

Susan R. Whitehead

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PROFESSIONAL PREPARATION

CORNELL UNIVERSITY • Ithaca, NY • Post-doctoral Research Associate, Feb 2014-Dec 2016
Department of Entomology
Advisor: Katja Poveda

UNIVERSITY OF COLORADO • Boulder, CO • Ph.D. May 2013
Department of Ecology and Evolutionary Biology
Advisor: M. Deane Bowers
Dissertation: Ecological costs and benefits of secondary metabolites in animal-dispersed fruits

OBERLIN COLLEGE • Oberlin, OH • B.A. May 2001
Major: Biology
Minor: Environmental Studies

ACADEMIC APPOINTMENTS

2017-present **Assistant Professor**, Department of Biological Sciences, Virginia Polytechnic
Institute and State University

RESEARCH INTERESTS

multi-species interactions, chemical ecology, plant-insect interactions, frugivory and seed dispersal, bat ecology, tropical biology and conservation, invasion biology, agroecology, and plant evolution under domestication

FELLOWSHIPS AND AWARDS

2015 **USDA NIFA Postdoctoral Fellowship** • Chemical mechanisms of insect resistance in apples, Advisor: Katja Poveda • *\$150,000*

2012 **Excellence in Teaching Award** • University of Colorado • *\$200*

2012 **Dissertation Completion Fellowship** • University of Colorado Graduate School • *\$9527*

2008-2010 **NSF Graduate STEM Fellowship in K-12 Education (GK-12)** • *\$90,000*

2010 **Research Fellowship** • University of Colorado Ecology and Evolutionary Biology • *\$13,000*

2008 **Tropical Biology Fellowship** • University of Colorado Graduate School • supported Organization for Tropical Studies Tropical Biology Course, Costa Rica • *\$3,500*

2008 **Best Graduate Student Talk** • Department of Ecology and Evolutionary Biology Spring Symposium

RESEARCH GRANTS (22 awards totaling \$109,714)

- 2015 **Grace Griswold Research Fund**, Cornell University • \$1,500
- 2012 **National Science Foundation** Doctoral Dissertation Improvement Grant (DDIG) • PI: M.D. Bowers, co-PI S.R. Whitehead • \$14,998
- 2011 **National Geographic** Waitt Grant • PI: S.R. Whitehead, with co-PIs M.D. Bowers, B. Herrera-Rodriguez, M.F. Obando-Quesada, and A.M. Trowbridge • \$14,870
- 2011 **Bat Conservation International** Student Research Grant • \$2,500
- 2011 **Garden Club of America** Tropical Botany Award • \$5,000
- 2009-2011 **Organization for Tropical Studies** Research Fellowship • \$4,165 (2009), \$3,000 (2010), \$3,150 (2011), \$910 (2008)
- 2008-2012 **Beverly Sears** Graduate Student Research Grant, University of Colorado • \$899 (2008), \$950 (2011), \$1,000 (2012)
- 2007-2012 **Departmental Research Grant**, Ecology and Evolutionary Biology, University of Colorado • \$1,950 (2007), \$1,200 (2008), \$2,300 (2009), \$1,000 (2010), \$2,000 (2011), \$2,446 (2012)
- 2009 **NSF International Research Supplement to GK-12 Award**: Ecology of McMurdo Dry Valleys, Antarctica • PI: Lesley Smith; proposal developed and written by: **S.R. Whitehead**, P. Taylor, K. Tea, and L. Sackett • \$42,516
- 2009 **Museum of Natural History** Research Grant, University of Colorado • \$1,200
- 2008 **Organization for Tropical Studies** Post-Course Research Grant • \$910
- 2007-2008 **John Marr** Memorial Research Scholarship • \$750 (2007), \$500 (2008)

