrenidae): Implications for Ecology and Biogeography.**

Zach Portman, zportman@gmail.com, Utah State Univ., Logan, UT and Terry L. Griswold, USDA, Agricultural Research Service, Logan, UT

- 43 3:06 **Population genetics of the *Bactrocera dorsalis* complex (Diptera: Tephritidae) based on mitochondrial DNA.**

Michael San Jose, mdsjose@hawaii.edu, Luc Leblanc and Daniel Rubinoff, Univ. of Hawaii, Honolulu, HI

- 44 3:18 ***Eleodes* and Allies: Phylogenetic Assessment of Amphidorini LeConte (Coleoptera:Tenebrionidae).**

M. Andrew Johnston, ajohnston@asu.edu<sup>1</sup>, Nico M. Franz<sup>1</sup> and Aaron D. Smith<sup>2</sup>, <sup>1</sup>Arizona State Univ., Tempe, AZ, <sup>2</sup>American Museum of Natural History, New York, NY

- 45 3:30 **Endogenous Plant Cell Wall Degrading Enzymes of the Phasmatodea.**

Matan Shelomi, mshelomi@ucdavis.edu, Univ. of California, Davis, Davis, CA

- 46 3:42 **Evolution of herbivory in *Scaptomyza* (Drosophilidae) associated with loss of critical yeast volatile receptors.**

Benjamin Goldman-Huertas, bgoldh@email.arizona.edu, Richard Lapoint, Robert Mitchell and Noah Whiteman, Univ. of Arizona, Tucson, AZ

- 47 3:54 **Experimental Evolution of *Wolbachia* in Novel Hosts.**

Amelia Lindsey, alind005@ucr.edu, Univ. of California Riverside, Riverside, CA and Richard Stouthamer, Univ. of California, Riverside, CA

Monday, April 7, 2014

PHD II

1:30 p.m. to 4:10 p.m.

Ventana

Moderators: Silvia Rondon<sup>1</sup> and Surendra Dara<sup>2</sup>, <sup>1</sup>Oregon State Univ., Hermiston, OR, <sup>2</sup>UC Cooperative Extension, San Luis Obispo, CA

**48 1:30 Efficacy of *Bacillus thuringiensis* var *galleriae* against Rice water weevil (*Lissorhoptrus oryzyophilus* Kuschel) in California Rice.**

**Mohammad-Amir Aghaee**, maghaee@ucdavis.edu, Univ. of California, Davis, CA and Larry D. Godfrey, Univ. of California, Davis, Davis, CA

**49 1:42 Field and laboratory evaluations of chlorantraniliprole as a termiticide in southern Arizona.**

Paul B. Baker and **Javier G. Miguelena**, javierm@email.arizona.edu, Univ. of Arizona, Tucson, AZ

**50 1:54 Harnessing an ecosystem service to reduce pesticide use: how and where natural enemy evenness is important for biological control.**

**Kevi C. Mace-Hill**, kmace@berkeley.edu, Univ. of California, Berkeley, CA

**51 2:06 Integrating biological control into management decisions for whitefly in cotton.**

**Timothy Vandervoet**, tvandervoet@email.arizona.edu<sup>1</sup>, Peter C. Ellsworth<sup>1</sup> and Steven Naranjo<sup>2</sup>, <sup>1</sup>Univ. of Arizona, Tucson, AZ, <sup>2</sup>USDA Agricultural Research Service, Maricopa, AZ

**52 2:18 Influence of flowering cover crops and landscape diversity on biological control in North Coast vineyards.**

**Houston Wilson**, houston@berkeley.edu<sup>1</sup>, Kent Daane<sup>2</sup> and Miguel Altieri<sup>1</sup>, <sup>1</sup>Univ. of California, Berkeley, CA, <sup>2</sup>Univ. of California, Berkeley, Berkeley, CA

**53 2:30 Crossmodal integration to assess the environmental safety of *Mogulones borraginis*.**

**Ikju Park**, park0563@vandals.uidaho.edu, Mark Schwarzländer and Sanford Eigenbrode, Univ. Idaho, Moscow, ID

**2:42 Break**

**54 2:54 Factors affecting communities of beneficial mites in Washington apple orchards.**

**Rebecca Schmidt**, rebecca.schmidt@wsu.edu and Elizabeth H. Beers, Washington State Univ., Wenatchee, WA

**55 3:06 Response of aphid vectors of *Potato leaf roll virus* to potato varieties in southern Idaho.**

**Shaonpius Mondal**, mond4500@vandals.uidaho.edu<sup>1</sup>, Erik J. Wenninger<sup>2</sup>, Pamela J.S. Hutchinson<sup>3</sup>, Sanford D. Eigenbrode<sup>1</sup>, Nilsa A. Bosque-Pérez<sup>1</sup>, Deepak Shrestha<sup>1</sup>, Jonathan L. Whitworth<sup>4</sup> and William E. Snyder<sup>5</sup>, <sup>1</sup>Univ. of Idaho, Moscow, ID, <sup>2</sup>Univ. of Idaho, Kimberly, ID, <sup>3</sup>Univ. of Idaho, Aberdeen, ID, <sup>4</sup>USDA-ARS, Aberdeen, ID, <sup>5</sup>Washington State Univ., Pullman, WA

**56 3:18 Why are there “lazy” ants? How worker inactivity can arise in social insect colonies.**

**Daniel Charbonneau**, dcharbonneau@email.arizona.edu, Anna Dornhaus, Neil Hillis, Maxwell Akorli and Karen Kierstead, Univ. of Arizona, Tucson, AZ

**57 3:30 Native Bee Foraging in the Presence of a Mass-Flowering Crop.**

**Hillary Sardinias**, hsardinias@berkeley.edu<sup>1</sup>, Kathleen Tom<sup>2</sup> and Claire Kremen<sup>1</sup>, <sup>1</sup>Univ. of California, Berkeley, CA, <sup>2</sup>Columbia Univ., New York, NY

**58 3:42 Determining the importance of nesting resource limitation on pollinator availability for serpentine endemic plants.**

**Margaret Scampavia**, mrscampavia@ucdavis.edu, Univ. of California, Oakland, CA

**59 3:54 Age Matters: The primer and releaser effects of young and old larvae on honey bee (*Apis mellifera*) foraging.**

**Kirsten Traynor**, ktraynor@asu.edu, Ying Wang, Colin S. Brent, Gro V. Amdam and Robert Page, Arizona State Univ., Tempe, AZ

**Monday, April 7, 2014**

**WHAT'S NEW IN INDUSTRY**

5:10 p.m. to 6:15 p.m.

*Madera*

Moderators and Organizers: Jesse M. Richardson, Dow AgroSciences, LLC, Hesperia, CA

**60 5:10 Torac 15EC and Bexar 15SC; two new insecticides for insect control in vegetables and TNV.**  
**Pedro Hernandez**, PHernandez@nichino.net, Nichino America, Inc, Wilmington, DE

**61 5:17 Syngenta products update.**  
**Joshua Adkins**, joshua.adkins@syngenta.com, Syngenta Crop Protection, Richland, WA

**62 5:24 Bayer CropScience product update.**  
**Dean Christie**, dean.christie@bayer.com, Bayer Crop Sciences, Spokane, WA

**63 5:31 Dow AgroSciences product update.**  
**Harvey Yoshida**, hyoshida@dow.com, Dow AgroSciences, Richland, WA

**64 5:38 Trece product update.**  
**Bill Lingren**, blingren@trece.com, Trece Incorporated, Adair, OK

**65 5:45 Marrone Bio Innovations 2014 product update.**  
**Cole Pearson**, cpearson@marronebio.com, Washington State Univ., Pullman, WA

**66 5:52 Valent product update.**  
**Todd Burkdoll**, todd.burkdoll@valent.com, Valent USA, Walnut Creek, CA

**67 5:59 FMC product update.**  
**Houston Joost**, Houston.Joost@fmc.com, FMC, Corp, Philadelphia, PA

**68 6:06 ISK Biosciences update.**  
**Sean Whipple**, whipples@iskbc.com, ISK Biosciences Corp., Kearney, MO

Monday, April 7, 2014

## STUDENT POSTER COMPETITION

1:30 pm to 5:00 pm

Foyer

Student posters will be on display Monday afternoon 1:30 to 5:00 pm in the Foyer. Students are requested to post their competition posters from 8:00 am to 12:00 pm on Monday. Students should be prepared to discuss their poster with judges at these times: from 1:30-3:00 for odd numbered posters and 3:30-5:00 for even numbered posters while judging is underway. Students who are not by their posters will not be judged.

### UNDERGRADUATE

1:30 p.m. to 5:00 p.m.

Foyer

**P1 Explorations in impacts of fumagillin and tylosin treatments on the honey bee (*Apis mellifera* L.) midgut microbiome *in vivo*.**

Ann C. Bernert, bernert.ann@gmail.com and Ramesh Sagili, Oregon State Univ., Corvallis, OR

**P2 *Xystocheir dissecta* (Wood) fluorescence compound extraction and identification (Polydesmida: Xystodesmidae).**

Alexander A. Nguyen, alanguyen@ucdavis.edu<sup>1</sup>, Kin Sing Lee<sup>1</sup>, Bruce D. Hammock<sup>1</sup>, Robert B. Kimsey<sup>1</sup> and Bruce Badzik<sup>2</sup>,  
<sup>1</sup>Univ. of California, Davis, Davis, CA, <sup>2</sup>National Park Service, San Francisco, CA

**P3 Effect of trichome density on predation by *Neoseiulus californicus* on the twospotted spider mite (*Tetranychus urticae*).**

Czarina Calayan, cec5@fpu.edu, Deanne Bell and Ruth Dahlquist-Willard, Fresno Pacific Univ., Fresno, CA

**P4 Effect of Pollen Feeding on Male Fertility in Two Solitary Bees, *Megachile rotunda* (Megachile) and *Nomia Melanderil* (Halictidae).**

Ethan Maier, ethan.c.maier@gmail.com and Heidi Dobson, Whitman College, Walla Walla, WA

**P5 Single-Cell Recordings to Elucidate Neuronal Response to Sex Pheromones in *Manduca Sexta*.**

Jessica Fletcher, JRaeF@email.arizona.edu, Jinglei Zhang, John Hildebrand and Hong Lei, Univ. of Arizona, Tucson, AZ

**P6 Characterizing the genetic changes of an outbred laboratory population of *Nasonia vitripennis* under individual and group selection for number of offspring.**

Shayan Shiehzadegan, shiehzadegan1@hotmail.com<sup>1</sup>, Christopher Dimond<sup>2</sup>, Ti Eriksson<sup>3</sup> and Jürgen Gadau<sup>3</sup>, <sup>1</sup>Arizona State Univ., Chandler, AZ, <sup>2</sup>Arizona State Univ., Tempe, AZ, <sup>3</sup>Arizona State Univ., Tempe, AZ

**P7 Habitat associations of hybrid populations of the *Culex pipiens* complex.**

Etienne Melese, emelese@ucmerced.edu<sup>1</sup>, Allan Inman<sup>2</sup>, Jason Bakken<sup>2</sup> and Andrea L. Joyce<sup>3</sup>, <sup>1</sup>Univ. of California, Merced, Merced, CA, <sup>2</sup>Merced County Mosquito Abatement District, Merced, CA, <sup>3</sup>Sierra Nevada Research Institute, Univ. of California Merced, Merced, CA

**P8 Test of natural and synthetic insecticides for the management of the brownbanded cockroach, *Supella longipalpa*.**

Joshua Djakaria, djakaria21@email.arizona.edu<sup>1</sup>, Javier G. Miguelena<sup>2</sup>, Paul B. Baker<sup>2</sup> and Andrew Conboy<sup>1</sup>, <sup>1</sup>Univ. Of Arizona, Tucson, AZ, <sup>2</sup>Univ. of Arizona, Tucson, AZ

**P9 Impact of Flower Organ Removal on Insect Visitation to Two Rose Species, *Rosa canina* and *R. rugosa*.**

Kaitie Ivory, kaitie@ivory.org, Whitman College, Walla Walla, WA

**P10 Ground Beetle (*Coleoptera: Carabidae*) Populations in Western Washington Prairies.**

Rachel Bietz, rachelbietz@gmail.com, The Evergreen State College, OLYMPIA, WA and Chris Maynard, WA State Dept of Ecology, Lacey, WA

**P11 Effect of Irrigation Method on Native Ground-nesting Rates.**

Collette Yee, colletteyee@berkeley.edu, Hillary Sardinias and Claire Kremen, Univ. of California, Berkeley, CA

**Monday, April 7, 2014**

**P12 A Survey of Pollen Feeding by Males of Five Solitary Bee Species.**

Mary Welter, welterm1@whitman.edu, Whitman College, Walla Walla, WA

**P13 Pollen consumption by adult females of two oligolectic bee species.**

Edward Younie, younieem@whitman.edu and Amber Lombard, Whitman College, Walla Walla, WA

**MASTERS**

1:30 p.m. to 5:00 p.m.

