Zachary (Zack) Shaffer

(He/Him/His)

zshaffe@asu.edu www.zackshaffer.com

Education

PhD in Biology.....May 2014
Arizona State University
Tempe, AZ

Dissertation Title: *The Wisdom of the Acorn: social foraging of the ant, Temnothorax rugatulus*
Advisor: Dr. Stephen Pratt

MS in Curriculum and Instruction .....May 2001
Arizona State University
Tempe, AZ

Advisor: Dr. Fred Staley

BA in Biology.....May 1996
University of Kansas
Lawrence, KS

- Departmental honors
- University honors

Professional references

Professor Stephen Pratt (doctoral advisor + ongoing scientific collaborator), Arizona State University School of Life Sciences.
Phone: (480)727-9425 Email: Stephen.Pratt@asu.edu

Professor Shelley Haydel (Associate director undergraduate programs), Arizona State University School of Life Sciences
Phone: (480)727-7234 Email: shelley.haydel@asu.edu

Jim Anderson (Principal, retired, at John M Andersen Jr. High School)
Phone: (480)883-5300

Teaching experience in Higher Education

Legend: [F2F] = Face-to-face instruction [O] = Online instruction

Assistant Teaching Professor……..……May 2023 – present
School of Life Sciences Arizona State University, Tempe, AZ

Fall 2023

- BIO 181: Introductory biology for majors I, one sections [F2F]
  - Instructed course
  - Supervised one graduate TA: Amy Sawyer
- BIO 182: Introductory biology for majors II, two sections [F2F]
  - Instructed lecture
  - Supervised two graduate TA's: Manasa Iyer and Mary Chisolm
  - Mentored one undergraduate ATA: Sean Gutierrez
- BIO 194: BIOBridge program [F2F]
  - Co-instructed course with Dr. Silvie Huijben
  - Supervised one graduate TA: Sergio Serrato-Arroyo
  - Supervised two undergraduate ATA's: Max Martinez and Peyton Belle

Summer 2023

- BIO 182: Introductory biology for majors II, two sections [O]
  - Co-instructed course (in collaboration with Dr. Marion Le Gall)
  - Supervised four graduate TA's: Samanta Orellana, Laura Banken, Annika Avery, and Sarika Sawant
- BIO 432: Why People Steal, Cheat, and Lie, one section [O]
  - Instructed course
  - Supervised two graduate TA's: Sergio Serrato-Arroyo and Bridget Diviak

Instructor……..August 2017 – May 2023
School of Life Sciences Arizona State University, Tempe, AZ

Courses taught:

Spring 2023

- BIO 182: Introductory biology for majors II, three sections [F2F]
    - Instructed lecture
    - Supervised four graduate TA's: Harshvardhan Yadav, Sofia Acosta, Camila Delgado-Montes, and Amanda Abdelsamad

Fall 2022

- BIO 182: Introductory biology for majors II, two sections [F2F]
    - Instructed lecture
    - Supervised one graduate TA: Kali Swichtenberg
- BIO 181: Introductory biology for majors I, one section [F2F]
    - Instructed lecture
    - Supervised one graduate TA: SM Bukola Obayomi
- BIO 194: BIOBridge program [F2F]
    - Co-instructed course with Dr. Janet Neisewander
    - Supervised two graduate TA's: Samantha Scott and Erica Nadile
    - Supervised one undergraduate ATA: Peyton Belle

Summer 2022

- BIO 432: Why People Steal, Cheat, and Lie, two sections [O]
    - Supervised one graduate TA: Brennan Hays
- BIO 181: Introductory biology for majors I, two sections [O]
    - Supervised eight graduate TA's and graders: Rachel Eder, Katherine Arguez, Daniel Moses, Mary Chisolm, Dylan Perez, Kailin Johnsson, Darakshan Zabin, and Deanna Larson

