**Education**

**PhD in Biology,** Drexel University, Philadelphia PA

*Advisor:* Sean O’Donnell, PhD

**B.S. in Biology, magna cum laude,** Ursinus College, Collegeville PA

Minor: Mathematics

Honors: Chemistry, Biology

**Research Positions**

2024-present **Postdoctoral Researcher**, Biology, Stanford University

Advisor: Lauren O’Connell, PhD

2022- 2024 **NSF Postdoctoral Fellow**, Biology, Stanford University

Advisors: Lauren O’Connell, PhD and Deborah Gordon, PhD

*Diet and defense: characterizing the relationship between poison frogs and their tropical ant prey*

2016- 2021 **PhD Candidate,** Biology, Drexel University

Advisor:Sean O’Donnell, PhD

*Thesis: Exploring the role of adult nutrition on social behavior, chemical and reproductive physiology of tropical social paper wasps (Mischocyttarus pallidipectus)*

2012-2016 **Research Assistant**, Biology and Chemistry Depts., Ursinus College, Collegeville Pa

Advisors:Mark Ellison and Anthony Lobo, PhD

*Honors Thesis: Overcoming Antibiotic Resistance in Escherichia coli Using PEG-Modified Nano-graphene Oxide*

2015 **Research Fellow,** Summer Fellows Program, Ursinus College, Collegeville Pa

Advisor: Dr. Mark Ellison

2014 **Environmental Education and Animal Behavior Intern**, Philadelphia Zoo

**Publications**

*Submitted*

Madryzk M, Yang M, Vonshak M, Das B, **Fiocca K**, Gordon DM. Mutual deterrence at resources by the native Winter ant and the invasive Argentine ant.

**Fiocca K**, Batterton J, White H and O'Donnell S. Can cuticular compounds function as queen pheromones in independent-founding paper wasps? Chemical profile variation in *Mischocyttarus pallidipectus*.

2024 Lopez, JS; Ali, S; Asher, M; Benjamin, CA; Brennan, RT; Burke, MLT; Fiocca K; et al.; O'Connell, LA. Pavement ant extract is a chemotaxis repellent for C. elegans. microPublication Biology. doi.org/10.17912/

2023 Alfonso et al. Argentine ant extract induces an osm-9 dependent chemotaxis response in C. elegans. microPublication Biology. 10.17912/micropub.biology.000745.

2022 Moskowitz NA, D’Agui R, Alvarez-Buylla A, **Fiocca K**, O’Connell LA. Poison frog dietary preference depends on prey type and alkaloid load. PLoS ONE.

2022 **Fiocca K**, R. Congdon & O’Donnell S. Body size correlations with female aggression and physiology suggest pre-adult effects on caste in an independent-founding eusocial paper wasp (*Mischocyttarus pallidipectus*, Hymenoptera: Vespidae). Ethology, Ecology & Evolution.

2021 O'Donnell, S., K. Fiocca, & R. Congdon. Social network analysis of male dominance in the paper wasp *Mischocyttarus mastigophorus* (Hymenoptera: Vespidae). Journal of Insect Behavior. DOI: 0.1007/s10905-021-09774-0

2020 **Fiocca K**, Capobianco K, Fanwick E, Moynahan K, Congdon R, Zelanko P, Velinsky D, O'Donnell S. Reproductive physiology corresponds to adult nutrition and task performance in a Neotropical paper wasp: a test of dominance-nutrition hypothesis predictions. *Behavioral Ecology and Sociobiology.* 74:114.

2020 Carver J\*, Simpson A\*, … **Fiocca K\*,** … Lobo A, Ellison M.Functionalized Single-Walled Carbon Nanotubes and Nanographene Oxide to Overcome Antibiotic Resistance in Tetracycline-Resistant *Escherichia coli*. *ACS Applied Nano Materials.* \*co-author.

2019 Barrett M\*, **Fiocca K\***, Waddell E, McNair C, O’Donnell S, Marenda DR. Larval mannitol diets increase mortality, prolong development, and decrease adult body sizes in fruit flies (*Drosophila melanogaster*). *Biology Open.* 8, bio047084. doi:10.1242/bio.047084.\*co-author

2019 O'Donnell S, Bulova S, Deleon S, Barrett M, & **Fiocca K**. Brain structure differences between solitary and social wasps are independent of body size allometry. Journal of Comparative Physiology A. doi.org/10.1007/s00359-019- 01374-w.