Foyer

**P14 Effects of floral visitation frequency and time of day on cumulative pollen deposition by bee assemblages in Southern California watermelon crops.**

Jacob Cecala, jmcecala@csupomona.edu and Joan M. Leong, California State Polytechnic Univ., Pomona, Pomona, CA

**P15 Evaluation of mosquito trap data and determining best measures for human disease prevention of West Nile Virus in Pinal County, Arizona.**

Megan Blain, meganm07@email.arizona.edu<sup>1</sup>, Graham Briggs<sup>1</sup>, Benjamin Coker<sup>1</sup>, Robin Harris<sup>2</sup>, Tamra Schuler<sup>1</sup> and Garry Bouquot<sup>1</sup>, <sup>1</sup>Pinal County Health Dept., Florence, AZ, <sup>2</sup>Univ. of Arizona, Tucson, AZ

**P16 Influence of Wildfire disturbance and post-fire seeding treatments on vegetation and insect diversity and abundance in sagebrush habitats in southwest Idaho, USA.**

Ashley Rohde, arohde@usgs.gov, U.S. Geological Survey, Boise, ID

**P17 Preliminary field trials of zingerone, a novel pheromone lure of fruit flies (Diptera: Tephritidae) in Hawaii.**

Jess R. Inskeep, jessinskeep@yahoo.com, Univ. of Hawaii, Honolulu, HI

**P18 Insect pathogenic factors of *Xenorhabdus bovienii* (Enterobacteriaceae) revealed by comparative genomic analysis and virulence assays.**

John McMullen II, jgm2@email.arizona.edu<sup>1</sup>, S. Patricia Stock<sup>1</sup>, Gaelle Bisch<sup>2</sup>, Sophie Gaudriault<sup>3</sup>, Jean Claude Ogier<sup>3</sup> and Sylvie Pages<sup>3</sup>, <sup>1</sup>Univ. of Arizona, Tucson, AZ, <sup>2</sup>Universite Montpellier II, Montpellier, France, <sup>3</sup>Institut National de la Recherche Agronomique, Montpellier, France

**PHD**

1:30 p.m. to 5:00 p.m.

Foyer

**P19 Interactions between behavioral thermoregulation and color change in pipevine swallowtail caterpillars (*Battus philenor*).**

Matthew Nielsen, nielsenm@email.arizona.edu and Daniel Papaj, Univ. of Arizona, Tucson, AZ

**P20 Primary polygyny and its potential fitness benefit in the desert honey ant *Myrmecocystus mendax* Wheeler (Hymenoptera: Formicidae).**

Ti Eriksson, th3@asu.edu, Arizona State Univ., Tempe, AZ

**P21 Role of chemical, visual, and surface wax cues in the host selection behavior of *Ceutorhynchus cardariae*, a potential biological control agent for *Lepidium draba*.**

Jessica Rendon, jkr021@gmail.com, Univ. of Idaho, Moscow, ID

**P22 Molecular gut analysis to determine generalist predators of Asian citrus psyllid (*Diaphorina citri*).**

Aviva Goldmann, agoldmann@gmail.com, Paul F. Rugman-Jones and Richard Stouthamer, Univ. of California, Riverside, CA

**P23 Characterizing the molecular mechanisms of insecticide resistance in *Phlebotomus papatasi* and *Lutzomyia longipalpis* sand flies (Diptera: Psychodidae).**

David Denlinger, david.denlinger@aggiemail.usu.edu<sup>1</sup>, Phillip G. Lawyer<sup>2</sup> and Scott A. Bernhardt<sup>1</sup>, <sup>1</sup>Utah State Univ., Logan, UT, <sup>2</sup>Laboratory of Parasitic Diseases, Bethesda, MD



**Monday, April 7, 2014**

**P24 A Tale of Two Subfamilies: Chyphotinae and Typhoctinae (Hymenoptera: Chyphotidae).**

**Emily A. Sadler**, sadler.e@gmail.com and James P. Pitts, Utah State Univ., Logan, UT

**P25 Whole-Genome Data Provide Insights into the Functions of Three Bacterial Symbionts of a Devastating Hemlock Pest.**

**Kathryn Weglarz**, kathryn.weglarz@usu.edu<sup>1</sup>, Nathan Havill<sup>2</sup>, John McCutcheon<sup>3</sup> and Carol D. von Dohlen<sup>1</sup>, <sup>1</sup>Utah State Univ., Logan, UT, <sup>2</sup>USDA, Forest Service, Hamden, CT, <sup>3</sup>Univ. of Montana, Missoula, MT

**P26 Variation in a transcription factor (CREB\_) expression in exocrine glands of honey bees and ants.**

**Rachna Nath**, rachna.nath@asu.edu, Arizona State Univ., Tempe, AZ

**P27 Hyper Alert: Confirming two Pakistani wasps are hyperparasitoids of valuable ACP biological control agents.**

**Allison Bistline-East**, allison.bistline@ucr.edu and Mark S. Hoddle, Univ. of California, Riverside, CA

**P28 Invasional meltdown: Are Argentine ants facilitating the invasion of Asian citrus psyllid (*Diaphorina citri*) in Southern California?.**

Mark S. Hoddle, Univ. of California, Riverside, CA and **Kelsey Schall**, kelseyschall@gmail.com, Univ. of California Riverside, Riverside, CA

**P29 A survey of billbugs (*Sphenophorus* spp.) in turf to improve management in the Intermountain West.**

**Madeleine Dupuy**, madeleine.dupuy@usu.edu, Lori R. Spears and Ricardo A. Ramirez, Utah State Univ., Logan, UT

**P30 Estimating the foraging range of the alfalfa leafcutting bee (*Megachile rotundata*) using transgenic pollen as a marker.**

**Natalie Boyle**, nboyle@wsu.edu and Doug Walsh, Washington State Univ., Prosser, WA

**P31 Impact of increased insulin signaling in the fat body of *Anopheles stephensi* and *Aedes aegypti* mosquitoes on lifespan and reproduction.**

**Lewis Hun**, Lewisvibulhun@email.arizona.edu, Univ. of Arizona, Tucson, AZ

**P32 Designing a Better Fly Trap: Spotted wing drosophila (*Drosophila suzukii*) and the impacts of trap factors on trap captures.**

**Alix Whitener**, alix.crilly@email.wsu.edu, Washington State Univ., Pullman, WA and Elizabeth H. Beers, Washington State Univ., Wenatchee, WA

**P33 Categorization of resistance factors against *Rhopalosiphum padi* (L.) in five selected varieties in soft winter wheat.**

**Qamar Zeb**, zebq@onid.oregonstate.edu, Oregon State Univ./The Univ. of Agriculture, Peshawar, Khyber Pakhtunkhwa - Pakistan, Hermiston, OR and Silvia Rondon, Oregon State Univ., Hermiston, OR

**Monday, April 7, 2014**

## **STUDENT COMPETITION JUDGES MEETING**

5:30 p.m. to 6:00 p.m.  
*Canyon C*

## **HANG GENERAL POSTERS**

6:00 p.m. to 10:00 p.m.  
*Foyer*

## **PBESA MIXER/ PRESIDENT'S RECEPTION**

6:00 p.m. to 8:00 p.m.  
*Arizona Historical Society Museum*  
*(Treasures Room and Courtyard, Displays Open)*

## **TEXTING COMPETITION**

7:30 p.m. to 8:00 p.m.  
*Arizona Historical Society Museum Auditorium*  
*Prizes Donated by BioQuip Prodcuts and BioQuipBugs*

## **LINNAEAN GAMES**

8:00 p.m. to 10:00 p.m.  
*Arizona Historical Society Museum Auditorium*

# Tuesday, April 8

## REGISTRATION

7:00 a.m. to 4:00 p.m.  
Atrium

## PROGRESS TOWARDS INTEGRATION OF CONSERVATION BIOLOGICAL CONTROL IN WESTERN APPLE, PEAR AND WALNUT ORCHARDS

8:10 a.m. to 11:35 a.m.  
Ventana

Moderators and Organizers: Vincent P. Jones, Washington State Univ., Wenatchee, WA

**69 8:10 Enhancing biological control in Western apple, pear, and walnut orchards: an overview.**

**Vincent P. Jones**, [vpjones@wsu.edu](mailto:vpjones@wsu.edu)<sup>1</sup>, Nicholas J. Mills<sup>2</sup>, Jay Brunner<sup>1</sup>, Elizabeth H. Beers<sup>1</sup>, David Horton<sup>3</sup>, Thomas R. Unruh<sup>3</sup>, Jessica Goldberger<sup>4</sup>, Peter W. Shearer<sup>5</sup>, Karina Gallardo<sup>1</sup> and Steve Castagnoli<sup>5</sup>, <sup>1</sup>Washington State Univ., Wenatchee, WA, <sup>2</sup>Univ. of California, Berkeley, CA, <sup>3</sup>USDA-ARS, Wapato, WA, <sup>4</sup>Washington State Univ., Pullman, WA, <sup>5</sup>Oregon State Univ., Hood River, OR

**70 8:20 Evaluating floral lures and herbivore-induced plant volatiles for monitoring natural enemies and improving biological control in western orchards.**

**Vincent P. Jones**, [vpjones@wsu.edu](mailto:vpjones@wsu.edu)<sup>1</sup>, Nicholas J. Mills<sup>2</sup>, David Horton<sup>3</sup>, Thomas R. Unruh<sup>4</sup>, Eugene Miliczky<sup>3</sup> and Peter W. Shearer<sup>5</sup>, <sup>1</sup>Washington State Univ., Wenatchee, WA, <sup>2</sup>Univ. of California, Berkeley, CA, <sup>3</sup>USDA - ARS, Wapato, WA, <sup>4</sup>USDA-ARS, Wapato, WA, <sup>5</sup>Oregon State Univ., Hood River, OR

**71 8:40 Comparative analysis of pesticide effects on natural enemies in Western orchards: a synthesis of laboratory bioassay data.**

**Nicholas J. Mills**, [nmills@berkeley.edu](mailto:nmills@berkeley.edu), Univ. of California, Berkeley, CA, Elizabeth H. Beers, Washington State Univ., Wenatchee, WA, Peter W. Shearer, Oregon State Univ., Hood River, OR and Thomas R. Unruh, USDA-ARS, Wapato, WA

**72 9:20 Gut content analysis of arthropod predators of the codling in Washington Apple Orchards.**

**Thomas R. Unruh**, [thomas.unruh@ars.usda.gov](mailto:thomas.unruh@ars.usda.gov)<sup>1</sup>, David Horton<sup>1</sup>, Eugene Miliczky<sup>2</sup> and Vincent P. Jones<sup>3</sup>, <sup>1</sup>USDA-ARS, Wapato, WA, <sup>2</sup>USDA - ARS, Wapato, WA, <sup>3</sup>Washington State Univ., Wenatchee, WA

**73 9:40 Assessing conservation biological control in Mid-Columbia pear orchards.**

**Peter W. Shearer**, [peter.shearer@oregonstate.edu](mailto:peter.shearer@oregonstate.edu), Kaushalya G. Amarasekare and Steve Castagnoli, Oregon State Univ., Hood River, OR

**10:00 Break**

**74 10:25 Assessing the economic value of biocontrol in western orchard systems.**

**Jay Brunner**, [jfb@wsu.edu](mailto:jfb@wsu.edu) and Karina Gallardo, Washington State Univ., Wenatchee, WA

**75 10:40 Who uses biological control and why? Evidence from surveys of walnut and pear growers in the western US.**

**Jessica Goldberger**, [jgoldberger@wsu.edu](mailto:jgoldberger@wsu.edu), Washington State Univ., Pullman, WA and Nadine Lehrer, Chatham Univ., Pittsburgh, PA

**76 11:00 Developing an outreach program for a regional, multi-year grant: lessons learned and future directions.**

**Angela Gadino**, [angela.gadino@wsu.edu](mailto:angela.gadino@wsu.edu), Jay Brunner, Ute Chambers, Wendy Jones and Vincent P. Jones, Washington State Univ., Wenatchee, WA

**77 11:20 Making new information accessible to the stakeholders through websites, decision support systems and smartphone apps.**

**Ute Chambers**, [uchambers@wsu.edu](mailto:uchambers@wsu.edu), Jay Brunner, Wendy Jones, Angela Gadino and Vincent P. Jones, Washington State Univ., Wenatchee, WA

Tuesday, April 8, 2014

## CHANGING LANDSCAPES, NEW FACES IN THE PACIFIC: TAXONOMY, BIODIVERSITY AND INVASIVE SPECIES (STUDENT SYMPOSIUM)

8:15 a.m. to 12:00 p.m.