STUDENT TRAINING/TRAVEL AWARDS

- 2012 **Undergraduate Research Opportunities Program**, University of Colorado • PI: M.D. Bowers, co-PI S.R. Whitehead, supported undergraduate research assistants for field work in Costa Rica • \$3,000
- 2012 **Travel Award**, University of Colorado United Government of Graduate Students • Tropical Biology and Conservation Annual Conference • \$300
- 2009-2011 **Undergraduate Research Opportunities Program**, University of Colorado • PI: M.D. Bowers, co-PIs C. Quintero, S.R. Whitehead, N. Robinson, and C.A. Kelly, supported undergraduate laboratory assistants • \$3,000 (2012), \$3,000 (2011), \$3,000 (2010), \$3,000 (2009)
- 2011 **Bioscience Undergraduate Research Skills and Training**, University of Colorado • PI: M.D. Bowers, co-PIs S.R. Whitehead and J. Tiramani, supported undergraduate honor's thesis work for J. Tiramani • \$2,500

PUBLICATIONS (*=student author)

- Whitehead, S.R.**, M. M. Turcotte, and K. Poveda (2017). Domestication impacts on plant-herbivore interactions: a meta-analysis. *Philosophical Transactions of the Royal Society B* 372 (1712): 20160034
- Turcotte, M.M., H. Araki, D.S. Karp, K. Poveda, and **S. R. Whitehead** (2017). The eco-evolutionary impacts of domestication and agricultural practices on wild species. *Philosophical Transactions of the Royal Society B* 372 (1712): 20160033
- Whitehead, S.R.**, M.F. Obando-Quesada*, and M.D. Bowers (2016). Chemical trade-offs in seed dispersal: defensive metabolites in fruits deter consumption by mutualist bats. *Oikos* 125: 927-937

PUBLICATIONS con't (*=student author)

- Whitehead, S.R.**, J. Tiramani*, and M.D. Bowers (2016). Iridoid glycosides from fruits reduce the growth of fungi associated with fruit rot. *Journal of Plant Ecology* 9 (3): 357-366
- Lieurance, D., S. Chakraborty, **S.R. Whitehead**, J.R. Powell, P. Bonello, M.D. Bowers, and D. Cipollini. (2015). Comparative herbivory rates and secondary metabolite profiles in the leaves of native and non-native *Lonicera* species. *Journal of Chemical Ecology* 41: 1069-1079
- Baldwin, J.* and **S.R. Whitehead** (2015). Fruit secondary compounds mediate the retention time of seeds in the guts of Neotropical fruit bats. *Oecologia* 177 (2): 453-466 (cover feature)
- Whitehead, S.R.** and M.D. Bowers (2014). Chemical ecology of fruit defence: synergistic and antagonistic interactions among amides from *Piper*. *Functional Ecology* 28 (5): 1094-1106
- Whitehead, S.R.**, E. Reid, J. Sapp, K. Poveda, A. Royer, A. Posto, and A. Kessler (2014). A specialist herbivore uses chemical camouflage to overcome the defenses of an ant-plant mutualism. *PLoS ONE* 9(7): e102604
- Ananda, A.*, M.F. Obando-Quesada*, and **S.R. Whitehead** (2014). Foraging and feeding preferences of co-occurring *Carollia* bat species on the shared resource of *Piper* fruit. *Saltman Quarterly* 11: 43-46
- Whitehead, S.R.**, C. Jeffrey, M. Leonard, C. Dodson, L.A. Dyer and M.D. Bowers (2013). Patterns of secondary metabolite allocation to fruits and seeds in *Piper reticulatum*. *Journal of Chemical Ecology*
- Whitehead, S.R.** and M.D. Bowers (2013). Evidence for the adaptive significance of secondary compounds in vertebrate-dispersed fruits. *American Naturalist* 182(5): 563-577
Recommended by Faculty of 1000
- Whitehead, S.R.** and M.D. Bowers (2013). Iridoid and secoiridoid glycosides in a hybrid complex of bush honeysuckles (*Lonicera* spp., Caprifoliaceae): implications for evolutionary ecology and invasion biology. *Phytochemistry* 86: 57-63
- Whitehead, S.R.** and K. Poveda (2011). Herbivore-induced changes in fruit-frugivore interactions. *Journal of Ecology* 99: 964-969

Manuscripts in Review/Revision

- Chautá, A., **S.R. Whitehead**, M. Amaya, and K. Poveda (in revision). Leaf herbivory imposes fitness costs mediated by hummingbird and insect pollinators. *PLoS One*

