

Michael C. Orr

PhD Candidate

USDA-ARS Bee Biology and Systematics Lab

Utah State University

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Utah State University, Logan, UT (USU)

Fall 2011–Spring 2017 (expected)

PhD in Biology

Dissertation: Systematics, Floral Specialization, and Biogeography of the *Anthophora (Heliophila)***Cornell University, Ithaca, NY (CU)**

Fall 2006–Spring 2010

B.S. in Entomology, with Distinction in Research

Honor's Thesis: The Biodiversity of Bees in the Apple Orchards of New York State

Relevant Appointments:

- Research Assistant for Dr. Terry Griswold, USDA-ARS National Pollinating Insects Collection (Five semesters; Fall 2012–Fall 2013, Fall 2014, Spring 2016–Fall 2016).
- Bee Identification Guide Designer, DiscoverLife.org (Spring 2011–present).
- Bee Identification Specialist for Sam Droege, USGS Bee Inventory and Monitoring Lab (Fall 2010–Summer 2011).
- Entomology Intern for Dr. Seán Brady, Smithsonian National Museum of Natural History (Fall 2010–Summer 2011).
- Lab Assistant (Fall 2008–Spring 2010) and Technician (Spring–Fall 2010) for Dr. Bryan Danforth, CU.

Grants and funding: \$63,531

- The USU Graduate Student Senate Graduate Enhancement Award (2015; \$4000).
- The USU James A. MacMahon and Patty MacMahon Endowed Ecology Graduate Student Research Award (2015; \$1000).
- Joshua Tree National Park Association's Robert Lee Graduate Student Research Grant at Joshua Tree National Park (2014; \$3830).
- The Cornell University Insect Collection's J.C. Bradley Fund for the Advancement of Insect Taxonomy (2014; \$276).

- The American Museum of Natural History's Collection Study Grant (2014; \$1100).
- The Community Foundation's Desert Legacy Fund for California fieldwork (2013; \$2825).
- UC Riverside Friends of the Entomology Research Museum Visiting Curator Grant (2013; \$500).
- Orr, M.C. & S. Droege. "Development of Online Guides to the Identification of the 4000 Bees Found in North America" G. Unger Vetlesen Foundation (2011; \$50,000).

Awards and honors:

- USU Research and Graduate Studies Office's Graduate Student Travel Award (2016).
- The Entomological Society of America's Pacific Branch Student Leadership Award (2016).
- Golden Key Academic Scholarship from USU Chapter (2016).
- The Entomological Society of America's Pacific Branch Travel Award (2015).
- University of Wyoming Program in Ecology Student Symposium, First Place (2015).
- USU Research and Graduate Studies Office's Graduate Student Travel Award (2014).
- USDA-ARS SPOT award for outreach efforts (2014).
- The Entomological Society of America's Pacific Branch Travel Award (2014).
- Utah State Graduate Research Symposium, Biology poster, First Place (2013).
- Entomological Society of America Pacific Branch meeting, PhD poster, Second Place (2013).
- CU Outstanding Undergraduate Teaching Assistant in Entomology Award (2010).

Publications:

Peer reviewed:

- **Orr, M.C.**, T. Griswold, J.P. Pitts, & F.D. Parker. (2016). A new bee species that excavates sandstone nests. *Current Biology* 26(17).
- Erenler, H.E., **M.C. Orr**, M.P. Gillman, B.R.B. Parkes, H. Rymer, & J.M. Maes. (2016). Persistent nesting by *Anthophora* Latreille (Hymenoptera: Apidae) bees in ash adjacent to an active volcano. *Pan-Pacific Entomologist* 92(2).
- **Orr, M.C.** & T. Griswold. (2015). Description of a New Kleptoparasitic Bee of the Genus *Townsendiella* (Hymenoptera: Apidae) from Pinnacles National Park. *ZooKeys* 546.
- **Orr, M.C.**, Z.M. Portman, & T. Griswold. (2015). *Megachile* (*Megachile*) *montivaga* (Hymenoptera: Megachilidae) nesting in live thistle (Asteraceae: *Cirsium*). *Journal of Melittology* 48.
- **Orr, M.C.**, J.B. Koch, T. Griswold, & J.P. Pitts. (2014). Taxonomic utility of environmental niche models for species distinction: A case study in *Anthophora* (*Heliophila*) (Hymenoptera: Apidae). *Zootaxa* 3846(3).