Canyon A

Moderators and Organizers: Rebecca Schmidt<sup>1</sup> and Garrett Hughes<sup>2</sup>, <sup>1</sup>WSU, Wenatchee, WA, <sup>2</sup>Univ. of Arizona, Tucson, AZ

### 8:15 Welcoming Remarks

#### 79 8:20 Who's who of recent invasive species in the Pacific.

Alix Whitener, alix.cilly@email.wsu.edu, Washington State Univ., Pullman, WA

#### 80 8:40 What's the plan of attack? Responding to new invasive pests.

Jimmy Klick, klickj@hort.oregonstate.edu, Oregon State Univ., Corvallis, OR

#### 81 9:00 Hawaii's inconspicuous hymenopteran intruders.

Jordie Ocenar, jordie@hawaii.edu, Univ. of Hawaii, Honolulu, HI

#### 82 9:20 Calling for backup: foreign exploration for natural enemies of invasive species.

Betsey Miller, millebet@hort.oregonstate.edu<sup>1</sup>, Jeffrey C. Miller<sup>1</sup>, Vaughn Walton<sup>1</sup>, Peter W. Shearer<sup>2</sup>, Daniel T. Dalton<sup>1</sup>, Kent M. Daane<sup>3</sup> and Xin-geng Wang<sup>3</sup>, <sup>1</sup>Oregon State Univ., Corvallis, OR, <sup>2</sup>Oregon State Univ., Hood River, OR, <sup>3</sup>Univ. of California, Berkeley, CA

#### 83 9:40 Role of invasive arthropods in introducing new pathogens to the Pacific.

Danny Klittich, dsklittich@ucdavis.edu, Univ. of California, Davis, CA and Michael P. Parrella, Univ. of California, Davis, Davis, CA

### 10:00 Break

#### 84 10:20 Invasive ants in a desert city: survival strategies and effects on diversity.

Javier G. Miguelena, javierm@email.arizona.edu and Paul B. Baker, Univ. of Arizona, Tucson, AZ

#### 85 10:40 What would a bed bug do? How bed bug resurgence influences human behavior.

Elizabeth Gerardo, emjablon@hawaii.edu and Helen Spafford, Univ. of Hawaii, Honolulu, HI

#### 86 11:00 Some like it hot: Biology of the xerophilous *Anthophora (Heliophila)* (Hymenoptera: Apidae).

Michael Orr, michael.christopher.orr@gmail.com<sup>1</sup>, James P. Pitts<sup>1</sup> and Terry L. Griswold<sup>2</sup>, <sup>1</sup>Utah State Univ., Logan, UT, <sup>2</sup>USDA, Agricultural Research Service, Logan, UT

#### 87 11:20 Up high and down low: phylogeny and zoogeography of the exclusively Nearctic ground beetle genus *Rhadine* LeConte (Coleoptera: Carabidae: Platynini).

R. Antonio Gomez, ragomez@email.arizona.edu<sup>1</sup>, Kipling Will<sup>2</sup> and Wendy Moore<sup>1</sup>, <sup>1</sup>Univ. of Arizona, Tucson, AZ, <sup>2</sup>Univ. of California, Berkeley, CA

#### 88 11:40 The saga of Ruby: A recent man-made biodiversity hotspot of sand wasps and mutillid parasitoids.

Justin Schmidt, ponerine@dakotacom.net, Southwestern Biological Institute, Tucson, AZ

Tuesday, April 8, 2014

## ARTHROPOD VECTORS OF PATHOGENS: INTERACTIONS WITHIN ANIMAL, PLANT AND HUMAN SYSTEMS

8:15 a.m. to 12:00 p.m.

Canyon B

Moderators and Organizers: Nilsa Bosque-Pérez<sup>1</sup>, Michael A. Riehle<sup>2</sup> and Glen Scoles<sup>3</sup>, <sup>1</sup>Univ. of Idaho, Moscow, ID, <sup>2</sup>Univ. of Arizona, Tucson, AZ, <sup>3</sup>USDA, ARS, Pullman, WA

### 8:15 Welcoming Remarks

89 8:20 **Vector-borne pathogens of animals and plants: Divergent systems, common themes, with examples from the equine piroplasmiasis outbreak.**

Glen Scoles, scoles@vetmed.wsu.edu, USDA, ARS, Pullman, WA

90 8:40 **Molecular and population analysis of the *Bemisia tabaci* sibling species group to unravel the Cassava mosaic disease pandemic in sub-Saharan Africa.**

Judith K. Brown, jkbrown@ag.arizona.edu, Univ. of Arizona, Tucson, AZ

91 9:00 **Chemical virology: Development of chemical tools to deepen our understanding of DENV-host interactions.**

John Jewett, jjewett@email.arizona.edu, Univ. of Arizona, Tucson, AZ

92 9:20 **Co-feeding as model for transmission of tick-borne pathogens.**

Massaro Ueti, Washington State Univ., Pullman, WA

93 9:40 **Plant viruses manipulate arthropod vectors to enhance their spread.**

Nilsa Bosque-Pérez, nbosque@uidaho.edu and Sanford D. Eigenbrode, Univ. of Idaho, Moscow, ID

### 10:00 Break

94 10:20 **You are what you eat: The effects of ingested mammalian blood factors on vector arthropod immunity and physiology.**

Nazzy Pakpour, npakpour@ucdavis.edu, Univ. of California – Davis, Davis, CA

95 10:40 **Widespread movement of invasive cattle fever ticks (*Rhipicephalus microplus*) in southern Texas leads to shared local infestations on cattle and deer.**

Joseph D. Busch, joseph.busch@nau.edu, Northern Arizona Univ., Flagstaff, AZ

96 11:00 **Different categories of host defense to infection are not epidemiologically equivalent: Picky sharpshooters and Pierce's disease dynamics.**

Matt Daugherty, matt.daugherty@ucr.edu and Adam Zeilinger, Univ. of California, Riverside, CA

97 11:20 **Turning up the heat on *Aedes aegypti* vector competence to dengue virus.**

Jonathan Cox, jtcx@email.arizona.edu and Michael A. Riehle, Univ. of Arizona, Tucson, AZ

### 11:40 Discussion

**Tuesday, April 8, 2014**

**ECOLOGY AND MANAGEMENT OF INSECTS ACROSS AGRICULTURAL LANDSCAPES**

8:15 a.m. to 12:00 p.m.

*Madera*

Moderators and Organizers: Yves Carrière<sup>1</sup> and David Crowder<sup>2</sup>, <sup>1</sup>Univ. of Arizona, Tucson, AZ, <sup>2</sup>Washington State Univ., Pullman, WA

**8:15 Welcoming Remarks**

**98 8:20 Landscape- and Field-scale Effects on Thrips and Iris Yellow Spot Virus in Onion Systems.**

**Diane Alston**, diane.alston@usu.edu, Claudia Nischwitz, Daniel Drost, Jennifer R. Reeve, Corey V. Ransom, Bonnie Bunn and Kristie Buckland, Utah State Univ., Logan, UT

**99 8:40 A landscape perspective to managing diseases caused by *Xylella fastidiosa*.**

**Mark Sisterson**, mark.sisterson@ars.usda.gov, USDA, Parlier, CA

**100 9:00 Effects of land-use on the incidence of West Nile virus in the Pacific Northwestern USA.**

**David Crowder**, dcrowder@wsu.edu<sup>1</sup>, Elizabeth Dykstra<sup>2</sup> and Jeb Owen<sup>1</sup>, <sup>1</sup>Washington State Univ., Pullman, WA, <sup>2</sup>Washington State Dept. of Health, WA

**101 9:20 Using agent-based models to explore the effect of ecological complexity on tsetse suppression programs.**

**Steven L. Peck**, steven\_peck@byu.edu, Brigham Young Univ., Provo, UT

**102 9:40 Distribution of cereal aphid biotypes in the Pacific Northwest.**

**Thomas Seth Davis**, tsdavis1@gmail.com, Stephen Fricke, Ying Wu and Sanford D. Eigenbrode, Univ. of Idaho, Moscow, ID

**10:00 Break**

**103 10:20 Effects of farming practice on native bee communities in fragments of Palouse Prairie.**

**Paul Raymond Rhoades**, paul.r.rhoades@gmail.com<sup>1</sup>, Sanford D. Eigenbrode<sup>1</sup>, Lisette Waits<sup>1</sup>, Nilsa Bosque-Pérez<sup>1</sup> and Walter S. Sheppard<sup>2</sup>, <sup>1</sup>Univ. of Idaho, Moscow, ID, <sup>2</sup>Washington State Univ., Pullman, WA

**104 10:40 Influence of Cropping System on the Sustainability of Insecticide Efficacy.**

**John C. Palumbo**, jpalumbo@ag.arizona.edu, Univ. of Arizona, Yuma, AZ and Peter C. Ellsworth, Univ. of Arizona, Tucson, AZ

**105 11:00 Gaming the landscape: cultural control, farmer learning & group adoption.**

**Peter C. Ellsworth**, peterell@ag.arizona.edu, Univ. of Arizona, Tucson, AZ and Al Fournier, Univ. of Arizona, Maricopa, AZ

**106 11:20 Landscape-based approach for sustaining efficacy of Bt crops.**

**Yves Carriere**, ycarriere@ag.arizona.edu and Bruce E. Tabashnik, Univ. of Arizona, Tucson, AZ

**107 11:40 Insect resistance to transgenic crops: lessons from the first billion acres.**

**Bruce E. Tabashnik**, brucet@ag.arizona.edu and Yves Carriere, Univ. of Arizona, Tucson, AZ

Tuesday, April 8, 2014

## GENERAL PAPERS SESSION I

8:30 a.m. to 12:00 p.m.

Canyon C

Moderators: Andrea Joyce<sup>1</sup>, Anais Castagnola<sup>2</sup>, and Ricardo Ramirez<sup>3</sup>, <sup>1</sup>Univ. of California, Merced, Merced, CA, <sup>2</sup>Univ. of Arizona, Tucson, AZ, <sup>3</sup>Utah State Univ., Logan, UT

**108 8:30 Rare is common; common is rare: Patterns among North American bee faunas.**

**Terry Griswold**, tgris@biology.usu.edu, USDA-ARS Bee Biology and Systematics Laboratory, Logan, UT

**109 8:42 Unprecedented and exceptional forest insect outbreaks in southern Arizona.**

**Ann M. Lynch**, alynch@fs.fed.us, U.S. Forest Service, Tucson, AZ

**110 8:54 Population structure of leaf-footed bugs (*Leptoglossus* spp) in almonds and alternate host plants.**

**Andrea Joyce**, ajoyce2@ucmerced.edu, Univ. of California Merced, Merced, CA, David Doll, Univ. of California Cooperative Extension, Merced, CA, Kent M. Daane, Univ. of California, Berkeley, CA and Bradley S. Higbee, Paramount Farming Co, Bakersfield, CA

**111 9:06 Localization of "*Candidatus Liberibacter solanacearum*" in potato psyllids.**

**William Rodney Cooper**, rodney.cooper@ars.usda.gov, Venkatesan Sengoda and Joseph Munyaneza, USDA-ARS, Wapato, WA

**112 9:18 Bats as potential reservoirs of tick-borne pathogens in Arizona.**

**Stephanie Cinkovich**, ssc79@nau.edu and Nathan Nieto, Northern Arizona Univ., Flagstaff, AZ

**113 9:30 Understanding *D. sukuzii* needs for food, shelter, and oviposition in the landscape.**

**Amanda Ohrn**, ohrna@onid.orst.edu, Amy J. Dreves and Tammy Winfield, Oregon State Univ., Corvallis, OR

**114 9:42 Field management impacts pollination by honey bees (*Apis mellifera*) in hybrid onion seed production.**

**Rachael Long**, rflong@ucanr.edu, Univ. of California Cooperative Extension, Yolo County, Woodland, CA and Sandra Gillespie, Simon Fraser Univ., Burnaby, BC, Canada

**115 9:54 Continuous monitoring of honey bee (*Apis mellifera*) hive weight and internal temperature in Southern Arizona.**

**William Meikle**, william.meikle@ars.usda.gov, USDA – ARS, Tucson, AZ, Milagra Weiss, USDA-ARS, Tucson, AZ and Abby R. Stilwell, USDA, TUCSON, AZ

**10:06 Break**

**116 10:24 Stem nematode counteracts plant resistance of aphids in alfalfa.**

**Ricardo A. Ramirez**, ricardo.ramirez@usu.edu and Lori R. Spears, Utah State Univ., Logan, UT

**117 10:36 Non-economic entomology: the sex pheromones of giant silk moths.**

**Jocelyn G. Millar**, jocelyn.millar@ucr.edu<sup>1</sup>, Rafael Gago<sup>2</sup>, Kenneth F. Haynes<sup>3</sup>, J. Steven McElfresh<sup>4</sup>, Jeremy D. Allison<sup>5</sup>, Angel Guerrero<sup>2</sup> and Jessica McKenney<sup>6</sup>, <sup>1</sup>Univ. of California, Riverside, CA, <sup>2</sup>Dept of Biological Chemistry, Barcelona, Spain, <sup>3</sup>Univ. of Kentucky, Lexington, KY, <sup>4</sup>Univ. of California, Riverside, Riverside, CA, <sup>5</sup>Natural Resources Canada, Great Lakes Forestry Centre, Sault St Marie, ON, Canada, <sup>6</sup>Louisiana State Univ., Baton Rouge, LA

**118 10:48 Insect tissue specificity of the bacterium *Photorhabdus luminescens* and its nematode host during the infection process.**