Spring 2022

- BIO 182: Introductory biology for majors II, one section [F2F]
    - Supervised two graduate TA's: Harshvardhan Yadav and Lohita Mallavarapu
- BIO 182: Introductory biology for majors II, two sections [O]
    - Supervised six graduate TA's/ graders: Christian Parrinello, Scott McAdams, Gregory Hocutt, Jessica Richardson, Mandy Welsh, and Alex Geiger
- BIO 345: Evolution, two sections [O]
    - Supervised five graduate TA's/ graders: Gaurav Bilolikar, Chris Vito, Fransiska Kangombe, Jennifer Eagle, and Shinji Otsuru
- Discovery Seminar: Evolution and Complexity [F2F]

Fall 2021

- BIO 181: Introductory biology for majors I, two sections [F2F]
    - Instructed lecture

    - Supervised two graduate TA: SM Bukola Obayomi, and Mengdi Lu
    - Mentored one undergraduate ATA: Justin Huynh
- BIO 181: Introductory biology for majors I, one section [O]
    - Instructed lecture
    - Supervised six graduate TA's/ graders: Kavita Manhas, Charles Wallace, Joseph Holway, Boyd, Armer, Alex Geiger, Tracy Davis
- BIO 182: Introductory biology for majors II, one section [F2F]
    - Instructed lecture
    - Supervised two graduate TAs: Camila Delgado-Montes and Lohita Mallavarapu

Summer 2021

- BIO 181: Introductory biology for majors I, one section [O]
    - Supervised two graduate TA's: Nicole DesJardins and Cameron Smith
- BIO 432: Why people cheat, lie, and steal, one section [O]
    - Supervised two graduate TAs: Erin Murphy and Emma Muran

Spring 2021

- BIO 282: Introductory biology for majors I, three sections [F2F]
    - Instructed lecture
    - Supervised two graduate TA's: Lauren Neel and Mengdi Lu
    - Mentored one undergraduate ATA: Justin Huynh

Fall 2020

- BIO 100: The Living World, two sections [O]
    - Supervised ten graduate TA's/ graders: Shawn Mahoney, Soon Flynn, Jason Lacson, Shelbi Pack, Ehsan Khosravani, Olivia Davis, Shelbi Pack, Emmaline Gates, Kristen Wellborn, Isaias Peraza
- BIO 182: Introductory biology for majors II, one section [F2F]
    - Instructed lecture
    - Supervised one graduate TA
- BIO 281: Introductory biology for majors I, one section [F2F]
    - Instructed lecture
    - Supervised one graduate TA

Spring 2020

- BIO 181: Introductory biology for majors I, two sections [F2F]
    - Instructed lecture

    - Supervised graduate TA's
- BIO 182: Introductory biology for majors II, one section [F2F]
    - Instructed lecture
    - Supervised graduate TA's

Fall 2019

- BIO 181: Introductory biology for majors I, two sections [F2F]
    - Instructed lecture
    - Developed online interactive textbook for Cogbooks and BIO 181
    - Supervised one graduate TA
- BIO 112: Why Sex? one section [O]
    - Supervised graduate TA's

Summer 2019

- BIO 181: Introductory biology for majors I, one section [O]
    - Supervised graduate TA's
- BIO 112: 'Why Sex?', one section [O]
    - Supervised graduate TA's

Spring 2019

- BIO 181: Introductory biology for majors I, three sections [F2F]
    - Instructed lecture
    - Supervised graduate TA's
- BIO 112: 'Why Sex?', one section [O]
    - Supervised graduate TA's/ graders

Fall 2018

- BIO 181: Introductory biology for majors I, two sections [F2F]
    - Instructed lecture
    - Supervised graduate TA
- BIO 182: Introductory biology for majors II, one section [F2F]
    - Instructed lecture
    - Supervised graduate TA

Summer 2018

- BIO 112: 'Why Sex?', two sections [O]
    - Supervised graduate TA's/ graders

Spring 2018

- BIO 181: Introductory biology for majors I, one section [F2F]
    - Instructed lecture
    - Supervised graduate TA's

