

Melissa S. Plakke

Division of Science, Mathematics, and Technology
Governors State University, University Park, IL 60484

E-mail: mplakke@govst.edu

Melissaplakke.weebly.com

EDUCATION

- 2013-2019 Ph.D. Biological Sciences, Minor in Teaching. University of Pittsburgh, PA.
Dissertation: "Post-mating, pre-zygotic interactions and their potential to drive speciation in the Cabbage White butterfly, *Pieris rapae*"
- 2009-2012 B.S. in Zoology with Honors, B.S. in Biological Sciences. Colorado State University, CO.

RESEARCH INTERESTS

Role of genetic diversity in evolution, co-evolution, speciation, sexual conflict, reproduction

RESEARCH EXPERIENCE

- 2022-present Assistant Professor, Governors State University
- 2019-2021 Post-doctoral NIH IRACDA Fellow, University of Kansas
Advisor: Dr. James Walters
Project: Exploring the evolution and development of dimorphic sperm across Lepidoptera
- 2013-2019 Ph.D. Candidate, University of Pittsburgh.
Advisors: Dr. Nathan Clark and Dr. Nathan Morehouse
Project: Assessing the relative role that sexual conflict and cooperation play in driving reproductive coevolution and speciation in butterflies
- 2012-2013 NSF-REU Undergraduate Researcher. Mueller lab, Colorado State University
Advisor: Dr. Rachel Mueller
Project: Determining the phylogenetics of salamanders and comparing nuclear genome evolution to mitochondrial genome evolution
- 2011-2012 Undergraduate Senior Thesis. Colorado State University
Advisor: Dr. Kim Hoke
Project: Evaluating genetic diversity, inbreeding, and infant mortality in captive breeding programs for cheetah populations around the world
- 2010-2012 Undergraduate assistant. Coughenour lab, Colorado State University
Advisor: Sarah Maisonneuve
Project: Identifying and addressing sources of conflict between humans and elephants in Tanzania

RESEARCH GRANTS

- Under Review* NSF BRC-BIO (\$486,497 requested)
PI. "Evolutionary drivers of dimorphic sperm function and development"
- 2019-2021 NIH IRACDA (\$170,000)
- 2017 Graduate Student Organization Summer Research Grant (\$500)
PI. "How to Make a Butterfly: The Process of One Species Becoming Two."

- 2017 Arthur and Barbara Pape Endowment Award (\$3,190)
PI. "Assessing divergence and evolutionary drivers in the reproductive tracts of the Cabbage White butterfly, *Pieris rapae*"
- 2017 NSF EAPSI/JSPS Summer Fellow (\$15,000)
PI. "Assessing Butterfly Evolutionary Divergence in a Post-mating, Pre-zygotic Interaction"
- 2015 Grant in Aid of Research, Sigma Xi (\$700)
PI. "Protease-substrate specificity in a digestive female reproductive organ"

TRAVEL SUPPORT

- 2022 SSE Caregiver Award, Society for the Study of Evolution (\$500)
- 2018 Elizabeth Dillion Travel Award, University of Pittsburgh (\$600)
- 2017 SICB Charlotte Magnum student travel support (\$100)
- 2016 Travel Grant, A&S PBC, University of Pittsburgh (\$600)
- 2016 Travel Grant, Graduate and Professional Student Government (\$170)
- 2016 Travel Grant, A&S GSO, University of Pittsburgh (\$200)
- 2016 SICB Charlotte Magnum student travel support (\$140)
- 2015 Travel Grant, Graduate and Professional Student Government (\$250)
- 2015 Travel Grant, Society of Systematic Biologists (\$1,750)
- 2015 Travel Grant, Society for the Study of Evolution (\$800)
- 2013 Travel Grant, American Genetics Association (\$500)

AWARDS AND HONORS

- 2023 Intellectual Life Grant, "Evolution Film Festival", Governors State University (\$495.90)
- 2019 3MT Natural Sciences, 3rd place, University of Pittsburgh
- 2019 3MT Biological Sciences Finalist, University of Pittsburgh
- 2018 Stanton C. Crawford Teaching Award, University of Pittsburgh
- 2018-2019 Andrew Mellon Predoctoral Fellowship, University of Pittsburgh (\$23,628)
- 2018 Graduate Expo Outstanding Presenter, University of Pittsburgh (\$100)
- 2017 SMBE Satellite Conference Funds (\$5,000)
- 2016-2017 Ivy McManus Diversity Fellowship, University of Pittsburgh (\$21,262)
- 2015 Honorable Mention, NSF GRFP
- 2014 Honorable Mention, NSF GRFP
- 2013-2014 First Year Fellowship. University of Pittsburgh (\$20,488)
- 2013 Honorable Mention, NSF GRFP

PUBLICATIONS (*indicates undergraduate co-author)

- In revision* **Plakke, M.S.** "Inbreeding Depression among Captive Cheetahs and Implications for Wild Populations."
- 2021 Echeverri, S.A., Miller, A.E., Chen, J., McQueen, E.W., **Plakke, M.**, Spicer, M., Hoke, Stoddard, M.C., Morehouse, N.I. (2021). How signaling geometry shapes the efficacy and evolution of animal communication systems. *ICB*. 61(3): 787-813.
- 2019 **Plakke, M.S.**, Walker, J.L., *Lombardo, J.B., *Goetz, B.J., *Pacella, G.N., Durrant, J.D., Clark, N.L., Morehouse, N.I. "Characterization of Female