**Anais Castagnola**, anais@email.arizona.edu, Univ. of Arizona, Tucson, AZ

**Tuesday, April 8, 2014**

- 119 11:00 **The explosive defensive system of paussine and brachinine bombardier beetles (Coleoptera Carabidae): comparative morphology and ultrastructure.**  
**Andrea Di Giulio**, andrea.digiulio@uniroma3.it<sup>1</sup>, Maurizio Muzzi<sup>1</sup> and Roberto Romani<sup>2</sup>, <sup>1</sup>Univ. of Roma Tre, Rome, Italy, <sup>2</sup>Univ. of Perugia, Perugia, Italy
- 120 11:12 **Molecular chemoreception in the Asian longhorned beetle: a first look from the ALB genome project.**  
**Robert Mitchell**, rfmitchell@email.arizona.edu, Univ. of Arizona, Tucson, AZ and Duane D. McKenna, Univ. of Memphis, Memphis, TN
- 121 11:24 **Antennation networks and division of labor in the seed harvester ant, *Pogonomyrmex californicus* (with a possible bonus slide on memory in the leafcutter ant, *Acromyrmex versicolor*).**  
**Ioulia Bespalova**, ibespalo@asu.edu, Arizona State Univ., Tempe, AZ
- 122 11:36 **Genomic signatures of adaptive evolution coupled with an evolutionary transition to herbivory in the Drosophilidae.**  
**Andrew Gloss**, agloss@email.arizona.edu, Richard Lapoint and Noah Whiteman, Univ. of Arizona, Tucson, AZ
- 123 11:48 **Evidence of recent (<60-yr) host race formation among sympatric populations of the apple maggot fly, *Rhagoletis pomonella* (Walsh, 1867), in the Pacific Northwestern United States.**  
**Monte Mattsson**, mattsson@pdx.edu, Portland State Univ., Portland, OR

## **AWARDS LUNCHEON**

**12:00 p.m. to 1:25 p.m.**

*Sabino/Pima*



# 2014 PBESA Awards Luncheon

Tuesday, April 8, 2014

12:00 pm to 1:25 pm

*Sabino/Pima*

**Your full-meeting registration includes admission to the luncheon.**

***Congratulations to the following recipients of Pacific Branch recognition awards:***

**C. W. Woodworth Award** – James R. Carey (University of California Davis)

**John Henry Comstock Graduate Student Award** – Kelly Hamby (University of California Davis)

**PBESA Award for Excellence in Teaching** – Diane E. Ullman (University of California Davis)

**PBESA Award for Excellence in Extension** – John Palumbo (University of Arizona Yuma Agricultural Center)

**PBESA Award for Excellence in Integrated Pest Management** – Peter Ellsworth (University of Arizona Maricopa Agricultural Center)

**PBESA Medical, Urban, and Veterinary Entomology Award** – Michael A. Riehle (University of Arizona)

**PBESA Plant-Insect Ecosystems Award** – Matthew Daugherty (University of California Riverside)

**PBESA Systematics, Evolution and Biodiversity Award** – Lynn Kimsey (University of California Davis)

**PBESA Distinction in Student Mentoring** – Martha S. (Molly) Hunter (University of Arizona)

**PBESA Student Leadership Award** – Rebecca A. Schmidt (Washington State University)

**Tuesday, April 8, 2013**

**NEW PERSPECTIVES FROM CHANGING LANDSCAPES AND BIG DATA**

1:30 p.m. to 4:50 p.m.

*Madera*

Moderators and Organizers: Steven Highland<sup>1</sup> and Rosalind James<sup>2</sup>, <sup>1</sup>Utah State Univ./USDA ARS, Logan, UT, <sup>2</sup>USDA - ARS, Logan, UT

**124 1:30 Temporal changes in crop diversity and its' potential impact on honeybees.**

**Rosalind James**, rosalind.james@ars.usda.gov, USDA - ARS, Logan, UT, Jonathan Aguilar, Kansas State Univ., Garden City, KS, John Hendrickson, USDA ARS, Mandan, ND and Steven Highland, Utah State Univ./USDA ARS, Logan, UT

**125 1:50 The promise and perils of retroactive data capture from museum specimens.**

**James Strange**, James.Strange@ars.usda.gov, USDA, Agricultural Research Service, Logan, UT, Jonathan Koch, Utah State Univ., Logan, UT, Harold Ikerd, USDA ARS, Logan, UT and Terry Griswold, USDA-ARS Bee Biology and Systematics Laboratory, Logan, UT

**126 2:10 Sampling large landscapes with aerial imagery - Pierce's disease in grapes.**

**Thomas M. Perring**, thomas.perring@ucr.edu, Univ. of California, Riverside, CA

**127 2:30 Research WAY outside the box: using satellite imagery and GIS to study and eradicate new world screwworm.**

**P. Phillips**, pamelaphillips@ars.usda.gov, USDA - ARS, Kerrville, TX

**128 2:50 Regional effects of farming practices and crop landscapes on insect biodiversity and community structure.**

**David Crowder**, dcrowder@wsu.edu, Washington State Univ., Pullman, WA

**3:10 Break**

**129 3:30 The importance of long-term temporal and spatial surveys for understanding climate change: the case of the Rocky Mountain Grasshoppers.**

**Cesar Nufio**, Cesar.Nufio@colorado.edu, Univ. of Colorado, Boulder, CO

**130 3:50 IPM trends: two decades of Arizona pesticide use data.**

**Al Fournier**, founier@cals.arizona.edu<sup>1</sup>, Peter C. Ellsworth<sup>2</sup>, Wayne Dixon<sup>1</sup>, Michael Guzy<sup>3</sup>, Paul Jepson<sup>3</sup> and John C. Palumbo<sup>4</sup>, <sup>1</sup>Univ. of Arizona, Maricopa, AZ, <sup>2</sup>Univ. of Arizona, Tucson, AZ, <sup>3</sup>Oregon State Univ., Corvallis, OR, <sup>4</sup>Univ. of Arizona, Yuma, AZ

**131 4:10 Historical pesticide use and risk in Arizona lettuce.**

**Michael Guzy**, guzym@engr.orst.edu<sup>1</sup>, Al Fournier<sup>2</sup>, Peter C. Ellsworth<sup>3</sup>, Wayne Dixon<sup>2</sup> and Paul Jepson<sup>1</sup>, <sup>1</sup>Oregon State Univ., Corvallis, OR, <sup>2</sup>Univ. of Arizona, Maricopa, AZ, <sup>3</sup>Univ. of Arizona, Tucson, AZ

**132 4:30 Honeybees (*Apis mellifera*) and big data: spatial and temporal patterns.**

**Steven Highland**, Steven.Highland@ARS.USDA.GOV, Utah State Univ./USDA ARS, Logan, UT and Rosalind James, USDA - ARS, Logan, UT

**Tuesday, April 8, 2013**

**HONEY BEE NUTRITION: FROM THE MOLECULAR TO THE COLONY LEVEL PERSPECTIVE**

1:30 p.m. to 4:40 p.m.

*Ventana*

Moderators and Organizers: Gloria DeGrandi Hoffman and Vanessa Corby-Harris, USDA-ARS, Tucson, AZ

**1:30 Introductory Remarks**

**133 1:40 The effect of nuclear-cytoplasmic incompatibilities on growth and survival.**

**Juergen Gadau**, jgadau@asu.edu, Arizona State Univ., Tempe, AZ

**134 2:10 The role of insulin pathway in honey bee larval development and adult behavior.**

**Ying Wang**, Ying.Wang6@asu.edu, Arizona State Univ., Tempe, AZ

**135 2:40 What high-throughput methods can tell us about malnutrition in honey bees.**

**Vanessa Corby-Harris**, vanessa.corby@ars.usda.gov, USDA-ARS, Tucson, AZ

**3:10 Break**

**136 3:30 Honey bee intracolony genetic diversity influences pollen consumption and protein allocation among nestmates.**

**Bruce Eckholm**, beckholm@ag.arizona.edu, Univ. of Arizona, Tucson, AZ

**137 4:00 Comparing nutrient acquisition from natural forage vs. protein supplements and measuring the effects on honey bee colony growth.**

**Gloria DeGrandi Hoffman**, gloria.hoffman@ars.usda.gov, USDA-ARS, Tucson, AZ

**138 4:30 Hitting at a higher level: The effects of honey bee pollen nutrition on coordinated colony function.**

**Mark J Carroll**, Mark.Carroll@ars.usda.gov, USDA - ARS, Tucson, AZ

**Tuesday, April 8, 2014**

**COMMUNICATING ENTOMOLOGY TO THE PUBLIC**

1:30 p.m. to 5:00 p.m.

*Canyon B*

Moderators and Organizers: Kathleen Walker<sup>1</sup> and Sujaya Rao<sup>2</sup>, <sup>1</sup>Univ. of Arizona, Tucson, AZ, <sup>2</sup>OSU, Corvallis, OR

**139 1:30 Who cares about fruitflies? - Communicating scientific models to kids .**

**Kathleen Walker**, krwalker@cals.arizona.edu, Univ. of Arizona, Tucson, AZ

**140 1:50 Edutainment: Education with a smile.**

**Dawn Gouge**, dhgouge@ag.arizona.edu, Univ. of Arizona, Maricopa, AZ

**141 2:10 The Arthropod Zoo Hall of Biodiversity: Moving from 'Gee wiz' to integrative learning in insect outreach education .**

**James A. Robertson**, erotylid@gmail.com, Tanya Renner and Wendy Moore, Univ. of Arizona, Tucson, AZ

**142 2:30 A Fresh Aesthetic: The Transformation of the Contemporary Documentary.**

**Matthew Velazquez**, matthewvelazquez@email.arizona.edu, Univ. of Arizona, Tucson, AZ

**143 2:50 Inspiring Entomological Interest in the Non-bug Loving Student.**

**Sujaya Rao**, sujaya@oregonstate.edu, OSU, Corvallis, OR

**3:10 Break**

**144 3:30 Bugs in the System: Developing a multi-faceted Extension program to enhance implementation of IPM and biological control.**

**Robin Rosetta**, robin.rosetta@oregonstate.edu, Oregon State Univ., Aurora, OR

**145 3:50 Communicating Pesticide Information Through Transferable Training Modules to Hispanic Community Health Workers.**

**Denise Moreno**, dmoreno@pharmacy.arizona.edu, Univ. of Arizona,, Tucson, AZ

**146 4:10 Entomological Experiences dealing with the Press.**

**Catherine Loudon**, cloudon@uci.edu, Univ. of California, Irvine, Irvine, CA

**147 4:30 Are humans really smarter than insects?.**

**Jeremy N. McNeil**, jmcneil2@uwo.ca, Western Univ. (formerly "Univ. of Western Ontario"), London, ON, Canada

Tuesday, April 8, 2014

## GENERAL PAPERS SESSION II

1:30 p.m. to 5:00 p.m.

Canyon C

Moderators: Erik Wenninger<sup>1</sup> and Christine Lynch<sup>2</sup>, <sup>1</sup>Univ. of Idaho, Kimberly, ID, <sup>2</sup>Univ. of Hawaii, Honolulu, HI

**148 1:30 Xxpire, a new insecticide for control of ornamental pests in outdoor nurseries.**

**Vanelle Peterson**, vfpeterson@dow.com, Dow AgroSciences LLC, Mulino, OR, James Breuninger, Dow AgroSciences, Indianapolis, IN, Anita Alexander, Dow AgroSciences, Lawrenceville, GA and Daniel Loughner, DowAgroSciences, Lawrenceville, NJ

**149 1:42 Monitoring potato psyllids, *Candidatus Liberibacter solanacearum*, and zebra chip disease in Idaho.**

**Erik Wenninger**, erikw@uidaho.edu<sup>1</sup>, Nora Olsen<sup>1</sup>, Michael Thornton<sup>2</sup>, Phillip Nolte<sup>3</sup>, Jeff Miller<sup>4</sup> and Alexander Karasev<sup>5</sup>, <sup>1</sup>Univ. of Idaho, Kimberly, ID, <sup>2</sup>Univ. of Idaho, Parma, ID, <sup>3</sup>Univ. of Idaho, Idaho Falls, ID, <sup>4</sup>Miller Research, LLC, Rupert, ID, <sup>5</sup>Univ. of Idaho, Moscow, ID

**150 1:54 From clusters to pomace: *Drosophila suzukii*'s role in Oregon Grape Vineyards.**

**Amy J. Dreves**, Amy.Dreves@oregonstate.edu<sup>1</sup>, Patricia Skinkis<sup>1</sup>, Jana C. Lee<sup>2</sup> and Adam Cave<sup>3</sup>, <sup>1</sup>Oregon State Univ., Corvallis, OR, <sup>2</sup>USDA ARS, Corvallis, OR, <sup>3</sup>USDA - ARS, Corvallis, OR

**151 2:06 Mid-Atlantic experience with two late season invasive pests of vineyards: Brown marmorated stink bug and spotted wing drosophila.**

