

ELIZABETH I. CASH

POSITION: Biology PhD Candidate | Graduate College Fellow

ADDRESS: Arizona State University
School of Life Sciences
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Tempe, AZ 85287-4601

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EDUCATION

Arizona State University

School of Life Sciences (SOLS)

Ph.D., Biology (expected)

Dissertation: Nestmate recognition in the red harvester ant, *Pogonomyrmex barbatus*.

Advisors: Jürgen Gadau (committee chair) and Jürgen Liebig

Committee: Jennifer Fewell, Bert Hölldobler, and Kenro Kusumi

Tempe, AZ

Summer 2016

The Ohio State University

Center for Life Sciences Education (CLSE)

B.Sc., Biology, graduated cum laude

Undergraduate Research: The function of pheromones in socially parasitic *Lasius* ants.

Advisors: Joseph Raczkowski, Steven Rissing, and John Wenzel

Columbus, OH

Spring 2009

University of Cincinnati

College of Design, Architecture, Art, and Planning (DAAP)

Design, Foundation Coursework

Cincinnati, OH

Fall 1999

RESEARCH PUBLICATIONS

Cash E, Hölldobler B, Gadau J (*in preparation*) Nasty neighbors: the effect of prior experience and familiarity on nestmate recognition behavior in the red harvester ant, *Pogonomyrmex barbatus*.

Cash E, Liebig J, Gadau J (*in preparation*) The ontogeny of nestmate recognition cues in the red harvester ant, *Pogonomyrmex barbatus*.

Helmkamp M[†], **Cash E**[†], Gadau J (2014) Evolution of the insect desaturase gene family with an emphasis on social Hymenoptera. *Molecular Biology and Evolution* 32: 2366–2372. [†]These authors contributed equally to this work.

Simola DF, ...**Cash E** (18/38 authors), ...Gadau J (2013) Social insect genomes exhibit dramatic evolution in gene composition and regulation while preserving regulatory features linked to sociality. *Genome Research* 23: 1235–1247.

Gibson JD, Niehuis O, Peirson BRE, **Cash EI**, Gadau J (2013) Genetic and developmental basis of F2 hybrid breakdown in *Nasonia*. *Evolution* 67: 2124–2132.

RESEARCH PUBLICATIONS CONTINUED

Smith CR, ...**Cash E** (11/45 authors), ...Gadau J (2011) A draft genome of the red harvester ant, *Pogonomyrmex barbatus*: a model for reproductive division of labor and social complexity. *Proceedings of the National Academy of Sciences of the United States of America* 108: 5667-5672.

Smith CD, ...**Cash E** (6/50 authors), ...Tsutsui ND (2011) The draft genome of the globally widespread and invasive Argentine ant (*Linepithema humile*). *Proceedings of the National Academy of Sciences of the United States of America* 108: 5673-5678.

Suen G, ...**Cash E** (9/49 authors), ...Currie CR (2011) The genome sequence of the leaf-cutter ant *Atta cephalotes* reveals insights into its obligate symbiotic lifestyle. *PLoS Genetics* 7: e1002007.

PRESENTATIONS

Cash E, Helmkampf M, Gadau J. 3rd May 2015. Genomic and genetic patterns of desaturase gene functional variation in ants. (Oral Presentation) Biology & Genomics of Social Insects, Cold Spring Harbor Laboratory, NY.

Cash E, Gadau J. 17th November 2014. Developing the Gestalt: Nestmate recognition cues in the red harvester ant, *Pogonomyrmex barbatus*. (Poster) 62nd annual Entomological Society of America meeting, Portland, OR.

Cash E, Helmkampf M, and Gadau J. 24th May 2014. Evolution of desaturases in ants. (Oral Presentation) ASU - UWü International Symposium and Workshop on Frontiers in Insect Behavior, Social Organization, and Evolution. Würzburg, Germany.

Cash E, Helmkampf M, Gadau J. 13th November 2013. The evolution of desaturase genes in ants. (Oral Presentation) 61st annual Entomological Society of America meeting, Austin, TX.

Cash E, Gadau J. 13th November 2013. Nasty neighbors: The effect of cuticular hydrocarbons and prior experience on nestmate recognition behavior in the red harvester ant, *Pogonomyrmex barbatus*. (Poster) 61st annual Entomological Society of America meeting, Austin, TX.

Cash E, Helmkampf M, Gadau J. 18th March 2012. Capturing That Air of Distinction: Desaturase gene diversity as a contributor to nestmate recognition in seven newly sequenced ant species. (Oral Presentation) Gordon Research Seminar on Genes & Behavior, Galveston, TX.

Cash E, Helmkampf M, Gadau J. 20th June 2011. Uncovering the genetic basis of colony recognition: desaturase gene diversity in seven newly sequenced ant species. (Poster) Evolution Meeting, Norman, OK.