Manuscripts in Preparation (data collection is complete, currently in analysis/writing phase)

- Whitehead, S.R.**, and K. Poveda (in prep). Plant-herbivore interactions in domesticated crops: selection for increased fruit size in apples affects chemical defense and insect performance.
- Whitehead, S.R.**, M.F. Obando-Quesada*, and A.M. Trowbridge (in prep). Identification of volatile cues used by *Carollia* bats to locate *Piper* fruit.
- Song, S., C. Rojas*, and **S.R. Whitehead** (in prep). Effects of *Piper* fruit secondary metabolites on the gut microbial community of *Carollia* bats.
- Glassmire, A., **S.R. Whitehead**, T. Nguyen, and C. Jeffrey (in prep). Anti-fungal effects of novel alkenyphenols in fruits of *Piper sancti-felicis*

TEACHING EXPERIENCE

- 2014, 2015 **Guest Faculty** • Organization for Tropical Studies graduate course in Tropical Biology
-lecturer and advisor for graduate student research
- 2006-2013 **Teaching Assistant** • University of Colorado Ecology and Evolutionary Biology
- Insect Biology, Fall 2011
- Plant Systematics, Fall 2010
- Ecology, Fall 2007
- General Biology, Fall 2006, Spring 2007, Spring 2008, Spring 2012, Spring 2013
- 2012 **Entomology Course Improvement Assistant** • University of Colorado
- updated specimen collection and digital resources library
- 2011 **Guest Lecturer** • University of Colorado • *Social Insects*, Insect Biology, Fall 2011
- 2008-2010 **National Science Foundation Graduate STEM Fellow in K-12 Education (GK-12)**
- 2005 **Teaching Assistant** • Stony Brook University Study Abroad, Madagascar
- Primate Ecology
- Biodiversity and Conservation Methods
- Madagascar Ecosystems
- advised 20 independent research projects

PROFESSIONAL SERVICE

- 2015 **Symposium Organizer** (w/ Katja Poveda), *XXV International Congress of Entomology*, “Crop domestication effects on plant-insect interactions: patterns, mechanisms, and future directions”
- 2012-2016 **Ad-hoc reviewer** for: National Science Foundation, Ecology, Oikos, Functional Ecology, Nature Reviews Chemistry, Journal of Chemical Ecology, BMC Evolutionary Biology, Entomologia Experimentalis et Applicata, Scientific Reports, Oecologia, New Phytologist, PLoS One
- 2012 **Symposium Organizer** (w/ Jessamyn Manson) *Ecological Society of America* Annual Conference: “Chemical Ecology of Plant-Animal Mutualisms”

University of Colorado Department of Ecology and Evolutionary Biology

- 2007-2013 **Colloquium committee** • organized weekly departmental seminar series
- 2007-2012 **Graduate peer mentoring** • served as resource for first-year grad students
- 2010-2013 **Lab Eco-Leader** • coordinated with CU-Boulder Green Labs program
- 2012 **Search committee** • graduate representative, assistant professor/curator position
- 2008-2009 **Evolution outreach committee** • organized workshops on teaching evolution

MENTORING ACTIVITIES

Professional Development

- 2015 **Research Mentoring Certificate Program**, Cornell Center for the Integration of Research, Teaching, and Learning

Supervision of Student Independent Projects (5 total)

- 2013 Ariana Ananda (NSF **Research Experiences for Undergraduates**, La Selva, Costa Rica)
- 2013 Connie Rojas (NSF **Research Experiences for Undergraduates**, La Selva, Costa Rica)
- 2012 Maria Fernanda Obando Quesada (independent master’s research, Costa Rica)
- 2011 Jordan Tiramani (**Undergraduate Research Opportunities Program**, CU Boulder)
- 2011 Justin Baldwin (NSF **Research Experiences for Undergraduates**, La Selva, Costa Rica)

MENTORING ACTIVITIES (continued)

Supervision of Research Technicians

- 2015-2016 Cornell University
Ethan Bass, Lindsay Fennell, Anna Wilson, Trey Ramsey
- 2009-2012 La Selva Biological Station, Costa Rica
Maria Obando Quesada, Daniela Azofeifa, Eric Ballesterero, Marisol Luna Martinez