- BIO 282: Introductory biology for majors II, two sections [F2F]
    - Instructed lecture
    - Supervised graduate TA's

Fall 2017

- BIO 181: Introductory biology for majors I, two sections [F2F]
    - Instructed lecture
    - Supervised graduate TA's
- BIO 182: Introductory biology for majors II, two sections [F2F]
    - Instructed lecture
    - Supervised graduate TA's

Faculty Associate……..August 2014 – August 2017
School of Life Sciences Arizona State University, Tempe, AZ

Summer 2017

- BIO 112: 'Why Sex?', one section [O]
    - Supervised graduate TA's/ graders
- BIO 182: 'Why Sex?', one section [O]
    - Supervised graduate TA's/ graders

Spring 2017

- BIO 112: 'Why Sex?', one section [O]
    - Supervised graduate TA's/ graders
- BIO 100: The Living World, one section [O]
    - Supervised graduate TA's/ graders
- BIO 182: General Biology II, one section [O]
    - Supervised graduate TA's/ graders

Fall 2016

- BIO 100: The Living World, one section [O]
    - Supervised graduate TA's/ graders
- BIO 112: 'Why Sex?', two sections [O]
    - Supervised graduate TA's/ graders

Summer 2016

- BIO 112: 'Why Sex?', two sections [O]
    - Supervised graduate TA's/ graders

Spring 2016

- BIO 112: 'Why Sex?', two sections [O]
    - Supervised graduate TA's/ graders

Fall 2015

- BIO 112: 'Why Sex?', two sections [O]
    - Supervised graduate TA's/ graders

Spring 2015

- BIO 112: 'Why Sex?', one sections[O]
    - Supervised graduate TA's/ graders

Fall 2014

- BIO 112: 'Why Sex?', two sections [O]
    - Developed online curriculum (entirely rebuilding online course for ASU): recording video lectures, developing new online lab activities
    - Supervised one graduate TA grader

Adjunct faculty ……..……August 2016 – May 2020
Biology Department Phoenix College, Phoenix, AZ

Spring 2020

- BIO 108: Plant Biology, one section [F2F]
    - Delivered lecture and supervised lab

Fall 2019

- BIO 108: Plant Biology one section [F2F]
    - Delivered lecture and supervised lab

Teaching Experience in K-12 STEM Education

High School Science teacher……..August 2014 - August 2017
Environmental Science Maryvale High School, Phoenix, AZ

Responsibilities:

- Planned and delivered lectures and labs in Environmental Science and AP Environmental Science
- Led field-trips
- Created a school garden
- Science Club advisor

Middle School teacher……August 2001 – July 2007
Middle School Science Andersen Junior High, Chandler, AZ

Responsibilities:

- Planned and delivered lectures and labs in middle school science.

- Led field-trips
- Supervised a MESA (Math, Engineering, Science, Achievement) school science club especially for female students and under-represented groups (2003 – 2007)
- Football coach (2006)
- School Union Rep (2004 – 2007)

Student teaching……...January 2001 – May 2001
High School biology Chandler High School, Chandler, AZ

Organizer - Saturday Science Program……September 2000 – May 2001
Science enrichment program Frye Elementary School, Chandler, AZ

Master's degree Curriculum and Instruction ……August 2000 – May 2001
Science education Arizona State University, Tempe, AZ

Teaching certification ……...August 2000 – May 2001
Secondary Science education Arizona State University, Tempe, AZ

Graduate Teaching Assistant Experience

Graduate Teaching Assistant…….August 2007 – May 2014
School of Life Sciences Arizona State University, Tempe, AZ

Course	TA Position	Modality	Semester
BIO 340	Lecture TA	F2F	Spring 2013
BIO 340	Lecture TA	F2F	Spring 2012
BIO 340	Lecture TA	F2F	Spring 2011

Research Experience

Honeybee Communication Project……..January 2021 – present

Designed and performed experiments studying honey bee waggle dance
Collaborated with Dr. Cahit Ozturk and Dr. Stephen Pratt
Co-advised Master's student Showmik Alam
School of Life Sciences
Arizona State University
Tempe, AZ