Cash E, Helmkampf M, Gadau J. 20th June 2010. The genetic basis of colony recognition: desaturase genes in the newly sequenced genomes of *Pogonomyrmex barbatus* and *Linepithema humile*. (Poster) Fourth Annual Arthropod Genomics Symposium, Kansas City, MO.

Cash E, Raczkowski J, Rissing S. 13th May 2009. The function of pheromones in worker ants: the parasitism of *Lasius alienus* by *Lasius claviger*. (Poster) The Richard J. and Martha D. Denman Undergraduate Research Forum, Ohio State University, Columbus, OH.

PRESENTATIONS CONTINUED

Cash E, Harder J. 2nd December 2008. Comparison of annual changes in arthropod abundance and diversity in a central Ohio oldfield community. (Oral Presentation) Conservation Biology, Ohio State University, Columbus, OH.

HONORS & AWARDS

Graduate Dissertation Fellowship Arizona State University Awarded funding for final year of dissertation - \$17,000.00	Tempe, AZ Fall 2015 – Spring 2016
Graduate Training Fellowship School of Life Sciences, ASU Awarded funding to receive training at the Ant Course - \$1,150.00	Tempe, AZ Spring 2015
62nd Annual Meeting Entomological Society of America Awarded 2 nd place in graduate student poster competition - \$50.00	Portland, OR Fall 2014
Conference Travel Grant School of Life Sciences, ASU Awarded funding to present research at the 62 nd annual Entomological Society of America Meeting - \$400.00	Tempe, AZ Fall 2014
Graduate Excellence Award School of Life Sciences, ASU Awarded funding for graduate achievements - \$350.00	Tempe, AZ Spring 2014 & 2015
Graduate Research Scholarship School of Life Sciences, ASU Awarded funding for graduate research - \$6,182.00	Tempe, AZ Summer 2013, 2014, & 2015
ESA Conference Travel Grant NAS-IUSSI Awarded funding to present research at the 61 st annual Entomological Society of America Meeting - \$500.00	Tempe, AZ Summer 2013
University Graduate Fellowship School of Life Sciences, ASU Awarded funding for graduate research - \$6,075.00	Tempe, AZ Summer 2012 & 2013
Study Abroad Scholarship School of Life Sciences, ASU Awarded funding to attend a tropical biology course at the Smithsonian Tropical Research Institute - \$750.00	Tempe, AZ Fall 2010
Conference Travel Grant School of Life Sciences, ASU Awarded funding to present research at the 4 th annual Arthropod Genomics Symposium - \$300.00	Tempe, AZ Spring 2010
Denman Undergraduate Research The Ohio State University Awarded 3 rd place in biological sciences (poster presentation) - \$200.00 Invited to join the scientific research society, Sigma Xi.	Columbus, OH Spring 2009
National SMART Grant The Ohio State University Awarded for academic achievement in the life sciences - \$8,000.00	Columbus, OH Fall 2007 – Spring 2009

TEACHING EXPERIENCE

Arizona State University | Graduate Teaching Associate

Organic Evolution (BIO 345), Lecture TA	Summer 2013, 2014, & 2015
InnovationSpace (IND 464 & 465), Biomimicry TA	Spring 2013 – Spring 2015
General Entomology (BIO 386), Laboratory TA	Fall 2011 & 2012
General Biology II (BIO 182), Laboratory TA	Spring 2012
General Biology I (BIO 181), Laboratory TA	Spring 2011
General Genetics (BIO 340), Lecture TA	Fall 2010
Introductory Biology (BIO 100), Laboratory TA	Fall 2009

Tempe, AZ

Arizona State University | Research Mentor

Marie-Luise Hagitte (Visiting International Student)	Fall 2015
David Contreras (Genetics Undergraduate)	Spring – Fall 2015
Katherine Fowler (Genetics Undergraduate)	Spring – Summer 2015
Rafael Testai* (Genetics Undergraduate)	Fall 2013 – Spring 2014
Harry Grissom† (Biology Undergraduate)	Fall 2012 – Summer 2013
Anna-Lena Roll (Visiting International Student)	Summer 2012
Chad Allen (Biology Undergraduate)	Spring 2012
Bitu Vaghari† (Biology Undergraduate)	Fall 2010 – Spring 2011
Lakshmi Ghanta† (Biology Undergraduate)	Fall 2009 – Spring 2010

Tempe, AZ

*Indicate students who successfully completed honor's thesis research.

†Indicate students who continued on in graduate research or professional school.