Supervision of Undergraduate Research Assistants

- 2014-2016 Cornell University
Renhui Lu, Molly Atkinson, Jessica Robinson, Erika Chick, Sascha Hernandez, Ashley Gleaton, Kabeera Fox, Molly Higgins, Rebecca Bernstein, Charles Tan
- 2008-2013 University of Colorado
Jason Hong, Hannah Burk, Daniel Brunelle, Kevin Le, Heather Stone, Albert Como, Pornsawan "Gift" Poopat, Jordan Tiramani, Sarah Ha, Timothy Kashiwa, Nina Xiong, Gillian Brooks, Peter Armington, Logan Ganoe, Joel Schulte, Garrett Smith

Supervision of K-12 Independent Projects

- 2009 Mimi Carson (5th grade BVSD Science Fair project)

PRESENTATIONS

Invited Seminars

- 2017 **Whitehead, S.R.** "The Evolutionary Ecology of Plant-Animal Interactions" *Oberlin College* Department of Biology
- 2016 **Whitehead, S.R.** "Crop Domestication and Plant-Insect Interactions", *Cornell University* Department of Entomology
- 2015 **Whitehead, S.R.** "Rewards, Toxins, and Trade-offs: The Chemical Ecology of Multispecies Interactions", *University of Pittsburgh* Department of Biological Sciences
- 2015 **Whitehead, S.R.** "Rewards, Toxins, and Trade-offs: The Chemical Ecology of Multispecies Interactions", *Virginia Tech* Department of Biological Sciences
- 2014 **Whitehead, S.R.** "Attracting bats but not bugs: chemical trade-offs in seed dispersal", *University of Virginia* Department of Biology

Invited Conference Presentations

- 2016 **Whitehead, S.R.**, M.M. Turcotte, and K. Poveda, "Effects of crop domestication on herbivore defense: a meta-analysis", *International Congress of Entomology*, Organized Oral Session, Orlando, FL
- 2016 **Whitehead, S.R.**, "Evolutionary ecology of toxic fruit: mediating mutualisms and averting antagonisms" *Ecological Society of America*, Organized Oral Session, Ft. Lauderdale, FL
- 2015 **Whitehead, S.R.** and K. Poveda, "Effects of selection for increased fruit size on insect resistance in apples", *Entomological Society of America Eastern Branch*, Rehoboth, DE
- 2012 **Whitehead, S.R.**, "Defense trade-offs in ripe fruits: secondary compounds deter pests but reduce consumption by mutualist seed dispersers", *Ecological Society of America*, Organized Oral Session: Chemical ecology of plant-animal mutualisms, Portland, OR

- 2012 **Whitehead, S.R.**, “Chemical ecology of seed dispersal and fruit defense in *Piper spp.*” *Association for Tropical Biology and Conservation*, Organized Oral Session: *Piper: A model genus for tropical ecology and evolutionary studies*, Bonito, Matto Grosso do Sul, Brazil
- 2010 **Whitehead, S.R.**, K. Tea, L. Sackett, and I. Schwartz, “Spatial heterogeneity of soil nutrients and respiration in McMurdo Dry Valleys, Antarctica”, Invited Poster Presentation, *Graduate STEM Fellows in K-12 Education (GK-12) Research Exposition*, National Science Foundation, Washington, D.C.