2019 **Fiocca K\*,**Barrett M\*, Waddell E, Viveiros J, McNair C, O'Donnell S, Marenda DR. Mannitol ingestion causes concentration-dependent, sex-biased mortality in adults of the fruit fly (*Drosophila melanogaster*). PloS ONE. 14(5): e0213760. \*co-author

2018 O'Donnell S, **Fiocca K**, Campbell M, Bulova S, Zelanko P, & Velinsky D. Adult nutrition and reproductive physiology: a stable isotope analysis in a eusocial paper wasp (*Mischocyttarus mastigophorus*, Hymenoptera: Vespidae). Behavioral Ecology and Sociobiology. 72:86.

2018 O’Donnell S, Bulova, SJ, Barrett M., **Fiocca K.** “Size constraints and sensory adaptations affect mosaic brain evolution in paper wasps (Vespidae: Epiponini)”. *Biological Journal of the Linnean Society*. 123(2):302-310.

2017 O’Donnell S, Bulova SJ, DeLeon S, Barrett M, **Fiocca K.** “Caste-differences in the mushroom bodies of swarm-founding paper wasps: implications for brain plasticity and brain evolution (Vespidae, Epiponini)”. *Behavioral Ecology and Sociobiology*. 71:116.

2017 O’Donnell S, Baudier K, **Fiocca K**, Marenda DR. “Erythritol ingestion impairs adult reproduction and causes larval mortality in *Drosophila melanogaster* fruit flies (Diptera: Drosophilidae)”. *J Appl Entomol*. 00:1-6.

**Teaching Experience**

2024 **Environmental Biology, BIOL F009**

Guest Lecturer, Biology Department, Foothill College

2022-2023 **Organismal Biology Lab, BIO 161**

Guest facilitator, Biology Department, Stanford University

2023 **BIO114 BUDS (Building Up Developing Scientists): Science In & Beyond the Lab**

Guest facilitator, Biology Department, Stanford University

2020-2021 **Cells and Biomolecules, BIO 134**

Teaching Assistant, Biology Department, Drexel University

2017-2021 **Form, Function and Evolution of Vertebrates, BIO 224**

Teaching Assistant, Biology Department, Drexel University

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2016-2019 **Cells and Genetics, BIO 122**

Teaching Assistant, Biology Department, Drexel University

2017 **Tropical Ecology, ENVS 323**

Field Teaching Assistant, Biodiversity, Earth & Environmental Science Department, Drexel University and Monteverde, Costa Rica

2016-2017 **Physiology and Ecology, BIO 126**

Teaching Assistant, Biology Department, Drexel University

2013 **Ecology and Evolution, BIO 101**

Supplemental Instructor, Biology Department, Ursinus College

**Grants and Fellowships**

Research Support:

2022-24 **Postdoctoral Research Fellowship- $138,000**

National Science Foundation

2021 **Student Research Grant- $1000**

Animal Behavior Society

2018 **Lewis and Clark Fund Grant- $5,000**

American Philosophical Society

2018 **International Experience Award- $750**

Drexel University Office of International Programs

2017 **Robert L. and Louise B. Jeanne Social Wasp Research Grant- $2,300**

International Union for the Study of Social Insects: North American Section

2016-2018 **Dean’s Fellowship- $10,000**

Drexel University College of Arts and Sciences

Travel Support:

2020 **Teck-Kah Lim Graduate Student Travel Subsidy Award- $95**

The Graduate College of Drexel University

2019 **Biology Department Travel Award- $250**

Drexel University Department of Biology

2019 **Teck-Kah Lim Graduate Student Travel Subsidy Award- $600**

The Graduate College of Drexel University

Conference Organizing Awards:

2018 Entomological Society of America Support of Small Meeting Sponsorship (as part of Social Insects in the North-East Regions meeting organizing committee), ESA

2018 IUSSI Support of Small Meeting Award (as part of Social Insects in the North-East Regions meeting organizing committee), International Union for the Study of Social Insects

