

Kristal M. Watrous

CURRICULUM VITAE

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Education

- 2009 M.S. in Biology. Utah State University, Logan, UT.
Thesis: Reproductive ecology of *Astragalus filipes*, a Great Basin restoration legume. Advisor: James H. Cane
- 2004 B.S. in Biology (environmental emphasis), Botany minor. Humboldt State University, Arcata, CA. *Cum laude*.

Relevant experience

- July 2016 – present. **Assistant Specialist.** Entomology Department, University of California Riverside. Conduct and coordinate ongoing research on nutritional ecology of native and managed bees. Maintain live bumble bee colonies and individuals for laboratory nutritional and behavioral experiments. Molecular lab techniques include RNA extractions for RNAseq experiments, colorimetric and fluorometric nutritional assays. Coordinate and mentor undergraduate researchers. Supervisor: Dr. S. Hollis Woodard.
- July 2015 – July 2016. **Junior Specialist & Lab Manager.** Entomology Department, University of California Riverside. See above. Supervisor: Dr. S. Hollis Woodard.
- Feb. 2015. **Participant.** Bumble Bee Molecular Techniques Workshop, sponsored by Project Integrated Crop Pollination at USDA-ARS Pollinating Insect – Biology, Management, Systematics Research Lab, Logan, UT. Hands-on experience in molecular biology and computational analysis of bumble bee population genetics. Mentor: Dr. Jamie Strange.
- May 2014 – Dec. 2014. **Research Technologist II & Lab Manager.** Entomology Department, Pennsylvania State University. Conduct and coordinate ongoing research in concurrent projects on crop pollination by native bees, floral resource addition and optimization in cropping systems, noctuid and invasive pest insect monitoring in agro-ecosystems. Supervisor: Dr. Shelby Fleischer.
- July 2012 – May 2014. **Research Specialist.** Entomology Department, Pennsylvania State University. Design and implement field research in crop pollination by native bees, and invasive pest insect sampling in agro-ecosystems. Supervisor: Dr. Shelby Fleischer.
- May 2005 – May 2007. **Research Assistant.** USDA-ARS Pollinating Insect – Biology, Management, Systematics Research Lab. Trap-nest and rear native bees, assess pollination efficacy of managed and potentially manageable cavity-nesting bees on

agricultural crops and Great Basin native plants for seed production. Supervisor: Dr. Jim Cane.

Sept. 2004 – May 2005. **Laboratory Assistant.** Zoology & Fisheries Departments, Southern Illinois University, Carbondale. Sort and identify aquatic invertebrates, conduct invertebrate and fish sampling in streams and rivers.

May – Aug. 2004. **Undergraduate Researcher.** Research Experience for Undergraduates program (National Science Foundation) at Humboldt State University, Arcata, CA. Design and implement a bee community survey project in Six Rivers National Forest. Project title: A Comparison of Bee Community Composition in Natural and Logged Clearings on Horse Mountain, Trinity County, CA. Mentor: Dr. Michael Mesler.

May – Aug. 2003. **Field Technician.** USDA-ARS Northern Plains Agricultural Research Lab. Survey rangeland grasshopper density under different fire and grazing treatments.

May – Aug. 2002. **Field Technician.** California Department of Fish and Game. Boat-based net collection of larval fish in San Joaquin and Sacramento River Delta to monitor the endangered Delta Smelt.

Publications

Kevin B. Rice, Rachael R. Troyer, **Kristal M. Watrous**, John F. Tooker, and Shelby J. Fleischer. 2016. Landscape factors influencing stink bug injury in Mid-Atlantic tomato fields. *Journal of Economic Entomology*. DOI: 10.1093/jee/tow252

Kristal Watrous, Kevin Rice, Shelby Fleischer and Scott Smiles. 2015. Evaluation of foliar insecticides for the control of lepidopterans, 2014. *Arthropod Management Tests*. 40(1): E73. DOI: : <http://dx.doi.org/10.1093/amt/tsv120>

Kristal Watrous and Shelby Fleischer. 2015. Pollination section (pp. A17-20). 2015 Commercial Vegetable Production Guide for Pennsylvania. <http://goo.gl/QovOm8>

Kristal Watrous and Shelby Fleischer. 2013. Who pollinates your blueberries? Penn State Vegetable, Small Fruit, and Mushroom Production Newsletter. <http://goo.gl/Af6tAY>

Kristal Watrous and James Cane. 2011. Breeding biology of the threadstalk milkvetch, *Astragalus filipes* (Fabaceae), with a review of the genus. *American Midland Naturalist* 165(2): 225-240. DOI:10.1674/0003-0031-165.2.225

Grants

2017 Alan Romsper grant in Desert Botany. "Ecological and functional examinations of *Krameria*, a hemiparasitic shrub in California deserts." Awarded by Southern California Botanists. \$1000.