**Douglas G. Pfeiffer**, dgppfeiff@vt.edu<sup>1</sup>, Sanjay Basnet<sup>1</sup>, Taliaferro Trope<sup>2</sup>, Meredith Shrader<sup>1</sup>, James Wahls<sup>3</sup>, Curt A. Laub<sup>1</sup> and Ryan Mays<sup>1</sup>, <sup>1</sup>Virginia Tech, Blacksburg, VA, <sup>2</sup>Virginia Tech, Christiansburg, VA, <sup>3</sup>Virginia Tech Univ., Blacksburg, VA

**152 2:18 Spotted wing drosophila (*Drosophila suzukii*) in British Columbia; an update on monitoring and risk mitigation in Fraser Valley berry crops.**

**Tracy Hueppelsheuser**, Tracy.Hueppelsheuser@gov.bc.ca, British Columbia Ministry of Agriculture, Abbotsford, BC, Canada

**153 2:30 Current Status of Myoporum Thrips (*Klambothrips myopori*) in Hawaii.**

**Leyla V. Kaufman**, leyla@hawaii.edu<sup>1</sup>, Cynthia B. A. King<sup>2</sup>, Elliott Parsons<sup>3</sup>, Mark Wright<sup>4</sup> and Andrew Kaufman<sup>4</sup>, <sup>1</sup>Univ. of Hawaii - Manoa, Honolulu, HI, <sup>2</sup>State of Hawaii, Honolulu, HI, <sup>3</sup>Division of Forestry and Wildlife, Kona, HI, <sup>4</sup>Univ. of Hawaii, Honolulu, HI

**154 2:42 Oregon host range testing for *Trissolcus japonicus* – a potential biological control agent for brown marmorated stink bug.**

Barry Bai<sup>1</sup>, **Christopher S. Hedstrom**, hedstroc@onid.oregonstate.edu<sup>2</sup> and Helmuth W. Rogg<sup>1</sup>, <sup>1</sup>Oregon Dept. of Agriculture, Salem, OR, <sup>2</sup>Oregon State Univ., Corvallis, OR

**155 2:54 Renewed effort in Nevada for mapping of invasive insects and weeds using EDDmaps.**

**Joy L. Newton Paterson**, joysbugs@gmail.com and Jay Davison, Univ. of Nevada Cooperative Extension, Fallon, NV

**3:06 Break**

**156 3:24 Non-target insects trapped with a food-type bait versus chemical lure for spotted wing drosophila.**

**Todd B. Adams**, tadams@oda.state.or.us<sup>1</sup>, Dong H. Cha<sup>2</sup>, Peter J. Landolt<sup>2</sup> and Helmuth W. Rogg<sup>1</sup>, <sup>1</sup>Oregon Dept. of Agriculture, Salem, OR, <sup>2</sup>USDA, Agricultural Research Service, Wapato, WA

**157 3:36 Effects of tree density, over-tree evaporative cooling, and temperature data source on the accuracy of insect prediction models in apple.**

**Ute Chambers**, uchambers@wsu.edu and Vincent P. Jones, Washington State Univ., Wenatchee, WA

Tuesday, April 8, 2014

- 158 3:48 **Managing threecorned alfalfa hopper, *Spissistilus festinus* and potato leafhopper, *Empoasca fabae* with a single "at stubble" insecticide application in forage alfalfa: Strategy for economically viable Insect management.**  
Vonnny Barlow, mailto:vmbarlow@ucdavis.edu, Univ. of California Davis, Blythe, CA
- 159 4:00 **The use of baiting technique for western yellowjacket IPM.**  
Dong-Hwan Choe, donghwan.choe@ucr.edu, Univ. of California - Riverside, Riverside, CA, Kathleen Campbell, Dept. of Entomology, Riverside, CA, Michael K. Rust, Univ. of California, Riverside, CA, John Kabashima, UC Cooperative Extension, Costa Mesa, CA and Monica Dimson, Univ. of California Cooperative Extension, Costa Mesa, CA
- 160 4:12 **Augmentative- and conservation biological control of corn earworm, *Helicoverpa zea*, in Hawaii.**  
Roshan Manandhar, Lincoln Univ., Jefferson City, MO and Mark G. Wright, markwrig@hawaii.edu, Univ. of Hawaii - Manoa, Honolulu, HI
- 161 4:24 **The trypsin-like and chymotrypsin-like proteinase of cotton bollworm (*Helicoverpa armigera*) play an important role in the toxicity and resistance of protoxin Cry1Ac.**  
Jizhen Wei, weijizhen1986@163.com, Chinese Academy of Agricultural Sciences, Beijing, China and Gemei Liang, Chinese Academy of Agricultural Science, Beijing, China
- 162 4:36 **Lethal and sublethal effects of field-aged insecticide residues on the green lacewing *Chrysoperla johnsoni* (Neuroptera: Chrysopidae).**  
Kaushalya G. Amarasekare, kaushalya.amarasekare@oregonstate.edu, Preston H. Brown and Peter W. Shearer, Oregon State Univ., Hood River, OR
- 163 4:48 **Commodity export regulation and emerging niche markets: moringa tree, *Moringa oleifera* Lam., and fruit fly species (Family Tephritidae) in Hawai'i.**  
Christine Lynch, calynch@hawaii.edu<sup>1</sup>, Helen Spafford<sup>1</sup> and Nicanor Liquido<sup>2</sup>, <sup>1</sup>Univ. of Hawaii, Honolulu, HI, <sup>2</sup>USDA-APHIS-PPQ, Honolulu, HI

## SOCIAL HOUR WITH POSTER PRESENTERS

5:00 p.m. to 6:00 p.m.

Foyer

## EMPLOYMENT FAIR

6:30 p.m. to 8:30 p.m.

Sabino/Pima

Tuesday, April 8, 2014

## SECTION GENERAL POSTER SESSION

8:30 a.m. to 6:00 p.m.  
Foyer

Tuesday poster presenters are encouraged to be present at their posters for viewing and interaction with other PBESA members from 5:00-6:00 PM. Moreover, breaks are popular times to view posters and authors are encouraged to be present at these times.

**P34 The effect of Cyazypyr™ on psyllid pests that vector the Huanglongbing and Zebra Chip diseases in citrus and potatoes, respectively.**

Juan M. Alvarez, juan.m.alvarez@usa.dupont.com<sup>1</sup>, R. Cameron<sup>1</sup>, Hector E. Portillo<sup>1</sup>, I. Billy Annan<sup>1</sup>, Silvia Rondon<sup>2</sup>, Erik Echegaray<sup>2</sup>, Joseph Munyaneza<sup>3</sup>, Tariq Mustafa<sup>4</sup>, D Hall<sup>5</sup> and El-Desouky Ammar<sup>6</sup>, <sup>1</sup>DuPont Crop Protection, Newark, DE, <sup>2</sup>Oregon State Univ., Hermiston, OR, <sup>3</sup>USDA-ARS, Wapato, WA, <sup>4</sup>Washington State Univ., WA, <sup>5</sup>USDA-ARS, NA, FL, <sup>6</sup>USDA-ARS, US Horticultural Research Laboratory, Fort Pierce, FL

**P35 Real-Time Polymerase Chain Reaction Assay to Improve the Molecular Diagnosis of Gypsy Moth Variants (*Lymantria dispar*) (Lepidoptera: Lymantriidae).**

Md-Sajedul Islam, M.sajed@gmail.com<sup>1</sup>, Norman Barr<sup>2</sup>, W Braswell<sup>3</sup>, John Molongoski<sup>4</sup>, Mario Martinez<sup>1</sup> and Erin Schuenzel<sup>5</sup>, <sup>1</sup>Univ. of Texas-Pan American and USDA APHIS, Edinburg, TX, <sup>2</sup>USDA - APHIS, Edinburg, TX, <sup>3</sup>USDA, Edinburg, TX, <sup>4</sup>USDA-APHIS, Otis ANGB, MA, <sup>5</sup>Univ. of Texas Pan American, Edinburg, TX

**P36 *Argyresthia pruniella* (Clerck) – a new pest of cherries in Washington State.**

Chris Looney, clooney@agr.wa.gov and Eric LaGasa, Washington State Dept. of Agriculture, Olympia, WA

**P37 New Digital Identification Tool of Microlepidoptera on Solanaceae.**

James E. Hayden<sup>1</sup>, Sangmi Lee, microlepi@hotmail.com<sup>2</sup>, Steven Passoa<sup>3</sup>, James Young<sup>4</sup>, Jean-François Landry<sup>5</sup>, Vazrick Nazari<sup>5</sup>, Richard Mally<sup>6</sup>, Louis Somma<sup>1</sup> and Kurt Ahlmark<sup>1</sup>, <sup>1</sup>Florida Dept. of Agriculture and Consumer Services (FDACS), Gainesville, FL, <sup>2</sup>Arizona State Univ., Tempe, AZ, <sup>3</sup>USDA Agricultural Plant Health Inspection Service, Columbus, OH, <sup>4</sup>USDA-APHIS-PPQ, Baltimore, MD, <sup>5</sup>Agriculture & Agri-Food Canada, Ottawa, ON, Canada, <sup>6</sup>Senckenberg Naturhistorische Sammlungen, Dresden, Germany

**P38 Effect of Trap Color on Captures of Bagrada Bug (Hemiptera: Pentatomidae).**

Shimat V. Joseph, svjoseph@ucdavis.edu, Univ. of California, Salinas, CA

**P39 Suppression of pear psylla using elicitors of host-defenses.**

William Cooper, rodney.cooper@ars.usda.gov and David Horton, USDA-ARS, Wapato, WA

**P40 Sivanto, a new insecticide from Bayer.**

Phil McNally, phil.mcnally@bayer.com, Bayer CropScience, Lake Forest, CA

**P41 Improved DNA diagnosis for five internal tortricid (Lepidoptera: Tortricidae) feeders of pome and stone fruits for export quarantine compliance.**

Thomas R. Unruh<sup>1</sup>, Ray Yokomi<sup>2</sup>, Jennifer Delgado<sup>3</sup> and Nina M. Barcenas, Barcenas\_n@heritage.edu<sup>3</sup>, <sup>1</sup>USDA-ARS, Wapato, WA, <sup>2</sup>USDA San Joaquin Valley Agricultural Research Center, Parlier, CA, <sup>3</sup>Heritage Univ., Toppenish, WA

**P42 Evaluation of synthetic insecticide formulations and formulations of entomopathogenic fungi for control of a *Blapstinus* spp. darkling beetle on cantaloupe melon.**

Eric T. Natwick, etnatwick@ucdavis.edu, Univ. of California ANR Coop. Ext, Holtville, CA, Robert W. Behle, USDA-ARS, Peoria, IL and Mark A. Jackson, USDA - ARS, Peoria, IL

**P43 Phytoseiid mites and plant structures: A meta-analysis.**

Rebecca Schmidt, rebecca.schmidt@wsu.edu, Washington State Univ., Wenatchee, WA

Tuesday, April 8, 2014

**P44 Food resources are vital for survival and fecundity of the olive fruit fly parasitoid, *Psytalia lounsburyi*, in the field.**

Livy Williams, lwilliams@ars-ebcl.org<sup>1</sup>, Olivia Pointurier<sup>2</sup> and Pauline Deschodt<sup>2</sup>, <sup>1</sup>USDA-ARS, Montpellier, France, <sup>2</sup>Montpellier SupAgro, Montpellier, France

**P45 Flight activity of Oregon populations of *Halyomorpha halys*.**

Nik G. Wiman, nik.wiman@oregonstate.edu<sup>1</sup>, Vaughn Walton<sup>1</sup>, Peter W. Shearer<sup>2</sup>, Silvia Rondon<sup>3</sup> and Jana C. Lee<sup>4</sup>, <sup>1</sup>Oregon State Univ., Corvallis, OR, <sup>2</sup>Oregon State Univ., Hood River, OR, <sup>3</sup>Oregon State Univ., Hermiston, OR, <sup>4</sup>USDA ARS, Corvallis, OR

**P46 SULTAN<sup>TM</sup>: A New miticide from BASF Corporation for US ornamental market.**

Sanjeev Bangarwa, sanjeev.k.bangarwa@basf.com, Larry Newsom, Joe Stout, John O'Barr, Tommy Wofford, Kathie Kalmowitz and Jennifer Bergh, BASF Corporation, Research Triangle Park, NC

**P47 Washington dairy producers report a diversity of IPM practices for fly control.**

Holly Ferguson, hferguson@wsu.edu<sup>1</sup>, Kit Galvin<sup>2</sup>, Michael Yost<sup>2</sup>, Sally O'Neal<sup>1</sup> and Doug Walsh<sup>1</sup>, <sup>1</sup>Washington State Univ., Prosser, WA, <sup>2</sup>Univ. of Washington, Seattle, WA

**P48 Are ants like cows? Compartmentalization of gut bacteria in a herbivore insect.**

Pedro Augusto Rodrigues, par@email.arizona.edu<sup>1</sup>, Michele Lanan<sup>2</sup>, Piotr Lukasik<sup>3</sup>, Jacob A. Russell<sup>3</sup> and Diana Wheeler<sup>4</sup>, <sup>1</sup>GIDP in Entomology and Insect Science, Tucson, AZ, <sup>2</sup>PERT Postdoc, Tucson, AZ, <sup>3</sup>Drexel Univ., Philadelphia, PA, <sup>4</sup>Univ. of Arizona, Tucson, AZ