**Honors and Awards**

2020 **Graduate Student Research First Place Award**

The College of Arts and Sciences Annual Research Day

2020 **Continuing Excellence in Teaching Assistance**

The Graduate College of Drexel University

2019 **Teaching Assistance Excellence Award** The Graduate College of Drexel University

2017 **Poster Presentation Second Place** Drexel Emerging Graduate Scholars Conference

2016 **Second Place Award, Biological Chemistry Division** Intercollegiate Student Chemists Convention, Ursinus College

2016 **Phi Beta Kappa Honor Society**

2014 **Beta Beta Beta National Honors Biological Society**

2012-2016 **Dean’s List**

Ursinus College

**Affiliations**

Society for Integrative and Comparative Biology (SICB)

Animal Behavior Society (ABS)

Entomological Society of America, Eastern Section (ESA)

International Union for the Study of Social Insects, North American Section (IUSSI-NAS)

**Invited Reviewer**

Current Research in Insect Science

Environmental Entomology

Proceedings of the Royal Society B

Behavioral Ecology and Sociobiology

Insectes Sociaux

Studies on Neotropical Fauna and Environment

**Additional Training**

2024 **Preparing Future Professors Fellow**, Stanford University

2023 **Postdoctoral Teaching Certificate**, Stanford University

2018-2021 **Graduate Minor in Undergraduate STEM Education (PROFESS Program),** Center for the Advancement of STEM Teaching and Learning Excellence (CASTLE), Drexel University

-STEM 511: Foundations in Teaching and Learning of STEM Undergraduates

-STEM 512: Advanced Undergraduate STEM Pedagogical Techniques

-STEM 513: Improving STEM Education Through Research

-STEM 514: Quality Assessment Practices

**Professional Service**

2023-present **Stanford Biology Postdoc Committee**, Member

2023 **BIORETS Mentor**, Stanford University

2023-present **Editorial Board Member**, Studies on Neotropical Fauna and Environment

2022 **Invited Seminar Speaker**, Department of Biology, California State University Dominguez Hills

2021 **Invited Guest Speaker**, Beta Beta Beta Biological Honors Society Induction Ceremony, Ursinus College

2019 **Conference Staff**, The 6th National CIRTL (Center for the Integration of Research, Teaching, and Learning) Forum, Drexel University

2017-2019 **Mentor**, international Students Tackling Advanced Research (iSTAR) Program, Drexel University

2018 **Conference Organizer**, Social Insects in the North-East Regions Conference, Philadelphia Pa

2015 **Mentor**, FUTURE Program, The Parlee Center for Science and the Common Good, Ursinus College

2014-2016 **Fellow**, Center for Writing and Speaking, Ursinus College

2013-2014 **Biology Tutor**, Center for Academic Support, Ursinus College

**Mentorship**

Professional:

2023 Anjana Amirapu, Lowell High School

Undergraduate:

2019- 2021 Rheanna Congdon, Drexel University

2019- 2021 Johanna Batterton, Haverford College

2019- 2021 Emily Johns, Drexel University

2019- 2020 Michelle Luu, Haverford College

2017-2019 Kelsey Capobianco, Drexel University

2018 Kyle Moynahan, Drexel University

2018 Emily Fanwick, Drexel University

2017-2018 Meghan Campbell, Drexel University

2015-2016 Nerica Normil, Ursinus College

**Scientific Communication & Outreach**

2022-23 Letters to a Pre-scientist Pen Pal

2020 Soapbox Science Philadelphia Outreach Speaker

2020 American Philosophical Society Brown Bag Lunch Speaker

2019-2020 Experienced Teaching Assistant Panel Speaker, Drexel University

2018-2019 Extramural Funding Panel Speaker, Drexel University

2019 Discussion on Research and Women in Science, Nazareth Academy High School

2018-2019 Scientist Saturday: Featured Scientist, Academy of Natural Sciences

**Field Experience**

**Costa Rica**

Puntarenas

Monteverde (2016-2019)

Monteverde Cloud Forest Reserve (2016-2018)

San Luis Biological Reserve (2017)

Heredia

San Gerardo Biological Station (2016-2018)

**United States of America**

Pennsylvania

John Heinz National Wildlife Refuge at Tinicum (2018)

Lacawac Sanctuary (2017)

**Presentations**

Oral Presentations:

Oct 2021 Fiocca K, Congdon R, O’Donnell S. Body size is linked to female dominance and reproduction in a Neotropical eusocial paper wasp. Entomological Society of America Annual Conference.