In preparation:

- **Orr, M.C.**, J.P. Pitts, & T. Griswold. Revision of the *Anthophora* (*Micranthophora*) (Hymenoptera: Apidae).

- **INVITED: Orr, M.C.,** F.D. Parker, S.H. Woodard. Between a rock and a hard place: The rediscovery of *Anthophora pueblo*. *Bee World*.
- Walker, R.H., **M.C. Orr,** & S.W. Miller. Mechanisms of leaf decomposition and an experimental examination of the effects of an extirpated species in the Intermountain West.

Technical reports:

- **Orr, M.C.** (2015). The Bees of Joshua Tree National Park. Investigator's Annual Report submitted via IRMA RPRS.
- **Orr, M.C.** & T. Griswold. (2014). A Faunal Survey of the Native Bees and Wasps of Death Valley National Park. Investigator's Annual Report submitted via IRMA RPRS.
- **Orr, M.C.** & T. Griswold. (2013). A Faunal Survey of the Native Bees and Wasps of Death Valley National Park. Investigator's Annual Report submitted via IRMA RPRS.

Other:

- Park, M.G., **M.C. Orr,** & B.N. Danforth. (2010). The role of native bees in apple pollination. *New York State Fruit Quarterly* 18(1).
- 30+ web-published bee identification guides with the DiscoverLife.org system. An example may be found at the following URL: http://www.discoverlife.org/mp/20q?guide=Anthophora_male

Presentations:

Invited presentations:

- **Orr, M.C.** & F.D. Parker. "Between a rock and a hard place to live: Discovery of a new bee nesting in sandstone." Grand Staircase-Escalante Science Forum, Escalante, UT (4 August 2016).
- **Orr, M.C.,** H.E. Erenler, & T. Griswold. "Extreme nesting substrates of the bee group *Anthophora*: Volcanic ash and sandstone." Entomological Society of America, Minneapolis, MN (17 November 2015).
- **Orr, M.C.** & J.B. Koch. "How to build an insect zoo." Entomological Society of America, Coeur d'Alene, ID (15 April 2015).
- Koch, J.B. & **M.C. Orr.** "Is this real?: Promoting insect science in northern Utah." Entomological Society of America, Coeur d'Alene, ID (15 April 2015).
- **Orr, M.C.,** T. Griswold, & J.P. Pitts. "Missing bees or missed bees?: using *Anthophora* to investigate rarity." Entomological Society of America, Coeur d'Alene, ID (14 April 2015).
- **Orr, M.C.,** J.B. Koch, T. Griswold, & J.P. Pitts. "Some like it hot: Biology of the xerophilous *Anthophora (Heliophila)*." Entomological Society of America, Tucson, AZ (8 April 2014).

Competition presentations:

- **Orr, M.C.**, F.D. Parker, T. Griswold, & J.P. Pitts. “Biology of a new bee species that nests in sandstone, *Anthophora pueblo* (Hymenoptera: Apidae).” Entomological Society of America, Honolulu, HI (4 April 2016).

General presentations:

- **Orr, M.C.**, J.M. Meiners, H. Ikerd, O. Messinger Carril, J.P. Pitts, & T. Griswold. “What can inventories tell us about bee phenology?” Entomological Society of America, Orlando, FL (30 September 2016).
- **Orr, M.C.**, J.M. Meiners, H. Ikerd, O. Messinger Carril, J.P. Pitts, & T. Griswold. “Understanding phenology through big data: Case Studies in native bees?” Entomological Collections Network, Orlando, FL (24 September 2016).
- Danforth, B.N., M. Park, E. Blitzer, J. Gibbs, & **M.C. Orr**. “Patterns of bee biodiversity across commercial New York apple orchards.” Entomological Society of America, Reno, NV (13 November 2011).