Contributed Conference Presentations

- 2017 **Whitehead, S.R.**, M.M. Turcotte, and K. Poveda, “Domestication impacts on plant-herbivore interactions: a meta-analysis”, *Gordon Research Conference on Plant/Herbivore Interactions*, Ventura, CA (poster)
- 2015 **Whitehead, S.R.** and K. Poveda, “Plant-herbivore interactions in domesticated crops: Does selection for increased fruit size in apples affect chemical defense and herbivore performance?” *Ecological Society of America*, Baltimore, MD
- 2014 **Whitehead, S.R.** and K. Poveda, “Crop yield and insect resistance: effects of increased fruit size on codling moth resistance in wild and domestic apples”, *Entomological Society of America*, Portland, OR
- 2013 **Whitehead, S.R.**, M.F. Obando-Quesada, and M.D. Bowers, “Chemical trade-offs in seed dispersal: defensive metabolites from *Piper* fruits deter seed-dispersing bats”, *Gordon Research Conference on Plant/Herbivore Interactions*, Ventura, CA (poster)
- 2013 Lieurance, D., S. Chakraborty, **S.R. Whitehead**, J. Powell, P. Bonello, M.D. Bowers and D. Cipollini, “Chemical defense profiles in native and non-native *Lonicera* species: partitioning variance and associations with herbivore resistance”, *Gordon Research Conference on Plant/Herbivore Interactions*, Ventura, CA (poster)
- 2012 Lieurance, D., S. Chakraborty, P. Bonello, **S.R. Whitehead**, M.D. Bowers, and D. Cipollini, “Does variation in defensive secondary metabolites in *Lonicera* explain herbivore performance?” *Ecological Society of America*, Portland, OR
- 2012 Lieurance, D., **S. Chakraborty**, P. Bonello, **S.R. Whitehead**, M.D. Bowers and **D. Cipollini**, “Variation in defensive secondary metabolites of native and non-native *Lonicera* species grown in the common garden: responses to nutrient availability and relationships with herbivore resistance”, *Terrestrial Invasive Plant Species Conference*, Ontario, Canada
- 2011 Baldwin, J. and **S.R. Whitehead**, “The effects of *Piper* fruit secondary compounds on gut retention time in *Carollia perspicillata*”, *North American Society for Bat Research (NASBR)*, Toronto, Canada (poster)
- 2011 **Whitehead, S.R.** and M.D. Bowers, “Are ripe fruit secondary compounds a consequence of foliar defense? Patterns of intraspecific chemical variation in *Lonicera x bella* (Caprifoliaceae)”, *Ecological Society of America*, Austin, TX
- 2011 Sackett, L., K. Tea, **S.R. Whitehead**, I. Schwartz, D. Wall, D. McKnight, and R. A. Virginia, “Spatial heterogeneity of biogeochemistry and respiration in exposed and subnivian soils in McMurdo Dry Valleys, Antarctica”, *Ecological Society of America*, Austin, TX (poster)
- 2010 **Whitehead, S.R.** and M.D. Bowers, “Are ripe fruit secondary compounds a consequence of foliar defense?” *Guild of Rocky Mountain Ecologists and Evolutionary Biologists*, Pingree Park, CO
- 2010 Tea, K., L. Sackett, **S.R. Whitehead**, I. Schwartz, D. Wall, R. A. Virginia, “Spatial heterogeneity of snowpack, soil biogeochemistry, and soil respiration in exposed and subnivian soils in McMurdo Dry Valleys, Antarctica”, *Ecological Society of America*, Pittsburgh, PA (poster)

- 2010 **Whitehead, S.R.** and K. Poveda, "Does leaf herbivory affect fruit/frugivore interactions and seed dispersal?" *Gordon Research Conference on Plant/Herbivore Interactions*, Galveston, TX (poster)
- 2009 Kessler, A., K. Poveda, J. Sapp, E. Reid, **S.R. Whitehead**, A. Posto, and A. Royer, "Chemical mimicry allows parasitism of an ant-*Acacia* mutualism by a coreid bug (*Mozena* sp.: Coreidae), *Ecological Society of America*, Albuquerque, NM
- 2009 **Whitehead, S.R.**, M. Ochomogo, R. LaCoss, and A. Beach, "Project EXTREMES: an integrative model for bringing ecology and technology into K-12 classrooms", *NSF Graduate STEM Fellows in K-12 Education (GK-12) Annual Conference*, Washington, D.C. (poster)
- 2000 **Whitehead, S.R.**, "Differential Habitat Preference in Epiphytic Ferns", *Tropical Ecology and Conservation Student Research Symposium*, Monteverde, Costa Rica
- 1999 **Whitehead, S.R.**, "Insect Diversity Among Three Forest Types in Ranomafana National Park", *Institute for the Conservation of Tropical Environments Research Symposium*, Madagascar