Ant Scattering Project……..January 2022 – present

Designed and performed experiments studying aggregation in rock cavity ants
Collaborated with Dr. Stephen Pratt
Co-advised Master's student Brooke Goodland
Co-advised undergraduate student, Caitilin O'horo
School of Life Sciences
Arizona State University
Tempe, AZ

Carpenter Bee Biology Project…….January 2018 – May 2022

Designed and performed experiments studying the biology of carpenter bees
Collaborated with Madeleine Ostwald and Jennifer Fewell and others
School of Life Sciences
Arizona State University
Tempe, AZ

Graduate Research Assistant…….August 2007 – May 2014

Designed and performed dissertation research studying rock cavity ants
Performed scientific studies on a range of other ant species
Supervisor: Stephen Pratt
School of Life Sciences
Arizona State University
Tempe, AZ

Laboratory technician…….January 1998 – December 1998

Worked as a molecular biology lab technician of genetics in multiple sclerosis
Supervisor: Dr. Brian Weinshenker
Mayo Clinic

Rochester, MN

Pre-doctoral rotation, MD Anderson Cancer Center…August 1997 – December 1997

Completed several rotations in cancer molecular biology
MD Anderson Cancer Center
Science Park Research Division
Smithville, TX

Undergraduate research assistant…….June 1994 – May 1996

Assisted in collection of ecological field data (flora and fauna)
Supervisor: Professor Robert D. Holt
University of Kansas
LTER field station
Lawrence, KS

Undergraduate research assistant…….May 1992 – August 1992

Assisted in analysis of honeybee biogeography using molecular biology techniques
Supervisor: Dr. Deborah Smith
University of Kansas
Lawrence, KS

Undergraduate Honors Student Mentoring

Aislinn Marek, ASU Biological Sciences Major……...January 2022 – May 2023

- Co-reader of thesis
- Thesis topic: Black-Footed Ferret Conservation History, Methodology, and Discussion

Noah Sharma, ASU Biological Sciences Major…….....Sept. 2022 – May 2023

- Committee member
- Thesis topic: Investigating the hindgut protists of *Cryptotermes brevis*

Christina Warren, ASU Biological Sciences Major……January 2023 – May 2023

- Faculty mentor (for MIC 401)

- Thesis: Examining the viability of interspecies herd immunity for lowering disease risk

Victoria Olivas, ASU Biological Sciences Major…….....Oct. 2022 – May 2023

- Committee Member
- Thesis: Responses to dominance behaviors impact the formation of a reproductive hierarchy in the ponerine ant Harpegnathos saltator

Graduate Student Mentoring

Brooke Goodland, ASU 4+1 Master's student……August 2021 – May 2023

- Co-advisor for thesis work
- Thesis topic: Ant Scattering – How do ant colonies aggregate after disturbance?

Showmik Alam, ASU 4+1 Master's student……January 2021 – December 2022

- Co-advisor for thesis work
- Thesis topic: Exploring Positive Feedback in the honey bee waggle dance

Ostwald, Madeleine, ASU biology doctoral student……..August 2018 – May 2022

- Served in an advisory role and collaborator (in addition to her formal advisor, Jennifer Fewell)
- Thesis topic: Exploring the Sociobiology of Carpenter Bees

Undergraduate Research Assistant Mentoring

Muniba Abdumanobova, ASU undergraduate……..January 2024 – present

- Project: Honey bee linearity – investigating waggle dance communication

Caitilin O'horo, ASU undergraduate……January 2023 – December 2023

- Project: Ant Scattering

Jacob Stoltman, ASU undergraduate……January 2023 – December 2023

- Project: Honey bee linearity – investigating waggle dance communication

Alicia Martin, ASU undergraduate…….January 2023 – May 2024

- Project: Getting along: investigating paper wasp cooperation

Justin Hyunh, ASU undergraduate……..January 2022 – May 2022

- Project: Getting along: investigating paper wasp cooperation

Brooke Goodland, ASU 4+1 undergraduate student……August 2021 – December 2022

- Project: Ant scattering' Investigating the colony re-formation after ant scattering'