Seminar presentations:

- **Orr, M.C.** “An Introduction to Bee Nesting Biology.” Ecology Center Ecolunch, USU (26 February 2016).
- **Orr, M.C.**, M.G. Park, & B.N. Danforth. “The Biodiversity of Bees in the Apple Orchards of New York State.” Jugatae seminar series, Cornell University, Ithaca, NY (3 May 2010).

Competition posters:

- Walker, R.H., **M.C. Orr**, & S.W. Miller. “Mechanisms of leaf decomposition in two streams of the Intermountain West: Examining the functional role of an extirpated shredding invertebrate.” University of Wyoming Program in Ecology Student Symposium, Laramie, WY (20 February 2015). **First Place.**
- **Orr, M.C.**, J.B. Koch, J.P. Pitts, & T. Griswold. “Taxonomic utility of environmental niche models for species delineation: a case study in *Anthophora* (Hymenoptera: Apidae).” Entomological Society of America 2014, Portland, OR (17 November 2014).
- **Orr, M.C.**, T. Griswold, & J.P. Pitts. “Color variation in the sweat bee, *Dieunomia heteropoda* (Hymenoptera: Halictidae).” USU Graduate Research Symposium, Logan, UT (12 April 2013). **First Place.**
- **Orr, M.C.**, T. Griswold, & J.P. Pitts. “The taxonomic fate of a rare and variable bee, *Dieunomia heteropoda* (Hymenoptera: Halictidae).” Entomological Society of America, Lake Tahoe, CA (8 April 2013). **Second Place.**

General posters:

- Walker, R., **M.C. Orr**, & S. Miller. “Assessing the role of species extirpation on leaf decomposition in two streams of the Intermountain West, Utah.” Joint Aquatics Sciences Meeting, Portland, OR (18 May 2014).

- Koch, J.B., **M.C. Orr**, & H. Ikerd. “The buzz on bee biodiversity in Utah.” Maps on the Hill, Salt Lake City, UT (29 January 2014).
- **Orr, M.C.** & J.B. Koch. “Environmental niche mapping as a taxonomic tool in bees.” Maps on the Hill, Salt Lake City, UT (29 January 2014).
- **Orr, M.C.** & H. Ikerd. “Bee inventory projects of the Bee Biology and Systematics Lab.” Maps on the Hill, Salt Lake City, UT (28 January 2013).

Alternative presentation formats:

- Interactive display, Tripodi, A.D., **M.C. Orr**, J.B. Koch, C. Andrikipoulos, S. Burrows, H. Judd, A. Kopit, B. Love, J.M. Meiners, J.H. Cane, S. Droege, T. Griswold, T.L. Pitts-Singer, & J. Strange. Invasion of the Bee Girls. Entomological Society of America, Coeur d’Alene, ID (14 April 2015).
- Interactive map, **Orr, M.C.**, J.B. Koch, & H. Ikerd. “Bees of Utah.” Maps on the Hill, Salt Lake City, UT (29 January 2014).
- Interactive map, **Orr, M.C.** & H. Ikerd. “How does collector effort impact measures of bee species richness?” Maps on the Hill, Salt Lake City, UT (28 January 2013).

Professional service:

Scientific societies:

- Symposium Co-organizer, “Making Species Inventories Work For You: Diverse Uses Across Varied Fields” at ICE 2016 (30 September 2016).
- Symposium Moderator, “Biodiversity, Biogeography and Conservation of Arthropods: Hymenoptera” at ICE 2016 (30 September 2016).
- Judge, Student Poster Competition at ICE 2016 (26 September 2016).
- Texting Competition Chair, Pacific Branch Entomological Society of America (twice, Fall 2014–present).

University:

- Discussion Leader, Undergraduate Research Symposium Poster Help Session, USU (28 October 2015).
- Co-organizer, “Small Wonders: The Expansive World of Insects” display at Utah State Merrill-Cazier Library (Fall 2015–Spring 2016).
- Academic Mentor, Biology Graduate Student Association (Summer 2014–present).