**P49 Grape mealybug (*Pseudococcus maritimus*) and grapevine leafroll disease in northern California vineyards: Implications for management.**

Monica Cooper, mlycooper@ucanr.edu<sup>1</sup>, Kent M Daane<sup>2</sup>, Rodrigo P. P. Almeida<sup>2</sup>, G. Blaisdell<sup>2</sup> and Neil McRoberts<sup>3</sup>, <sup>1</sup>Univ. of California Cooperative Extension, Napa, CA, <sup>2</sup>Univ. of California, Berkeley, Berkeley, CA, <sup>3</sup>Univ. of California, Davis, Davis, CA

**P50 Practical methods of controlling bed bugs at home.**

Shujuan Li, lisj@cals.arizona.edu and Dawn Gouge, Univ. of Arizona, Maricopa, AZ

**P51 U.S. Geological Survey science meets buggy issues in the Southwest: A call for collaborations.**

Kathryn Thomas, kathryn\_a\_thomas@usgs.gov, U.S. Geological Survey, Tucson, AZ, Julie Crawford, U.S. Fish and Wildlife Service, Tucson, AZ, Travis Marisco, Arkansas State Univ., State Univ., AR, Margaret Hiza-Redsteer, U.S. Geological Survey, Flagstaff, AZ and Lincoln Smith, USDA-ARS, Albany, CA

**P52 Can the redshouldered stink bug (*Thyanta custator*) cause pecky rice?**

Luis Espino, laespino@ucdavis.edu, Univ. of California Cooperative Extension, Colusa, CA and Larry D. Godfrey, Univ. of California, Davis, Davis, CA

**P53 Juvenile hormone and reproduction in the western tarnished plant bug (*Lygus hesperus*).**

Colin S. Brent, colin.brent@ars.usda.gov, US Dept. of Agriculture, Maricopa, AZ

**P54 Photodegradation of pesticide residues in hop yards.**

Ruth Henderson, ruthend@wsu.edu<sup>1</sup>, Gary Grove<sup>1</sup>, Matt Hengel<sup>2</sup>, Dan Groenendale<sup>1</sup> and Doug Walsh<sup>1</sup>, <sup>1</sup>Washington State Univ., Prosser, WA, <sup>2</sup>UC Davis, Davis, CA

**P55 Phytovirus infection mediates host selection behavior and fecundity of the insect vector *Acyrtosiphon pisum*.**

Ying Wu, Thomas S. Davis and Sanford D. Eigenbrode, sanforde@uidaho.edu, Univ. of Idaho, Moscow, ID

**P57 Old World honey bee (*Apis mellifera*) populations: a genetic resource for U.S. honey bee breeding.**

Megan Taylor, megan.a.taylor@email.wsu.edu, Washington State Univ., Pullman, WA

**P58 Pathogenicity of mixed infections of *Ascosphaera* in solitary and social bees.**

Ellen Klinger<sup>1</sup>, Svjetlana Vojvodic<sup>2</sup>, Gloria DeGrandi-Hoffman<sup>3</sup>, Rosalind James<sup>1</sup> and Dennis Welker, dennis.welker@usu.edu<sup>4</sup>, <sup>1</sup>USDA - ARS, Logan, UT, <sup>2</sup>Univ. of Arizona, Tucson, AZ, <sup>3</sup>Carl Hayden Bee Research Center, Tucson, AZ, <sup>4</sup>Utah State Univ., Logan, UT



**Tuesday, April 8, 2014**

**P59 Utilization of association mapping to identify DNA markers for resistance to Hessian fly (*Mayetiola destructor*) in wheat.**

Nilsa Bosque-Pérez<sup>1</sup>, **Lana M. Unger**, lunger@uidaho.edu<sup>1</sup>, Kaori Ando<sup>2</sup>, Steve Odubiyi<sup>1</sup> and Michael Pumphrey<sup>2</sup>, <sup>1</sup>Univ. of Idaho, Moscow, ID, <sup>2</sup>Washington State Univ., Pullman, WA

**P60 Hot on *D. sukikii*'s trail in the landscape.**

**Tammy Winfield**, tammy.winfield@gmail.com, Amy J. Dreves and Amanda Ohrn, Oregon State Univ., Corvallis, OR

**P61 How do insects live inside their plant hosts?**

**Paul Nabity**, nabity@email.arizona.edu, Richard Lapoint and Noah Whiteman, Univ. of Arizona, Tucson, AZ

**P62 Survey and Detection of Coconut Pests Not Known to Occur in Hawaii.**

**Arnold Hara**, arnold@hawaii.edu<sup>1</sup>, Susan Cabral<sup>1</sup>, Yolisa Ishibashi<sup>2</sup>, Ruth Y. Niino-DuPonte<sup>1</sup> and Jorden Zarders<sup>1</sup>, <sup>1</sup>Univ. of Hawaii at Manoa, Hilo, HI, <sup>2</sup>USDA, Honolulu, HI

**P63 Biocontrol of Lewis spider mite (*Eotetranychus lewisi*) and twospotted spider mite (*Tetranychus urticae*) in strawberry.**

**Anna Howell**, adhowell@ucanr.edu, Univ. of California, Ventura, CA and Oleg Daugovich, Univ. of California, Davis, Ventura, CA

**P64 Initial characterization of nicotinic acetylcholine receptor subunits expressed in codling moth.**

**Stephen F. Garczynski**, steve.garczynski@ars.usda.gov, USDA-ARS, Wapato, WA

**P65 Facilitating Adoption of Conservation Biological Control in Cotton IPM.**

**Lydia Brown**, lbrown@cals.arizona.edu<sup>1</sup>, Timothy Vandervoet<sup>2</sup>, Peter C. Ellsworth<sup>2</sup>, Steven Naranjo<sup>3</sup> and Alfred Fournier<sup>1</sup>, <sup>1</sup>Univ. of Arizona, Maricopa, AZ, <sup>2</sup>Univ. of Arizona, Tucson, AZ, <sup>3</sup>USDA Agricultural Research Service, Maricopa, AZ

**P66 The genome of *Scaptomyza flava*: insights into the evolution of herbivory.**

**Richard Lapoint**, rlapoint11@gmail.com and Noah Whiteman, Univ. of Arizona, Tucson, AZ

**P67 Bee abundance and diversity in Southern California pepper fields.**

**Ruben Alarcón**, ruben.alarcon@csuci.edu, Katherine Soto and Jannesa Moreno, California State Univ. Channel Islands, Camarillo, CA

**P68 Preliminary field trials of zingerone, a novel lure of fruit flies (Diptera: Tephritidae) in Hawaii.**

**Jess R. Inskeep**, jinskeep@hawaii.edu<sup>1</sup>, Helen Spafford<sup>1</sup> and Todd E. Shelly<sup>2</sup>, <sup>1</sup>Univ. of Hawaii, Honolulu, HI, <sup>2</sup>USDA-APHIS, Waimanalo, HI

**P69 Insect Pathogen *Photobacterium l. sonorensis*: novel source of compounds for control of plant parasitic nematodes.**

**Rousel A Orozco**, rouselo@email.arizona.edu, Univ. of Arizona, Tucson, AZ

# Wednesday, April 10, 2013

## REGISTRATION

7:00 a.m. to 10:00 a.m.

Atrium

## FINAL BUSINESS MEETING

7:00 a.m. to 8:00 a.m.

Ventana

- 7:00** Debriefing of 2014 PB-ESA Meeting  
Unfinished business, new business  
Call for resolutions  
Nominations & Elections for 2014-2015  
Introduction of 2014-2015 PBESA President

## THE SPECTRUM OF INSECT SYMBIOSES

8:00 a.m. to 11:25 a.m.

Sabino

Moderators and Organizers: Cara Gibson<sup>1</sup> and Kirk E. Anderson<sup>2</sup>, <sup>1</sup>Univ. of Arizona, Tucson, AZ, <sup>2</sup>USDA - ARS, Tucson, AZ

### 8:00 Introductory Remarks

- 164 8:05 Hidden in plain sight: Illuminating insect-fungal associations.**

Cara Gibson, cgibson@email.arizona.edu, Univ. of Arizona, Tucson, AZ

- 165 8:25 Honey bee microbial ecology.**

Kirk E. Anderson, kirk.anderson@ars.usda.gov, USDA - ARS, Tucson, AZ

- 166 8:45 A Species Specific Real Time PCR assay for Quantifying Honey Bee Core Gut Bacteria.**

William Fitz, wfitz@email.arizona.edu, USDA-ARS Carl Hayden Bee Research Center, Tucson, AZ

- 167 9:05 The role of diet type in the establishment of the core microbiota of the honey bee *Apis mellifera*.**

Pedro Rodrigues, par@email.arizona.edu, Univ. of Arizona, Tucson, AZ

- 168 9:25 A tale of two niches: flower- and bee-associated bacteria.**

Quinn McFrederick, qmcfrederick@csufresno.edu, California State Univ., Fresno, Fresno, CA

### 9:45 Break

- 169 10:05 Insights into the evolution of *Cardinium*: the development of a Multi Locus Sequence Typing system.**

Corinne Stouthamer, cmstouthamer@gmail.com, Univ. of Arizona, Tucson, AZ

- 170 10:25 Dynamics of host-symbiont interactions in whiteflies.**

Anna G. Himler, ahimler@email.arizona.edu, Univ. of Arizona, Tucson, AZ

- 171 10:45 *Spiroplasma*-mediated protection against parasitic nematodes in *Drosophila*.**

Steve J. Perlman, stevep@uvic.ca, Univ. of Victoria, Victoria, BC, Canada

- 172 11:05 Morphological adaptations for gut symbiont partitioning in the ant *Cephalotes rohweri*.**

Michele C. Lanan, lanan@email.arizona.edu, Univ. of Arizona, Tucson, AZ

Wednesday, April 9, 2014

## LEAVING A MARK: MARKING TECHNOLOGIES FOR TRACKING INSECT MOVEMENT

8:00 a.m. to 11:25 a.m.

Pima

Moderators and Organizers: James R. Hagler, USDA, Agricultural Research Service, Maricopa, AZ

### 8:00 Introductory Remarks

#### 173 8:05 *Heterotermes aureus*: The marked termite in Arizona.

**Paul Baker**, pbaker@ag.arizona.edu<sup>1</sup>, James R. Hagler<sup>2</sup>, Ruben Marchosky<sup>1</sup>, Scott A. Machtley<sup>3</sup> and David Bellamy<sup>4</sup>, <sup>1</sup>Univ. of Arizona, Tucson, AZ, <sup>2</sup>USDA, Agricultural Research Service, Maricopa, AZ, <sup>3</sup>USDA Agricultural Research Service, Maricopa, AZ, <sup>4</sup>USDA - ARS, Parlier, CA

#### 174 8:25 Marking natural enemies in biofuel crops without getting egg on your face.

**Brian McCornack**, mccornac@ksu.edu, Kansas State Univ., Manhattan, KS, James R. Hagler, USDA, Agricultural Research Service, Maricopa, AZ and Kristopher Giles, Oklahoma State Univ., Stillwater, OK

#### 175 8:45 Field-scale movement of pest and beneficial insects in cotton.

**Ayman Mostafa**, ayman@cals.arizona.edu<sup>1</sup>, Peter C. Ellsworth<sup>2</sup>, James R. Hagler<sup>3</sup>, Steven Naranjo<sup>4</sup> and Scott A. Machtley<sup>4</sup>, <sup>1</sup>Univ. of Arizona, Phoenix, AZ, <sup>2</sup>Univ. of Arizona, Tucson, AZ, <sup>3</sup>USDA, Agricultural Research Service, Maricopa, AZ, <sup>4</sup>USDA Agricultural Research Service, Maricopa, AZ

#### 176 9:05 Movement and dispersion of lygus bugs and their associated natural enemies in trap-cropped organic strawberries.

**Diego J. Nieto**, dnieto@ucsc.edu<sup>1</sup>, Sean L. Swezey<sup>1</sup>, James R. Hagler<sup>2</sup>, Charles H. Pickett<sup>3</sup>, Scott A. Machtley<sup>4</sup> and Janet A. Bryer<sup>5</sup>, <sup>1</sup>Univ. of California, Santa Cruz, Santa Cruz, CA, <sup>2</sup>USDA, Agricultural Research Service, Maricopa, AZ, <sup>3</sup>California Dept. of Food and Agriculture, Sacramento, CA, <sup>4</sup>USDA Agricultural Research Service, Maricopa, AZ, <sup>5</sup>Univ. of California, Santa Cruz, CA

#### 177 9:25 Drought-mediated effects on vector movement and pathogen spread: Insights to epidemiology of *Xylella fastidiosa*-elicited diseases.