Oral Presentations and Posters

- Kristal Watrous**, R. Carley Miller, Rachael Troyer, Mark Otieno, Shelby Fleischer. Integrated Crop Pollination in Pennsylvania Pumpkins. Poster presented at Mid-Atlantic Fruit and Vegetable Convention 2015. Hershey, PA. Jan. 2015.
- Kristal Watrous**, Mark Otieno, C. Sheena Sidhu, Cory Stanley-Stahr, Rachael Troyer and Shelby Fleischer. Challenges of adding forage for bees in cucurbit crops. Oral presentation at Entomology 2014. Portland, OR. Nov. 2014.
- Kevin Rice, Rachael Troyer, **Kristal Watrous**, Lynn Kime, John Tooker, and Shelby Fleischer. The influence of crop management and landscape diversity on damage in tomatoes by brown marmorated stink bug. Oral presentation at Entomology 2014. Portland, OR. Nov. 2014.
- Kristal Watrous**. Small Fruit Pollination in Pennsylvania. Oral presentation at PA Extension Inservice Meeting. Penn State University, University Park, PA. July 2014.
- Kevin Rice, Rachael Troyer, William Mitchell, **Kristal Watrous**, Lynn Kime, Jayson Harper, John Tooker and Shelby Fleischer. Economics of BMSB in processing tomato: Influence of landscape and management. Oral presentation at Entomological Society of America Eastern Branch Meeting 2014. Williamsburg, VA. Mar. 2014.
- Rodney Nagoshi, Robert Meagher, John Westbrook, Shelby Fleischer, **Kristal Watrous** and Rachael Troyer. Predictive modeling and mitigation of the effects of climate change on the infestation patterns of a migratory crop pest insect. Poster presented at Agricultural Science for Climate Variability and Change - Project Directors Meeting. Gainesville, FL, Jan. 2014.
- Robert Meagher, Rodney Nagoshi, Shelby Fleischer, John Westbrook and **Kristal Watrous**. Area-wide management of fall armyworm using selected ground covers. Oral presentation at Entomology 2013. Austin, TX. Nov. 2013.
- Kevin Rice, William Mitchell, Rachael Troyer, **Kristal Watrous**, John Tooker and Shelby Fleischer. Damage rates from brown marmorated stink bug in processing tomatoes: Influence of farm management, cultivar, and landscape. Poster presented at Entomology 2013. Austin, TX. Nov. 2013.
- Shelby Fleischer, Robert Meagher, Rodney Nagoshi, **Kristal Watrous** and C. Sheena Sidhu. Wild bees and pollination services. Oral presentation at NCERA-213 Multistate Research – Migration and Dispersal of Agriculturally Important Biota. Scottsbluff, NE. Oct. 2013.
- Kristal Watrous**, Robert Meagher, Rodney Nagoshi and Shelby Fleischer. Investigation of the bee community in sunn hemp, a cover crop for mitigating fall armyworm spring populations. Poster presented at 2nd International Conference on Pollinator Biology, Health, and Policy. Penn State University, University Park, PA. Aug. 2013.

Oral Presentations and Posters continued

Kristal Watrous and James Cane. Evaluation of pollinator manageability for agricultural use on a native Great Basin legume. Poster presented at 1st International Conference on Pollinator Biology, Health, and Policy. Penn State University, University Park, PA. July 2010.

Kristal Watrous and James Cane. Breeding biology and pollinator assessment of threadstem milkvetch, *Astragalus filipes*. Oral presentation at Botany 2009. Snowbird, UT. July 2009.

Kristal Watrous and James Cane. Pollination Biology of Threadstem Milkvetch, *Astragalus filipes*. Oral presentation at Intermountain Native Plant Summit IV. Boise State University, Boise, ID. Mar. 2006.

Kristal Watrous and James Cane. Pollination Biology of the Threadstem Milkvetch, *Astragalus filipes*. Poster presented at the Inland Northwest Restoration Conference. Washington State University, Pullman, WA. Oct. 2005.

Kristal Watrous. A Comparison of Bee Community Composition in Natural and Logged Clearings on Horse Mountain, Trinity County, CA. Oral presentation at Midwest Ecology and Evolution Conference. Southern Illinois University, Carbondale, IL. Mar. 2005.

Expertise and Skills

- RNA extraction for RNAseq in bumble bees.
- Colorimetric and fluorometric nutritional assays.
- Statistical analyses in R, including post-sequencing analyses of gene expression data.
- Laboratory rearing techniques for solitary and social bees.
- Species-level identification of bees and plants in wild, urban and agricultural settings.
- Native bee community ecology and natural history.
- Pollination management of bees and crops in agro-ecosystems.
- Laboratory management experience including coordination of field crews for concurrent projects, data management and storage, lab materials maintenance and purchasing.