Aug 2021 Fiocca K, Congdon R, O’Donnell S. Size effects on caste: ovary development varies with body size in a monomorphic paper wasp. The Animal Behavior Society Annual Meeting.

March 2021 Fiocca K, Batterton J, Luu M, Johns E, White H, O’Donnell S. Cuticular hydrocarbons and caste signaling in a primitively eusocial paper wasp (*Mischocyttarus pallidipectus*). Entomological Society of America Conference, Eastern Branch.

Feb 2021 Fiocca K, Batterton J, Luu M, Johns E, White H, O’Donnell S. Cuticular hydrocarbons and caste signaling in a primitively eusocial paper wasp (*Mischocyttarus pallidipectus*). Scholars Share, Graduate College of Drexel University

Nov 2020 Fiocca K, Capobianco K, Fanwick E, Moynahan K, Congdon R, Zelanko P, Velinsky D, O’Donnell S. Adult behavior and nutrition, but not body size, are related to reproductive physiology in a Neotropical paper wasp. Entomological Society of America Annual Meeting.

July 2020 Fiocca K, Fanwick E, Moynahan K, Capobianco K, Congdon R, Zelanko P, Velinsky D, O’Donnell S. Adult behavior and nutrition are related to reproductive opportunity in a Neotropical paper wasp. Animal Behavior Society Annual Meeting.

May 2020 Fiocca K. Reproductive caste corresponds to adult nutrition and task performance in a Neotropical paper wasp. Biology Seminar, Drexel University.

May 2020 Fiocca K, Fanwick E, Moynahan K, Capobianco K, Congdon R, Zelanko P, Velinsky D, O’Donnell S.Adult nutrition is linked to social status and reproductive opportunity in a Neotropical paper wasp (*Mischocyttarus pallidipectus*, Hymenoptera: Vespidae). International Research Showcase, Drexel Office of Global Engagement and Education Abroad.

Jan 2020 Fiocca K, Fanwick E, Moynahan K, Capobianco K, Congdon R, Zelanko P, Velinsky D, O’Donnell S. *Effects of nutritional physiology on reproductive caste in a eusocial tropical paper wasp (Mischocyttarus pallidipectus)*. Binghamton University Biology Department Symposium, Binghamton NY.

Nov 2019 Fiocca K, Fanwick E, Moynahan K, Capobianco K, Zelanko P, Velinsky D, O’Donnell S. *Effects of nutritional physiology on reproductive caste in a eusocial tropical paper wasp (Mischocyttarus pallidipectus)*. Entomological Society of America Annual Conference, St. Louis MO.

Aug 2019 Fiocca K, Fanwick E, Moynahan K, Capobianco K, Zelanko P, Velinsky D, O’Donnell S. *Effects of nutritional physiology on reproductive caste in a eusocial tropical paper wasp (Mischocyttarus pallidipectus)*. Evolution in Philadelphia Conference, Temple University, Philadelphia Pa.

May 2019 Fiocca K. *Exploring social and reproductive conflict in a tropical paper wasp (Mischocyttarus pallidipectus).* Biology Department Seminar, Drexel University, Philadelphia Pa.

Dec 2018 Fiocca K. *Exploring caste determination and reproductive plasticity in a eusocial, tropical paper wasp (Mischocyttarus spp.).* Social Insects in the North-East Regions Conference, Academy of Natural Sciences, Philadelphia Pa.

Sept 2018 Fiocca K. *Eating your way to becoming queen: adult nutrition influences social caste in tropical paper wasps (Mischocyttarus spp.).* Evolution in Philadelphia Conference, Academy of Natural Sciences, Philadelphia Pa.

May 2018 Fiocca K. *Determination of Caste: How Adult Nutrition Affects Reproductive Options in Primitively Social Paper Wasps.* Biology Department Seminar, Drexel University, Philadelphia Pa.

April 2018 Fiocca K. *Nutrition: a path to queendom in paper wasps.* Drexel Emerging Graduate Scholars Conference, Drexel University, Philadelphia Pa.