**Rodrigo Krugner**, rodrigo.krugner@ars.usda.gov, USDA-ARS, San Joaquin Valley Agricultural Sciences Center, Parlier, CA, James R. Hagler, USDA, Agricultural Research Service, Maricopa, AZ, Russell L Groves, Univ. of Wisconsin-Madison, Madison, WI, Mark Sisterson, USDA, Parlier, CA, Joseph G. Morse, Univ. of California, Riverside, CA, Elaine Backus, USDA San Joaquin Valley Agricultural Research Center, Parlier, CA and Marshall W. Johnson, Univ. of California, Riverside, Parlier, CA

### 9:45 Break

#### 178 10:05 Influence of field margin on *Drosophila suzukii* invasion of red raspberries.

**Jimmy Klick**, klickj@hort.oregonstate.edu<sup>1</sup>, Denny Bruck<sup>2</sup>, Vaughn Walton<sup>1</sup>, Daniel T Dalton<sup>1</sup>, James R. Hagler<sup>3</sup>, Amy J. Dreves<sup>1</sup> and Wei Q. Yang<sup>4</sup>, <sup>1</sup>Oregon State Univ., Corvallis, OR, <sup>2</sup>DuPont Pioneer, Johnston, IA, <sup>3</sup>USDA, Agricultural Research Service, Maricopa, AZ, <sup>4</sup>Oregon State Univ., Aurora, OR

#### 179 10:25 Insights on brown marmorated stink bug behavior from a mark recapture field experiment.

**Kevin Rice**, kbr10@psu.edu<sup>1</sup>, Moshe Gish<sup>1</sup>, William Mitchell<sup>1</sup>, Shelby J. Fleischer<sup>2</sup> and John Tooker<sup>3</sup>, <sup>1</sup>Penn State Univ., Univ. Park, PA, <sup>2</sup>Pennsylvania State Univ., State College, PA, <sup>3</sup>Pennsylvania State Univ., Univ. Park, PA

#### 180 10:45 You are what you eat: Tracking insect movement using fatty acid profiles.

**Stephen Bayes**, sbayes@berkeley.edu<sup>1</sup>, Marc Hellerstein<sup>1</sup>, Mark Fitch<sup>2</sup>, Nicholas Mills<sup>1</sup> and Stephen C Welter<sup>3</sup>, <sup>1</sup>Univ. of California, Berkeley, Berkeley, CA, <sup>2</sup>Univ. of California at Berkeley, Berkeley, CA, <sup>3</sup>San Diego State Univ., San Diego, CA

#### 181 11:05 Tracking protein-marked prey in the food chain.

**James R. Hagler**, james.hagler@ars.usda.gov, USDA, Agricultural Research Service, Maricopa, AZ

Wednesday, April 9, 2014

**INTEGRATING MOLECULAR BIOLOGY: LINKING EVOLUTION AND ECOLOGY WITH  
FUNCTION**

8:00 a.m. to 12:05 p.m.

*Madera*

Moderators and Organizers: Bradley White<sup>1</sup> and Laura Corley Lavine<sup>2</sup>, <sup>1</sup>Univ. of California, Riverside, CA, <sup>2</sup>Washington State Univ., Pullman, WA

**8:00 Welcoming Remarks**

**182 8:05 High-Throughput Quantitative and Population Genomics in Malaria Mosquitoes.**

**Bradley White**, bradley.white@ucr.edu, Univ. of California, Riverside, CA

**183 8:25 Detecting locally adapted loci in non-model systems: divergence or admixture mapping?.**

**Jacob Crawford**, j.crawford@berkeley.edu, Univ. of California, Berkeley, Berkeley, CA

**184 8:45 Functional genomics and the evolution of herbivory in insects.**

**Noah Whiteman**, whiteman@email.arizona.edu, Univ. of Arizona, Tucson, AZ

**185 9:05 Physiological antagonism and synergism in the evolution of life histories.**

**Goggy Davidowitz**, goggy@email.arizona.edu, Univ. of Arizona, Tucson, AZ

**186 9:25 Developmental links between sex and nutrition in the stag beetle.**

**Laura Corley Lavine**, lavine@wsu.edu, Washington State Univ., Pullman, WA

**9:45 Break**

**187 10:05 Integrating mechanistic explanations across species: the evolution of a complex sexual ornament.**

**Julia Bowsher**, julia.bowsher@ndsu.edu, North Dakota State Univ., Fargo, ND

**188 10:25 The evolution of honey bee foraging division of labor.**

**Robert E. Page Jr.**, Robert.Page@asu.edu, Arizona State Univ., Tempe, AZ

**189 11:05 Evolution of a novel male sex pheromone in *Nasonia*.**

**Juergen Gadau**, juergen.gadau@asu.edu, Arizona State Univ., Tempe, AZ

**190 11:25 The evolution and reproductive consequences of primary polygyny in a harvester ant.**

**Brian Haney**, brhaney@asu.edu, Arizona State Univ., Tempe, AZ

**191 11:45 Insecticide resistance at the population level: insights from the western tarnished plant bug.**

**Mark Lavine**, mark.lavine@wsu.edu, Washington State Univ., Pullman, WA

Wednesday, April 9, 2014

## THE CHANGING LANDSCAPE OF REGULATORY ENTOMOLOGY AND GLOBAL TRADE: NEW TECHNOLOGIES AND STRATEGIES TO REDUCE INVASIVE PEST RISKS IN THE WESTERN US

8:00 a.m. to 12:10 p.m.

Canyon A/B

Moderators and Organizers: Gregory S. Simmons<sup>1</sup> and Victoria Y. Yokoyama<sup>2</sup>, <sup>1</sup>Center for Plant Health Science and Technology (CPHST), Salinas, CA, <sup>2</sup>USDA-ARS, San Joaquin Valley Agricultural Sciences Center, Fresno, CA

### 8:00 Introductory Remarks

192 8:05 **The need for new technology and science based strategies to protect our agricultural production systems.**  
Gregory Simmons, gregory.s.simmons@aphis.usda.gov, USDA-APHIS-PPQ, CPHST, Salinas, CA

193 8:25 **Fast and accurate commodity-associated species identification system for streamlining border inspections.**  
Richard Stouthamer, richard.stouthamer@ucr.edu and Paul F. Rugman-Jones, Univ. of California, Riverside, CA

194 8:45 **Development of stable isotopes and fatty acid signature analysis for identification of quarantine pest intercepts and determination of pest origin.**  
Rebecca Hood-Nowotny, Rebecca.Clare.Hood-Nowotny@univie.ac.at, Univ. of Vienna, Vienna, Austria

195 9:05 **Fruit fly identification using molecular markers to determine the taxonomy and origin of pest fruit fly interceptions.**  
Norman Barr, Norman.B.Barr@aphis.usda.gov, USDA - APHIS, Edinburg, TX

196 9:25 **Identification of cerambycids and buprestids from port interceptions in solid wood packing material, a model system for integrating DNA and morphological data to determine high risk pathways for forest pests.**  
Hannah Nadel, Hannah.Nadel@aphis.usda.gov, USDA-APHIS, Buzzards Bay, MA and Peter Reagel, Xavier Univ., Cincinnati, OH

### 9:45 Break

197 10:05 **The molecular identification of *Frankliniella* sp. thrips larvae intercepted from Colombia and Ecuador on cut flowers.**  
Cheryle O'Donnell, Cheryle.A.O'Donnell@aphis.usda.gov, USDA-APHIS-PPQ, San Diego, CA

198 10:25 **An update on the U.S. Asian gypsy moth pest exclusion program in Japan, Korea, China, and the Russian Far East.**  
Baode Wang, Baode.Wang@aphis.usda.gov, USDA, Animal and Plant Health Inspection Service (APHIS), Buzzards Bay, MA

199 10:45 **Mexican strategies for the management of invasive insect species in citrus..**  
J. Isabel López-Arroyo, lopez.jose@inifap.gob.mx<sup>1</sup>, Gustavo Mora-Aguilera<sup>1</sup>, Gabriel Díaz-Padilla<sup>1</sup> and Jesús Loera-Gallardo<sup>2</sup>, <sup>1</sup>Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias, Nuevo León, Mexico, <sup>2</sup>Campo Experimental Río Bravo, Río Bravo, Tam., Mexico

200 11:05 **The merging of biology, ecology, and risk: Development of an enhanced risk analyses model.**  
Lisa G. Neven, Lisa.Neven@ars.usda.gov, USDA-ARS, Wapato, WA

201 11:25 **Developing systems approaches for fruit fly incursions under state and federal quarantines.**  
Eric B. Jang, eric.jang@ars.usda.gov, USDA-ARS, Pacific Basin Agricultural Research Center, Hilo, HI

202 11:45 **Can oriental fruit moth establish on a host after accidental introduction of a mating pair?**  
Victoria Y. Yokoyama, victoria.yokoyama@ars.usda.gov, USDA-ARS, San Joaquin Valley Agricultural Sciences Center, Fresno, CA

### 12:05 Concluding Remarks

Wednesday, April 9, 2014

### GENERAL PAPERS SESSION III

8:30 a.m. to 12:00 p.m.

Ventana

Moderators: David Haviland<sup>1</sup> and Jesse Richardson<sup>2</sup>, <sup>1</sup>UC Cooperative Extension, Bakersfield, CA, <sup>2</sup>Dow AgroSciences, LLC, Hesperia, CA

**203 8:30 Field Evaluation of Synthetic Lures for Monitoring Spotted Wing Drosophila.**

David R. Haviland, dhaviland@ucdavis.edu, Univ. of California Cooperative Extension, Kern Co, Bakersfield, CA

**204 8:42 The role of Cooperative Extension in facing new challenges in strawberry and vegetable entomology on the California Central Coast.**

Surendra Dara, skdara@ucdavis.edu, Univ. of California Cooperative Extension, San Luis Obispo, CA

**205 8:54 Bemisia tabaci control and CYSDV mitigation in cantaloupe with Sivanto.**

Hank Mager, hank.mager@bayer.com, Bayer CropScience, Fountain Hills, AZ and Mark White, Bayer CropScience, Yuma, AZ

**206 9:06 Characterizing insecticidal spray coverage in Almond orchards.**

Bradley S. Higbee, bradh@paramountfarming.com, Paramount Farming Co, Bakersfield, CA

**207 9:18 Chemical Control of Gill's Mealybug, Ferrisia gilli, in Pistachio.**

Stephanie M. Rill, smrill@ucdavis.edu and David R. Haviland, Univ. of California Cooperative Extension, Kern Co, Bakersfield, CA

**208 9:30 Optimizing use of insecticides in rice pest management to enhance sustainability.**

Larry D. Godfrey, ldgodfrey@ucdavis.edu, Univ. of California, Davis, CA, Luis Espino, Univ. of California Cooperative Extension, Colusa, CA and Kevin Goding, Univ. of California Davis, Davis, CA

**209 9:42 Preventive and Curative Control of the Aloe Mite, Eriophyes aloinis KEIFER.**

James A. Bethke, jabethke@ucanr.edu, Univ. of California Cooperative Extension, San Diego, CA and Lucia E. Villavicencio, Center for Applied Horticultural Research, Vista, CA

**210 9:54 STATIC<sup>TM</sup> Spinosad ME Weathered in California and Florida: A Reduced-Risk Male Annihilation Treatment for Oriental fruit fly (Bactrocera dorsalis).**

Roger I. Vargas<sup>1</sup>, Steven K. Souder, steven.souder@ars.usda.gov<sup>1</sup> and James E. Dripps<sup>2</sup>, <sup>1</sup>USDA, Agricultural Research Service, Hilo, HI, <sup>2</sup>Dow AgroSciences, LLC, Indianapolis, IN

**10:06 Break**

**211 10:24 Managing sucking insect pests in western vegetables with Closer<sup>®</sup> insecticide.**

Jesse M. Richardson, jmrichardson@dow.com, Dow AgroSciences, LLC, Hesperia, CA, Boris Castro, Dow AgroSciences, LLC, Mogi Mirim, Brazil, James P. Mueller, Dow AgroSciences, Brentwood, CA, Melissa Siebert, Dow AgroSciences, Greenville, MS, John C. Palumbo, Univ. of Arizona, Yuma, AZ, Larry D. Godfrey, Univ. of California, Davis, CA, Surendra Dara, Univ. of California Cooperative Extension, San Luis Obispo, CA, Eric T. Natwick, Univ. of California ANR Coop. Ext, Holtville, CA and Carol Frate, UC Cooperative Extension, Tulare, CA

**212 10:36 Control of western tarnished plant bug (Lygus hesperus) in alfalfa with Transform<sup>®</sup> WG insecticide.**

Harvey A. Yoshida, hyoshida@dow.com, Dow AgroSciences, Richland, WA, Jesse M. Richardson, Dow AgroSciences, LLC, Hesperia, CA, Boris Castro, Dow AgroSciences, LLC, Mogi Mirim, Brazil, Luis E. Gomez, Dow AgroSciences, LLC, Indianapolis, IN and Melissa Willrich Siebert, Dow AgroSciences, Greenville, MS