Showmik Alam, ASU 4+1 undergraduate student……August 2021 – December 2022

- Project: Honey bee linearity – investigating waggle dance communication

Christopher Sanders, ASU undergraduate student…January 2021 – December 2021

- Project: Ants prioritize recruitment over exploitation

Elijah Ozaki, ASU undergraduate honors student…….August 2019 – December 2021

- Project: Ants prioritize recruitment over exploitation

Daniel Kelly, ASU undergraduate student……January 2018 – December 2018

- Project: Ant scattering' Investigating the colony re-formation after ant scattering'

Gage Schaper, ASU undergraduate honors student….January 2010 – December 2014

- Project: Division of labor and the regulation of house hunting and foraging in the rock cavity ant *Temnothorax rugatulus*'

Jacob Evans, ASU undergraduate…….January 2012 – December 2014

- Project: 'Mechanisms of brood aggregation by the ant, *Temnothorax rugatulus*, after complete nest destruction'

Mike Bayuk, ASU undergraduate honors student……January 2011 – December 2011

- Project: Dominance hierarchy formation in the ant, *Harpegnathos saltator*'

Sara Dreyer, ASU undergraduate honors student……..May 2009 – December 2009

- Project: 'Optimum foundress number in a pleometrotic population of *Pogonomyrmex californicus*'

Refereed Publications

1. Oswald, M., Fox, T., Hillery, WS., **Shaffer, Z.**, Harrison, JF., Fewell, JH. 2022 Animal Behaviour. Group-living Carpenter bees conserve heat and body mass better than solitary individuals winter.

2. **Shaffer, Z.,** Dreyer, S., Clark, R., Pratt, S., Fewell, JH. 2022. Frontiers in Ecology and Evolution. Efficient Allocation of Labor Maximizes Brood Development and Explains Why Intermediate-Sized Groups Perform Best During Colony-Founding in the Ant, Pogonomyrmex californicus.

3. Ostwald, M., Dahan, RA, **Shaffer, Z.,** Fewell, JH., 2021 Frontiers in Ecology and Evolution. Fluid Nest Membership Drives Variable Relatedness in Groups of a Facultatively Social Bee.

4. Ostwald, M., Lyman, B., **Shaffer, Z.**, Fewell, J. 2020 Insect Sociaux. 'Temporal and spatial dynamics of carpenter bee sociality revealed by CT imaging'.

5. Valentini, G., Masuda, N., **Shaffer, Z.,** Hanson, J., Sasaki, T., Walker, S.I., Pavlic, T., Pratt, S. 2020 Proceedings of the Royal Society, B. Division of labor promotes the spread of information in colony emigrations by the ant *Temnothorax rugatulus*.

6. Ostwald, M., **Shaffer, Z.,** Pratt, S., Fewell, J. September 2019 Animal Behaviour, 'Multimodal cues facilitate nest recognition in carpenter bee aggregations'

7. **Shaffer, Z**, Sasaki, T., Haney, B., Janssen, M., Pratt, S., Fewell, J. 2016 Scientific Reports The Foundress's dilemma: group selection for cooperation among queens of the ant, *Pogonomyrmex californicus*

8. Sasaki, T., Penick, C., **Shaffer, Z.**, Haight, K., Pratt, S., Leibig, J., 2016 American Naturalist. A simple and general model of dominance hierarchy formation

9. Sasaki, T., Janssen, MA., **Shaffer, Z.**, Pratt, SC 2016 Current Zoology 'Exploration of unpredictable environments by networked groups'

10. **Shaffer, Z.**, Sasaki, T., Pratt, S. 2013 Animal Behaviour. 'Linear recruitment leads to allocation and flexibility in collective foraging by ants'