PROFESSIONAL SOCIETIES

International Union for the Study of Social Insects (IUSSI)	2013 – Present
The Society for the Study of Evolution (SSE)	2011 – Present
Association for Women in Science (AWIS)	2010 – Present
The Entomological Society of America (ESA)	2010 – Present
The National Society of Collegiate Scholars (NCS)	2005 – Present

ADDITIONAL PROFESSIONAL EXPERIENCE

CLAS | Arizona State University

Photography

Contributed photographs for ASU and science media sources

The Biomimicry Center - <http://asunews.asu.edu/20150306-biomimicry-center-asu-launch>

Ant research - <http://www.livescience.com/47151-ants-trap-carbon-weathering-minerals.html>

InnovationSpace - http://asunews.asu.edu/20130328_todd_innovationspace

Nasonia research - http://asunews.asu.edu/20130213_wasppheromones

Biomimicry Travel Studio - http://sols-archive.asu.edu/news/2012/02_news_12.php

Biomimicry Travel Studio - <http://vimeo.com/30211881>

Biomimicry - <http://places.designobserver.com/feature/biomimicry-and-design-education/32848/>

Videography

Contributed videos for education and research promotion

Why Does Ant Diversity Matter? (Ant Course) - <http://youtu.be/lgtZU5xraol>

Mark-Recapture Technique (Ant Course) - <http://youtu.be/ekSjRsnhJrk>

Tempe, AZ

Fall 2011 – Present

Summer 2012 – Present

Videography Continued

Tournament of the Ants (NY Times) - <http://nyti.ms/1mUflZz>

InnovationSpace Alumni Profile - <http://innovationspace.asu.edu/students/>

SIRG & friends (SOLS, ASU) - <http://vimeo.com/86664707>

Flight of the Sexuials (SOLS, ASU)- <http://vimeo.com/48173557>

Graphic and Website Design

Spring 2012 – Present

Designed logos, graphics, and websites for research promotion

Arizona Beekeepers Association (logo) - <http://www.elizabethcash.com/azbeekeepers.html>

The Biomimicry Center (posters) - <http://www.elizabethcash.com/biomimicry.html>

I heart ants & I heart bees (graphics) - <http://www.elizabethcash.com/iheartants.html>

SIRG & friends (logo) - <http://www.facebook.com/SIRG.ASU>

Gadau Lab (logo + website) - <http://gadau.lab.asu.edu>

SOLS | Arizona State University**Tempe, AZ****Biomimicry Consultant**

Summer 2013

Served as biomimicry project consultant on the architectural redesign of ASU's Life Sciences A-wing building lobby and courtyard space.

GLO jeans girls | Jones Apparel Group**New York, NY / Hong Kong****Associate Designer**

Fall 2004 – Summer 2005

Designed and developed denim & knit styles for a young girls, tween clothing line.

Fetish | Ecko Unlimited**New York, NY****Product Development Manager**

Summer – Fall 2004

Oversaw design and development of knit styles for an urbanwear, junior (young women's) apparel line.

RocaWear Juniors | Nesi Apparel Group**New York, NY / Hong Kong****Product Development Associate**

Spring 2002 – Summer 2004

Assisted in coordination of design and development for an urbanwear, junior (young women's) clothing line.

PUBLIC OUTREACH**Summer Flashlight Tours | Desert Botanical Garden****Phoenix, AZ**

Volunteered as an expert entomologist to inform public attendees about insect diversity of the Sonoran Desert.

Summer 2014

<http://www.dbg.org>

SOLS Takes a Hike | Arizona State University**Tempe, AZ**

Participated in guided hikes at the Gilbert Riparian Preserve to teach local attendees about insects of the Sonoran Desert.

Spring 2014

<http://sols.asu.edu/hike>

PUBLIC OUTREACH CONTINUED

BEST Summer Program | Arizona State University

Developed active learning exercises to teach camp attendees (grades 5-9) the process of using the scientific method while studying social insects.

<http://outreach.engineering.asu.edu/>

Tempe, AZ
Summer 2013

InsectARium | Arizona State University

Edited insect images with Adobe Photoshop to create interactive, 3D graphical insect models for use in an online, technology based learning and research tool.

<http://tblr.asu.edu/mtpd/insectarium/ar/flashcards3.php>

Tempe, AZ
Fall 2012

Ask-a-Biologist | Arizona State University

Answer biology questions submitted online by K-12 students and connect Ask-a-Biologist resources with K-12 teachers.

<http://askabiologist.asu.edu>

Tempe, AZ
Spring 2010

CompuGirls | Arizona State University

Served as a graphic design project consultant in a technology program for adolescent girls.

<http://sst.clas.asu.edu/about/compugirls>

Tempe, AZ
Spring 2010

Project Connect | Cincinnati Public Schools

After school tutor for inner city, underrepresented students (K-6).

<http://www.cps-k12.org/Academics/ProjConnect/ProjConnect.htm>

Cincinnati, OH
Spring 2000