OUTREACH AND VOLUNTEER ACTIVITIES

- 2015 **Insectapalooza Volunteer** • helped organize annual one-day insect fair hosted by the Cornell University Department of Entomology
- 2008-2013 **Campus Tours** • science-focused university tours for 4th and 5th grade classes from Boulder and Denver public schools
- 2009-2011 **Project EXTREMES Antarctica** • extensive education outreach in public schools surrounding Antarctic science (<http://extremesantarctica.wordpress.com/>)
- 2007-2011 **Alpine Ecology Project** • overnight science enrichment program for Denver elementary schools at University of Colorado Mountain Research Station
- 2009 **Science Fair Judge**, Boulder Valley School District
- 2006-2008 **GAMES (Girls at the Museum Enjoying Science)** • tours and activities for elementary school girls in the Entomology section of the University of Colorado Museum of Natural History

PROFESSIONAL POSITIONS

- 2010 **Research Assistant** • Human Microbiome Project, Department of Chemistry and Biochemistry, University of Colorado, Supervisor: Rob Knight
- 2008-2009 **Science Discovery Wilderness Camp Staff** • University of Colorado
 "Wolves and Wilderness", Ages 9-13 • Summer 2008
 "Pacific Northwest Marine Science Trek", Ages 13-17 • Summer 2008-2009
- 2006 **Field Geologist** • geophysical surveys of northern Minnesota wetlands
- 2003 **Research Technician**, Floristic Inventory of Madidi National Park, Bolivia,
 Supervisor: Peter Jørgensen, Missouri Botanical Garden
- 1999 **Environmental Education Intern** • Wintergreen Nature Foundation, VA
- 1999 **Research Technician** • point count surveys of bird communities in Wintergreen, VA, Supervisor: Dr. Ruth Beck, College of William and Mary

POPULAR PRESS AND INTEGRATIVE ACTIVITIES

- 2015 **Documentary Film** • "How to Make a Scientist" La Selva Student Film Fest • <https://vimeo.com/132536578>

- 2014 **Documentary Film** • “Bats and Piper” La Selva Student Film Fest •
<https://vimeo.com/100745931>
- 2010 **Podcast** • “Teacher and graduate students bring extreme science into K-12 curriculum” •
 University of Colorado Science Education Initiative
- 2009 **Research News Feature** • “Casey Middle School teacher, CU-Boulder graduate students
 headed to Antarctica” • Boulder Daily Camera, 12/13/2009.
- 2009 **Education News Feature** • “Extreme outreach: CU-Boulder grad students head to
 Antarctica for research and education” • Antarctic Sun, 12/18/09
- 2009 **Performance Theater** • inspired by Project EXTREMES Antarctica, directed by Courtney
 Manning, University of Texas, performed 02/2010 in Austin, TX
- 2009 **Research News Feature** • “Scientists explore plant and animal communication at annual
 ecology conference” • Science Codex, 08/04/09
- 2009 **Research News Feature** • “Bugs pretending to be ants are protected against attack” •
 Science Daily, 08/26/09
- 2001 **Documentary Film** • volunteer veterinary assistant for a mobile elephant clinic in
 Chiang Mai, Thailand, and co-filmed/produced/edited (w/ A. Lewis) a 30-minute
 documentary: "Conservation implications of the use of Asian elephants in the Thai
 tourism industry", publicly screened at Oberlin College 05/2001

FIELD COURSES

- 2008 **Tropical Biology: An Ecological Approach** • Organization for Tropical Studies
 graduate course, Costa Rica
- 2002 **Plants and People Field Quarter** • Sierra Institute, Santa Cruz, CA
- 2000 **Tropical Ecology and Conservation** • Council for International Educational Exchange
 Study Abroad, Monteverde, Costa Rica
- 1999 **Madagascar Biodiversity and Ecosystems** • Stony Brook University Study Abroad,
 Ranomafana National Park, Madagascar
- 1998 **Primate Behavior and Ecology** • Estación Biológica La Suerte, Costa Rica

PROFESSIONAL SOCIETIES

Ecological Society of America
 American Society of Naturalists
 Association for Tropical Biology and Conservation
 Entomological Society of America