Grants

- Doctoral completion RA, Arizona State University, (fall 2013) ($9000)
- GPSA research grant, for conference travel and collaboration in Lund, Sweden and Brussels, Belgium (2012) ($1000)
- Jumpstart Grant, Arizona State University, for study, 'Exploring collective rationality in cockroach aggregations' ($350)
- School of Life Sciences travel grants (2008, 2009, 2010, 2011, 2012) ($400)
- Graduate Initiative Fellowship for training (GIFT award), 2009, for participation in the Ant Course, American Museum of Natural History field station ($2500)
- University Special Fellowship, Arizona State University, (2007 – 2008) ($17,000)

Honors and Awards

ASU College of Liberal Arts and Sciences Teaching Award winner (CLAS Outstanding Instructor Award) (2022)
ASU College of Liberal Arts and Sciences Teaching Award finalist (CLAS Outstanding Lecturer or Instructor Award) (2021)
ASU College of Liberal Arts and Sciences Teaching Award nominee (CLAS Outstanding Lecturer or Instructor Award) (2019)
ASU School of Life Sciences Teaching Associate of the year (2012 -2013)
Graduate College excellence in teaching award (TA) – nominee 2012.

Professional Service and Committees

ASU School of Life Sciences, Tempe, AZ.....

- Career Track Faculty member School of Life Sciences.....October 2023 – present

- Reimagining SoLS Social Interactions Committee, co-lead Oct. 2023 – Dec. 2023
- Co-director of BIOBridge (early start) program……..……..May 2021 - present
- School of Life Sciences DEI Committee……..December 2022 – present
- School of Life Sciences DEI Faculty Hiring Committee……...December 2022
- School of Life Sciences BIO 182 Liaison with Dreamscape……November 2022
- School of Life Sciences BIO 182 Liaison with EdPlus……..January 2022 – present
- School of Life Sciences Faculty member OrgBIO…….January 2020 –present
- Lead for BIO 181 'Tiger Team' curriculum development**……**Jan 2021 – Jan 2022

Public Service and Outreach

- 'Little Big Bugs' insect educational booth ASU Open Door February 2023
- 'Little Big Bugs' insect educational booth, ASU Homecoming 2022
- 'Little Big Bugs' insect educational booth, Tempe Center for the Arts, Puente fest, April, 2022
- Secondary faculty advisor: Medical Book Club (ASU club January 2022 – present)
- 'Little Big Bugs' insect educational booth, Desert Botanical Garden, October, 2021
- Primary Faculty advisor: ASU Digital animation club (2020 – 2021)
- 'Little Big Bugs' insect educational booth, Dia De Los Muertos event, Steel Indian School Park November, 2019
- Co-organizer for a citizen science group, Sonoran Desert Pollinators (based in Gold Canyon, AZ), 2018 – 2022
- Animal Behaviour Society Student grant reviewer: 2019 - present
- Animal Behavior chair of judging, Intel International Science and Engineering Fair, Phoenix, Arizona, May 2019
- 'Little Big Bugs' insect educational booth, Boyce Thompson Arboretum Family Day March 30, 2019
- 'Little Big Bugs' insect educational booth. Sunday, October 28, 2018
- March for Science insect educational booth. Saturday, April 14, 2018
- March for Science insect educational booth. Saturday April 22, 2017
- Vice-president, ASU graduate student organization for the study of complexity. (2012 – 2013).
- Vice President of the board, Concorde Village Inc. (a housing cooperative serving 375 households in Tempe, AZ). 2009 – 2012.
- Graduate Student social committee representative, ASU school of life sciences. 2009 – 2011.
- Teacher's Union representative, Andersen Junior High, 2004 - 2007

Professional organizations (membership)

- International Union for the Study of Social Insects (IUSSI)
- Entomological Society of America
- Society for the Study of Evolution