Nov 2017 Fiocca K and O’Donnell S. *Determination of caste: how adult nutrition affects reproductive options in primitively social paper wasps.* Biodiversity, Earth and Environmental Science Departmental Seminar, Drexel University, Philadelphia Pa.

May 2016 Fiocca K. *Overcoming Antibiotic Resistance in Escherichia coli using PEG-modified Nano-graphene oxide.* Chemistry Department Honors Defense, Ursinus College, Collegeville Pa.

April 2016\* Fiocca K. *Antibiotic Delivery in Resistant Escherichia coli using PEG- modified Nano-graphene Oxide.* Intercollegiate Student Chemists Convention, Ursinus College, Collegeville Pa. \*Won second place in Biological Chemistry division

July 2015 Fiocca K. *Antibiotic Delivery in Resistant Escherichia coli using PEG- modified Nano-graphene Oxide.* Summer Fellows Symposium, Ursinus College, Collegeville Pa.

July 2014 Fiocca K. *Behavior Analysis of Choloepus hoffmanni.* Philadelphia Zoo, Philadelphia Pa.

Poster Presentations:

Jan 2024 Fiocca K and O’Connell L. Using *Caenorhabditis elegans* chemotaxis to understand ant chemistry in an undergraduate laboratory course. The Society for Integrative and Comparative Biology Annual Meeting. Seattle, WA.

July 2022 Fiocca K, Batterton J, White H and O’Donnell S. Differences in cuticular hydrocarbon profiles reflect caste status in a eusocial paper wasp (*Mischocyttarus pallidipectus*). International Union for the Study of Social Insects Congress. San Diego, CA.

Oct 2020\* Fiocca K and O’Donnell S. Body size does not predict reproductive development in a primitively eusocial paper wasp. The College of Arts and Sciences Annual Research Day, Drexel University, Philadelphia Pa. \*won first place in graduate student competition.

Feb 2020 Fiocca K, Fanwick E, Capobianco K, Congdon R, Moynahan K, Zelanko P, O’Donnell S, Velinsky D. *Adult nutrition and social behavior predict reproductive caste in a Neotropical paper wasp (Mischocyttarus pallidipectus, Hymenoptera: Vespidae).* Biodiversity, Earth & Environmental Science Research Day, Drexel University, Philadelphia Pa.

Nov 2019 Fiocca K, Barrett M, Waddell E, Viveiros J, McNair C, O’Donnell S, Marenda DR. *Mannitol ingestion causes concentration-dependent, sex- biased mortality in adults of the fruit fly (Drosophila melanogaster).* Entomological Society of America Annual Conference, St. Louis MO.

April 2019 Fiocca K, Fanwick E, Moynahan K, Zelanko P, Velinsky D, O’Donnell S. *Exploring nutrition and reproductive plasticity in a social tropical paper wasp (Mischocyttarus spp.).* Drexel Emerging Graduate Scholars Conference, Drexel University, Philadelphia Pa.

May 2018 Fiocca K, Campbell M, Bulova SJ, Zelanko P, Velinsky D, O’Donnell S. *Eating your way to becoming queen: adult nutrition influences social caste in tropical paper wasps (Mischocyttarus mastigophorus.* International Research Showcase, Drexel University, Philadelphia Pa.

Feb 2018 Fiocca K, Baudier K, Vander Meer R, O’Donnell S. *An Investigation into the Active Components of Army Ant Trail Pheromone.* BEES Research Showcase, Drexel University, Philadelphia Pa.

May 2017 Fiocca K, Baudier K, Vander Meer R, O’Donnell S. *An Investigation into the Active Components of Army Ant Trail Pheromone.* International Research Showcase, Drexel University, Philadelphia Pa.

April 2017\* Fiocca K, Baudier K, Vander Meer R, O’Donnell S. *An Investigation into the Active Components of Army Ant Trail Pheromone.* Drexel Emerging Graduate Scholars Conference, Drexel University, Philadelphia Pa. \*Won second place in poster competition

Jan 2016 Fiocca K, Normil N, Lobo A, Ellison M. *Antibiotic delivery in resistant Escherichia coli using PEG-modified nano-graphene oxide.* 251st American Chemical Society National Meeting and Exposition, San Diego CA.