Other:

- Consultant (unpaid), Mantis Digital Arts for “Buzz Whizz: Bees” video game (Spring 2014–Spring 2015).

- Reviewer for four journals: *Systematic Entomology* (Spring 2015–present), *Zootaxa* (Spring 2015–present), *Pan-Pacific Entomologist* (November 2014–present), & *Journal of Melittology* (Fall 2013–present).
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Memberships and positions:

- The International Society of Hymenopterists (Spring 2016–present).
 - Golden Key Honor Society (Winter 2014–present).
 - Society for Advancement of Chicanos and Native Americans in Science (Fall 2013–present).
 - Friends of the Entomology Research Museum, UC Riverside (Spring 2013–present).
 - USU Entomology Club (Spring 2013–present): Live Animal Manager (Spring 2013–Spring 2015).
 - USU Biology Graduate Student Association (Fall 2011–present): Vice President (Winter 2015–Winter 2016), Academic Committee member (Spring 2015–present), Fundraising Committee member (Spring 2014–present), Outreach Committee Chair (Spring 2014–Spring 2015) and member (Spring 2014–present), & Treasurer (Fall 2011–Fall 2013).
 - CU Snodgrass and Wigglesworth Undergraduate Entomology Club (Fall 2006–Spring 2010): Treasurer (Fall 2006–Spring 2009).
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Teaching experience:

Teaching assistantships:

- Evolutionary Biology lecture, Dr. Zachariah Gompert, USU (Spring 2017).
- Evolutionary Biology lecture (gave one lecture), Dr. Frank Messina, USU (Fall 2015).
- Principles of Genetics lecture, Dr. Paul Wolf, USU (Spring 2015).
- Principles of Genetics lecture, Dr. Gregory Podgorski, USU (Spring 2014).
- Principles of Genetics lecture (gave two lectures), Dr. Paul Wolf, USU (Spring 2012).
- Principles of Genetics lab (gave two lectures), Dr. Paul Wolf, USU (Fall 2011).
- Teaching Assistant Course completion, USU (Fall 2011).
- Insect Phylogenetics and Evolution field trip, Dr. Bryan Danforth, CU (Fall 2009).
- Spider Biology lecture and lab, Dr. Linda Rayor, CU (Fall 2009).

Invited lectures:

- Gareth Hopkins' Biology & The Citizen, USU (3 June 2015).
 - Nick Kiriazis' Field Science and Biodiversity, Venture High School (2–4 October 2014).
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Extension and outreach efforts:

Invited public talks

- “Desert Bees and Climate Change.” Black Rock Ranger Station, Joshua Tree National Park, CA (2 September 2016).
- “Entomology: How to make a living studying insects.” Utah’s GEAR Up Education program, USU (26 June 2014).
- “What can you do with a biology degree?” Cache Valley Youth Center, Logan, UT (25 April 2014).

Management experience: 47 events

- Curriculum enrichment, specimens and information, Nick Kiriazis’ Natural History course, Venture High School (8 January 2016).
- Co-organizer, Insect Demos, Heritage Elementary School, Nibley, UT (5 March 2015).
- Leader, two Spider Biology tours for interested students, Entomology Club (Summer 2014–present).
- Co-organizer, Bear River Celebration, Biology Graduate Student Association (7 June 2014).
- Organizer, five presentations at First Presbyterian Church of Logan’s Summer Camp (3 June 2014).
- Co-organizer, Plant Sale, Biology Graduate Student Association (24 April 2014, 23 April 2015, 28 April 2016).
- Organizer, USU Science Unwrapped, Biology Graduate Student Association (21 March 2014, 12 September 2014, 10 October 2014, 14 November 2014, 16 January 2015).
- Co-organizer, USU STE²M Center Opening, Entomology Club (11 February 2014).
- Co-organizer, USU “Fear no Weevil” Halloween, Entomology Club (31 October 2013).
- Leader, fifteen Bug Zoo tours for local classrooms, Entomology Club (Summer 2013–present).
- Co-organizer, National Pollinator Week at the Logan Farmer’s Market, USDA Bee Lab (16 June 2012, 22 June 2013, 19 June 2014, 20 June 2015, 25 June 2016).
- Co-organizer, USU Pow Wow, Biology Department (3 March 2012, 2 March 2013, 28 February 2014, 1 March 2014).
- Co-organizer, USU Science Unwrapped, USDA Bee Lab (4 November 2011).
- Specimen provider and co-designer, pollination and mimicry outreach displays, CU (2009–2010).
- Co-organizer, Entomology Department Open House “Insectapalooza,” CU (2009).