Conference Talks

Legend= ***undergraduate mentee** ****graduate mentee**

Shaffer, Z., October 2022 Invited talk (panel discussion, 'I got my degree now what?' Arizona Physiological Society (AZPS) annual meeting. Scottsdale, Arizona

Shaffer, Z., Clark, R., Pratt, S., Fewell, J., July 2022. In-person presentation. Efficient allocation of labor maximizes brood development and explains why intermediate-sized groups perform best during colony-founding in the ant, Pogonomyrmex californicus. IUSSI. San Diego, CA. USA

Goodland, B**., **Shaffer, Z.,** Pratt., July 2022 In-person presentation. Ant Scattering: Evaluating aggregation and consensus in Temnothorax ants after physical decentralization. Animal Behavior Society. San Jose, Costa Rica

Alam, S.** **Shaffer, Z.,** Pratt., S., July 2022 In-person presentation. Exploring Positive Feedback in the Waggle Dance and its Effect on Collective Behavior of Honeybees. Animal Behavior Society. San Jose, Costa Rica

Alam, S.*, Ozturk, C., **Shaffer, Z.**, Pratt, S., July 2021 On-Demand talk. Animal Behavior Society

Ostwald, M., Hillery, W., **Shaffer, Z**., Harrison, J., Fewell, J.H., November 2020. On-Demand talk. Group living confers thermal and physiological benefits in winter nests of a facultatively social bee. Animal Behavior Society

Shaffer, Z. Pratt, S. November 2020. On-Demand Talk. Individual versus collective assessment of food resources in Temnothorax ants. Animal Behavior Society

Shaffer, Z., Clark, R., Pratt, S., Fewell, J.H., July 2020 On-Demand Talk. Intermediate-sized groups outperform small and large groups during colony founding in the ant, *P. californicus*. Animal Behavior

Shaffer, Z, Sasaki, T., Haney, B., Janssen, M., Pratt, S., Fewell, J. June 2017. Talk. The Foundress's dilemma: group selection for cooperation among queens of the ant, *Pogonomyrmex californicus'* Evolution. Portland, Oregon

Shaffer, Z., Pratt, S. December 2015. Poster. Are cockroaches rational decision-makers? Frontiers in Insect Research (ASU – Wurzburg social insect workshop) Tempe, Arizona

Shaffer, Z., Sasaki, T., Pratt, S. June 2015. Are cockroaches rational decision-makers? Animal Behavior Society Annual Meeting. Anchorage, Alaska.

Shaffer, Z., Pratt, S. April 2015. Poster: How do foraging ants learn the quality of food resources? Collective dynamics and model verification: Connecting kinetic modeling to data (workshop). Tempe, Arizona

Shaffer, Z., Sasaki, T., Haney, B., Janssen, M., Pratt, S., Fewell, J. November 2014. Talk: The Foundress Dilemma: group selection for cooperation among queens in the ant, *Pogonomyrmex californicus*. Entomological Society of America annual annual meeting. Portland, Oregon

Shaffer, Z., and Pratt, S. May 2014. Talk: The wisdom of the acorn: the social foraging of the ant, *Temnothorax rugatulus*. Social insect workshop. Wurzburg, Germany

Shaffer, Z., and Pratt, S. November 2013. Talk: The wisdom of the acorn: the social foraging of the ant, *Temnothorax rugatulus*. Entomological Society of America annual meeting. Austin, Texas

Evans, J*., **Shaffer, Z.**, and Pratt, S. July 2013. Poster: Re-aggregation after complete nest destruction in *Temnothorax rugatulus*. Animal Behavior Society annual meeting.

Shaffer, Z. Pratt, S., and Fewell, J. July 2013. Talk: The Foundress Dilemma: group selection for cooperation among queens in the ant, *Pogonomyrmex californicus.* Animal Behavior Society annual meeting. Boulder, Colorado

Shaffer, Z. and Pratt, S. November, 2012. Invited talk: 'Assessing the rationality of decision-making in individuals and groups of cockroaches'. Entomological Society of America annual meeting, Knoxville, Tennessee.