**213 10:48 Torac<sup>TM</sup>, a novel insecticide for the management of key pests in potato.**

Jessica Samler, jsamler@nichino.net<sup>1</sup>, Scott Ludwig<sup>2</sup>, Pedro Hernandez<sup>3</sup>, Botond Balogh<sup>4</sup> and James Adams<sup>3</sup>, <sup>1</sup>Nichino America, Inc, Pasco, WA, <sup>2</sup>Nichino America, Inc, Arp, TX, <sup>3</sup>Nichino America, Inc, Wilmington, DE, <sup>4</sup>Nichino America, Inc, Apollo Beach, FL

**Wednesday, April 9, 2014**

- 214 11:00 NEALTA™: A new miticide from BASF Corporation for US crop market.**  
**Sanjeev Bangarwa**, sanjeev.k.bangarwa@basf.com, Sam Willingham, John O'Barr, Larry Newsom, Joe Stout, Siddharth Tiwari, Tommy Wofford, Curtis Rainbolt, Dawn Brunmeier, Katherine Walker and Chuck Rice, BASF Corporation, Research Triangle Park, NC
- 215 11:12 Marrone Bio Innovations: An Update of the Insecticides Grandevo and Venerate.**  
**Sarah Han**, shan@marronebio.com<sup>1</sup>, Cole Pearson<sup>2</sup>, Phyllis Himmel<sup>1</sup>, Pamela Marrone<sup>3</sup> and Timothy Johnson<sup>4</sup>,  
<sup>1</sup>Marrone Bio Innovations, Inc., Davis, CA, <sup>2</sup>Marrone Bio Innovations, Davis, CA, <sup>3</sup>Marrone Organic Innovations, Davis, CA, <sup>4</sup>Marrone Bio Innovations Inc, Danville, PA
- 216 11:24 Controlling stem and leaf galling wasps on Chinese banyan in Hawaii.**  
**Zhiqiang Cheng**, cheng241@hawaii.edu and Bishnu Bhandari, Univ. of Hawaii at Manoa, Honolulu, HI
- 217 11:36 Commercial Research trials with Closer® and Transform® Insecticides for aphids, mealybugs and plant bugs in the Western U.S.**  
**Mike Lees**, mdlees@dow.com, Dow AgroSciences, Granite Bay, CA
- 218 11:48 Closer® SC for managing insect pests of western citrus.**  
**Alistair McKay**, ahmckay@dow.com, Dow AgroSciences, Clovis, CA, Elizabeth Grafton-Cardwell, Univ. of California-Riverside, Parlier, CA, Jesse M. Richardson, Dow AgroSciences, LLC, Hesperia, CA, Alejandro Calixto, Dow AgroSciences LLC, Wesley Chapel, FL and Melissa Siebert, Dow AgroSciences, Greenville, MS

**JAMES R. CAREY**  
**2014 C.W. WOODWORTH AWARD**



**Dr. James R. Carey** is Professor and the former Vice-Chair in the Department of Entomology at the University of California, Davis (UCD) with research interests in insect demography, mortality dynamics, and insect invasion biology. He received two degrees from Iowa State University including a BS in Fisheries and Wildlife Biology (1973) and an MS in Entomology (1975). He received his Ph.D. in entomology from UC Berkeley in 1980 and immediately accepted a position as Assistant Professor of Entomology at UCD where he has been ever since. He is a Fellow in the Entomological Society of America as well as in three other professional societies including the American Association for the Advancement of Science (AAAS), the Gerontological Society of America, and the California Academy of Science. He is the author of three books including *“Demography for Biologists with special emphasis on insects”* (Oxford University Press, 1993), *Longevity* (Princeton University Press, 2003), and *Longevity Records: Life Spans of Mammals, Birds, Amphibians and Reptiles* (Odense University Press, 2000), and over 220 scientific publications on insect invasion biology, demography, and aging. From 2003 through 2013 he served as director of the 11-university, National Institute on Aging-funded program titled *“Evolutionary Ecology of Lifespan”*. He is considered the preeminent world authority on arthropod demography, and has been credited by professional demographers as having discovered a previously unknown life table identity now formally designated *“Carey’s Equality”* i.e. in a stationary population, age composition and the distribution of remaining lifespans are identical. This equivalence can be used to estimate age structure if information is available on time to death. This identity laid the foundation for the *“captive cohort method”* method—a technique he and his colleagues developed for estimating population age structure from the post-capture distribution of deaths in live-caught insects. A recent recipient of the UC Davis Academic Senate Distinguished Teaching Award, Carey teaches two main courses including a 4-credit course on the biology and demography of aging titled *‘Longevity’* with an annual enrollment of over 250 students, and a lower division 4-cr GE course (now online) through the Science and Society program titled *‘Terrorism and War’* with an annual enrollment of up to 300 students.



## KELLY HAMBY

### 2014 JOHN HENRY COMSTOCK GRADUATE STUDENT AWARD



**Dr. Kelly Hamby** received her PhD in Entomology in March 2014 under the direction of Professor Frank Zalom at the University of California Davis with a focus on sustainable Integrated Pest Management strategies for various insect pests. Her dissertation research, titled “Biology and pesticide resistance management of *Drosophila suzukii* in coastal California berries” was concentrated on monitoring, yeast associations, chronobiology, chronotoxicity of insecticides and the implications of this work to managing the recent invader, spotted wing drosophila. Kelly also received a National Science Foundation Graduate Research Fellowship to study molecular mechanisms of target site resistance to insecticides in this system. She earned her Bachelor’s degree in Environmental Toxicology with a specialization in Ecotoxicology from UC Davis in 2009, where she worked in Dr. Inge Werner’s aquatic toxicology lab in the School of Veterinary Medicine. During her undergraduate education she received the 2005-2009 UC Regents’ Scholarship, a merit-based academic scholarship; and the 2009 UC Davis College of Agricultural and Environmental Sciences Mary Regan Meyer Prize, an academic and service award for a graduating senior. In 2011 she was awarded the Lillian and Alex Feir Graduate Student Travel Award in Insect Physiology, Biochemistry, or Molecular Biology from the Pacific Branch. She has ten peer-reviewed publications and has been invited to participate in symposia both at Pacific Branch and National ESA meetings as well as the International Congress of Entomology.

## **IN-COMING PRESIDENT**

**PBESA 2014-2015**

**DR. LISA NEVEN**



Welcome to Dr. Lisa Neven, the PB-ESA President for 2014-2015. Lisa will be arranging an exciting meeting in beautiful Coeur d'Alene, Idaho with the theme "Celebrating Entomological Discoveries in the Pacific Branch". The 2015 PB-ESA meeting will be April 12-15, 2015 at the Coeur d'Alene Resort in Coeur d'Alene, Idaho. Please see the back page of the program booklet for details.

## **PRESIDENT-ELECT NOMINEE**

**PBESA 2015-2016**

**DR. PETER FOLLETT**



Peter received his B.S. in Plant & Soil Science from the University of Vermont; his M.S. in Entomology from Oregon State University, and his Ph.D. in Entomology from N. C. State University. He held postdoctoral fellowships in conservation biology and entomology at the University of Maryland and the University of Hawaii at Manoa. Since 1997, Peter has been a Research Entomologist with USDA-ARS at the U.S. Pacific Basin Agricultural Research Center in Hilo, Hawaii. He is responsible for coordinating research efforts to develop new or improved postharvest treatments and field measures to control quarantine pests that restrict the export of tropical fruits and vegetables from Hawaii; to increase product quality, marketability, and safety, while reducing treatment costs; and to develop holistic approaches to quarantine security that result in realistic pest-risk analyses and reduced treatment severity. He recently developed phytosanitary irradiation treatments for light brown apple moth, spotted wing drosophila, rice weevil, and various ants. Biological control projects include the recent first field release of *Encarsia diaspidicola* against white peach scale in papaya, and new research to enhance predation by the square necked grain beetle of coffee berry borer in Kona coffee fields. Peter served as co-program chair for the 2011 PBESA meeting in Kona, and has served as the student travel award coordinator the past 4 years.

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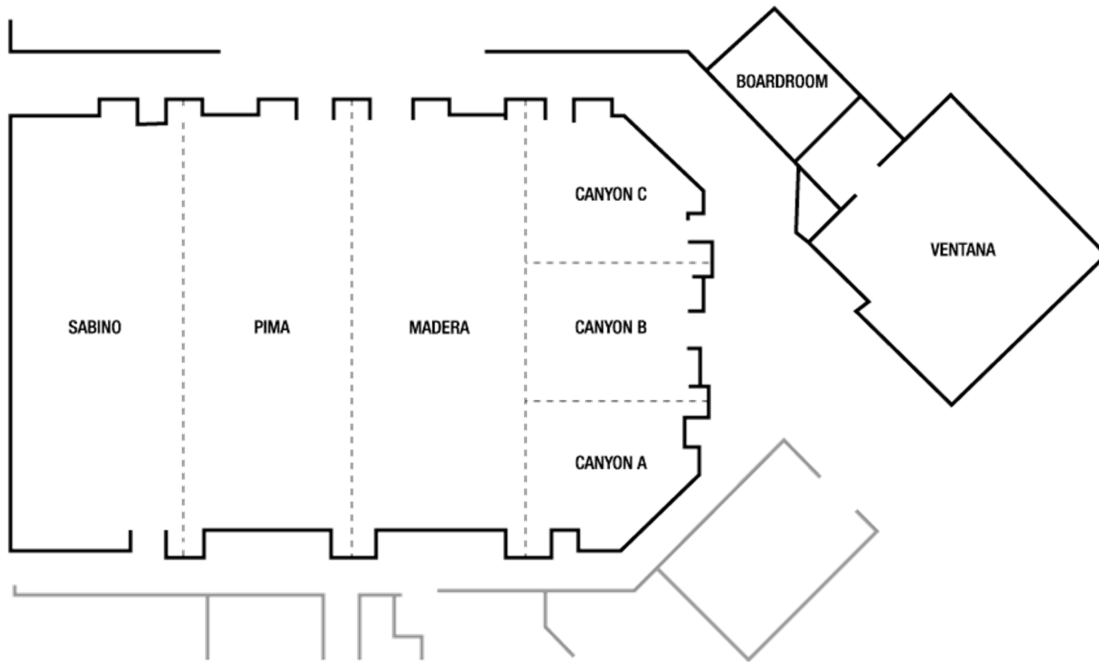
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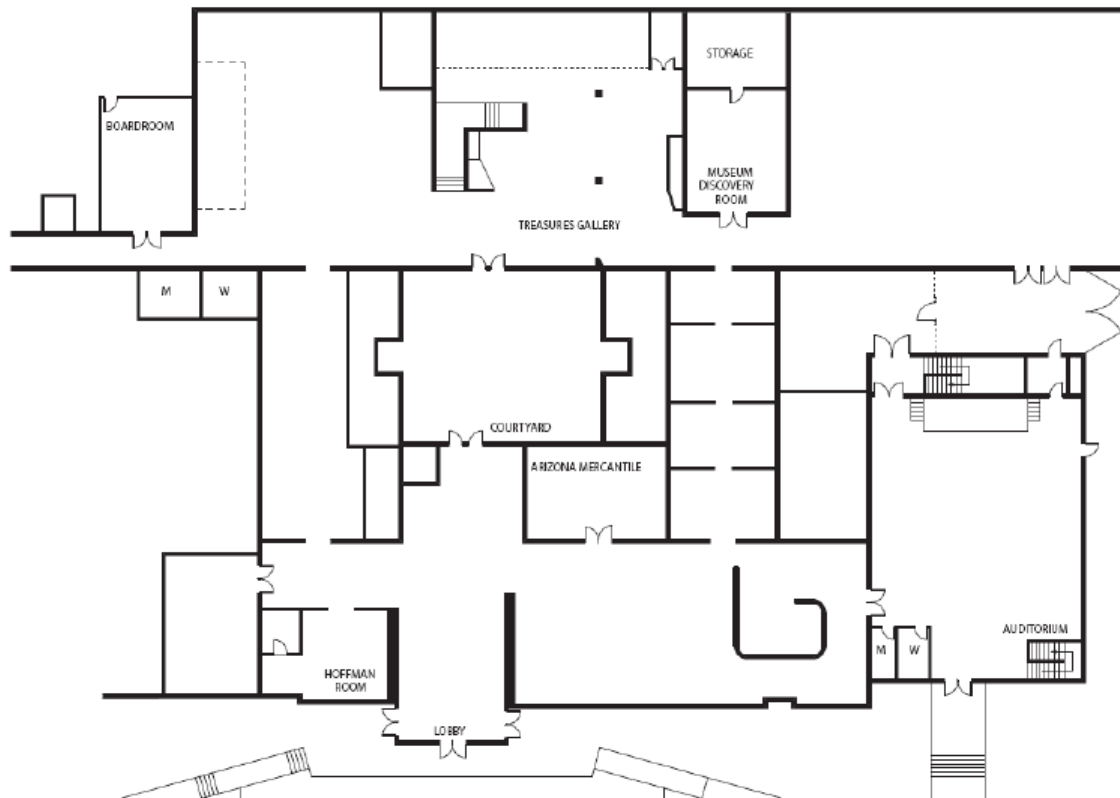
## NOTES



## Marriott University Park First Floor Layout



## Arizona Historical Society Museum (Across from the hotel)





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