Volunteer experience: 34 events

- Guided Pollinator Walk, Grand-Staircase Escalante National Monument (3 August 2016).
- Landscaping Project, USU Golden Key (30 April 2016).
- Biology Graduate Student Association table at Major’s Fair, USU (22 September 2015).
- Spider Festival, Antelope Island State Park (8 August 2015, 30 July 2016).
- Bee Lab tour for local school (27 April 2015).
- USU Science Unwrapped, Biology Graduate Student Association (20 February 2015, 20 March 2015, 6 November 2015, 29 February 2016, 16 September 2016).

- Judge, Thomas Edison School Science Fair (6 February 2015).
 - USU “Fear no Weevil” Halloween, Entomology Club (27 October 2014, 30 October 2015).
 - USU Day on the Quad, Entomology Club (27 August 2014).
 - Judge, Bridgerland Science Fair at USU (22 February 2014, 21 March 2015, 27 February 2016).
 - Bridgerland Science Fair, Entomology Club (22 February 2014).
 - USU Science Unwrapped, SACNAS (24 January 2014).
 - USU Edith Bowen Elementary School Science Night, Biology Department (5 March 2013).
 - Nine outreach presentations for Naturalist Outreach Practicum course, taught by Dr. Linda Rayor, CU (Fall 2009).
 - CU Entomology Department table at the Tompkins Co., NY State Fair (Fall 2009).
 - Entomology Department Open House “Insectapalooza,” CU (2006–2008).
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Popular media coverage:

- "This bee lives on the edge—of an active volcano."
<http://www.sciencemag.org/news/2016/07/bee-lives-edge-active-volcano>
 - "Podcast: Pollution hot spots in coastal waters, extreme bees, and diseased dinos."
<http://www.sciencemag.org/podcast/podcast-pollution-hot-spots-coastal-waters-extreme-bees-and-diseased-dinos>
 - "Extreme bees live on edge of active volcano."
<http://www.mnn.com/earth-matters/wilderness-resources/blogs/bees-active-volcano>
 - “Earthwatch Institute: The bees of Masaya Volcano.”
<https://www.youtube.com/watch?v=N8c2ZmUkAqs&feature=youtu.be>
 - "The Bee That Lives On The Edge... Of An Active Volcano."
<http://www.northampton.ac.uk/news/the-bee-that-lives-on-the-edge-of-an-active-volcano/>
 - "A colony of bees has been discovered living in the lip of an active volcano."
<http://www.zmescience.com/ecology/animals-ecology/volcano-bees-59310/>
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Extracurricular courses and certifications:

- Entomological Collections Management Workshop by Dr. David Furth and Dr. Floyd Shockley, Smithsonian Institution, Washington, D.C. (Scheduled for 18–20 July 2016).
- Software Carpentry Workshop, hosted by Dr. Greg Wilson, USU (16–17 March 2015).

- Science Communication Workshop: Strategies All Scientists Should Know, USU (25 March 2014).
 - Software Carpentry Software Bootcamp, hosted by Dr. Ethan White, USU (23–24 March 2013).
 - Getting Started as a Successful Proposal Writer and Academician Workshop, USU (26 February 2013).
 - Bee Course, AMNH's Southwestern Research Station, Portal, AZ (10 September 2012).
 - Xerces Society Pollinator Short Course, State College, PA (29 July 2010).
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Reference contacts:

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