Shaffer, Z., Dreyer, S., Pratt, S., Fewell, J. October 2012. Poster: 'Optimum foundress number in the pleometrotic ant, *Pogonomyrmex californicus*'. International Union for the study of Social Insects North American chapter meeting. Greensboro, North Carolina.

Ebie, J., **Shaffer, Z.**, and Pratt, S. October 2012. Poster: 'To recruit or not to recruit: When do *Temnothorax* recruit to natural prey?' International Union for the study of Social Insects North American chapter meeting. Greensboro, North Carolina.

Shaffer, Z. and Pratt, S. August, 2012. Talk: 'Social foraging in the ant, *Temnothorax rugatulus*'. International Behavioral Ecology Congress. Lund, Sweden.

Shaffer, Z. August, 2012. Talk: 'Temnothorax rugatulus: collective decision-making during foraging'. Seminaire: Universite libre de Bruxelles. Brussels, Belgium.

Shaffer, Z. and Pratt, S. June, 2012. Talk: 'Individual and social foraging in the ant Temnothorax rugatulus'. Animal Behavior Society annual meeting. Albuquerque, New Mexico.

Schaper, G*., **Shaffer, Z.**, and Pratt, S. June, 2012. Poster: 'Elite ants and the regulation of house-hunting and foraging in the rock cavity ant, *Temnothorax rugatulus*'. Animal Behavior Society annual meeting.

Shaffer, Z., Sasaki, T., and Pratt, S. November, 2011. Talk: 'Bees in a box: social Foraging of the ant Temnothorax rugatulus'. Entomological Society of America

Annual meeting. Reno, Nevada.

Shaffer, Z., Sasaki, T., and Pratt, S. July 2011. Talk: 'Bees in a box: social foraging of The ant Temnothorax rugatulus'. Animal Behavior Society annual meeting. Bloomington, Indiana.

Shaffer, Z., Sasaki, T., and Pratt, S. January, 2011. Poster: 'The social networks of House-hunting ants'. Society for Comparative and Integrative Biology annual Meeting. Salt Lake City, Utah.

Shaffer, Z. and Pratt, S. December 2010. Talk: 'Temnothorax rugatulus: advantages in group size and environmental variance reduction'. Entomological Society of
America annual meeting. San Diego, California.

Shaffer, Z., Sasaki, T., Pratt, S., Penick, C., Bayuk, M., and Leibig, J. November 2010. Talk: 'Ponerine Putsch: an agent-based model of dominace hierarchy formation in the ant Harpegnathos saltator'. Computational Social Science Society annual meeting. Tempe, Arizona.

Shaffer, Z., Sasaki., and Pratt, S. August 2010. Talk and poster: 'The social networks of house-hunting ants'. International Union for the Study of Social Insects, international meeting. Copenhagen, Denmark.

Shaffer, Z., Sasaki, T., Anderies, M., Janssen, M., Fewell, J., and Pratt, S. February 2010. Poster: 'The Foundress dilemma'. Biomimicry conference, Arizona State University, Tempe, AZ.

Shaffer, Z., Sasaki, T., Anderies, M., Janssen, M., Fewell, J., and Pratt, S. February 2010. Poster: 'The Foundress dilemma'. North American Association for Computational Social and Organization Sciences annual meeting. Tempe, Arizona.

Shaffer, Z. and Pratt, S. October 2008. Talk: 'Invadeability and maintenance of Foundress strategy in P. californicus'. International Union for the study of Social Insects North American chapter meeting. San Juan, Puerto Rico.

Shaffer, Z. and Pratt, S. February 2008. Talk: 'The multiple queen phenomenon'. GELS conference, Arizona State University, Tempe, Arizona.

Journal peer reviewer

- Proceedings of the Royal Society B
- Scientific Reports, Current Zoology
- Journal of Insect Behavior
- PLOS ONE
- IEEE Transactions on Computational Social Systems
- Animal Behaviour
- Functional Ecology
- Behavioral Ecology
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