- Reproductive Proteases in a Butterfly from Functional and Evolutionary Perspectives.” *PBZ*. 92 (6): 579-590.
- 2017 Meslin, C., *Cherwin, T.S., **Plakke, M.S.**, Hill, J., *Small, B.S., *Goetz, B.J., Wheat, C.W., Morehouse, N.I., Clark, N.L. “The complexity and molecular heterogeneity of a butterfly ejaculate reflect a complex history of selection.” *PNAS*. 114 (27): E5406-E5413.
- 2015 **Plakke, M.S.**, *Deutsch, A.B., Meslin, C., Clark, N.L., Morehouse, N.I. “Dynamic digestive physiology of a female reproductive organ in a polyandrous butterfly.” *J. Exp. Biol.* 218 (10): 1548-1555.
- 2015 Meslin, C., **Plakke, M.S.**, *Deutsch, A.B., *Small, B.S., Morehouse, N.I., Clark, N.L. “Digestive Organ in the Female Reproductive Tract Borrows Genes from Multiple Organ Systems to Adopt Critical Functions.” *Mol. Bio. Evol.* 32 (6): 1567-1580.

INVITED REVIEW ARTICLES/BOOK CHAPTERS

- In Press* Garlovsky, M.D., Whittington, E., Albrecht, T., Arenas-Castro, H., Castillo, D.M., Keais, G.L., Larson, E.L., Moyle, L.C., **Plakke, M.S.**, Reifová, R., Snook, R.R., Ålund, M., Weber, A.A.-T. “Synthesis and scope of the role of post-mating pre-zygotic isolation in speciation.” *Cold Springs Harbor: Perspectives in Biology*.
- In prep* **Plakke, M.S.**, Clark, N.L., Morehouse, N.I. “Reproductive proteases and their role in post-mating, pre-zygotic interactions.” *Molecular Reproductive Development*.

INVITED SEMINARS

- 2019 Reproductive co-evolution and incipient speciation in the Cabbage White butterfly. Department of Biology, Missouri State University, MO.
- 2017 Man Eater: Reproductive Digestion and its Repercussions for Coevolution. Pymatuning Laboratory of Ecology, PA.

PRESENTATIONS

- 2022 Single-cell gene expression of dimorphic lepidopteran sperm. UIC-GSU IRACDA Retreat, Chicago, IL. Poster.
- 2022 Single-cell gene expression of lepidopteran sperm morphs across developmental stages. Evolution conference. Virtual Talk.
- 2020 Patterns of small non-coding RNA expression across dimorphic sperm. Great Plains Genetic Conflict conference, Lawrence, KS. Poster.
- 2020 Patterns of small non-coding RNA expression across dimorphic sperm. Society for Integrative and Comparative Biology conference, Austin, TX. Poster.
- 2020 A recent, lineage-specific, co-option event within the female reproductive tract of the Cabbage White butterfly, *Pieris rapae* L. Society for Integrative and Comparative Biology conference, Austin, TX. Talk.
- 2019 Divergence at a post-mating, pre-zygotic interface in the Cabbage White butterfly. Biology of Spermatozoa Meeting, Nynäshamn, Sweden. Poster.
- 2019 Divergence at a post-mating, pre-zygotic interface in the Cabbage White butterfly. Evolution conference, Providence, RI. Talk.
- 2018 Co-Evolution Between the Male and Female Reproductive Tracts of the Cabbage White Butterfly. Three Rivers Evolution Event, Pittsburgh, PA. Poster.

- 2018 Co-Evolution Between the Male and Female Reproductive Tracts of the Cabbage White Butterfly. Evolution conference, Montpellier, FR. Poster.
- 2017 Investigating Functional Divergence in Reproductive Physiology as a Driver of Butterfly Speciation. SOKENDAI, Japan. Poster.
- 2017 Investigating Digestive Properties of Reproductive Proteases in a Female Butterfly. Society for Integrative and Comparative Biology conference, New Orleans, LA. Talk.
- 2016 Molecular Dynamics and Phenotypic Divergence in a Post-Copulatory Interaction in the Butterfly *Pieris rapae*. Evolution conference, Austin, TX. Poster.
- 2016 Investigating Reproductive Coevolution Using Butterflies as a Model. University of Pittsburgh, PA. Seminar
- 2016 Stomachs in Your Butterfly: Exploring the Identity and Activity of Proteases in the Reproductive Tract of Female Butterflies. Society for Integrative and Comparative Biology conference, Portland, OR. Poster.
- 2015 Dynamic Digestive Physiology of a Female Reproductive Organ in a Polyandrous Butterfly. Evolution conference, Guarujá, Brazil. Talk.
- 2014 Evolution and Co-Evolution of Derived Reproductive Traits in a Polyandrous Butterfly. University of Pittsburgh, PA. Seminar.
- 2014 Extreme Digestive Physiology in a Female Reproductive Organ Mediating Sexual Conflict in a Polyandrous Butterfly. International Society for Behavioral Ecology conference, New York, NY. Poster.
- 2014 Cellular Processes Generating a Highly Divergent Reproductive Trait. University of Pittsburgh, PA. Talk.
- 2014 Sexual Cooperation and Conflict in Male and Female Molecular Interactions. University of Pittsburgh, PA. Talk.
- 2013 Sexual Conflict and the Physiology of a Unique Reproductive Organ. University of Pittsburgh, PA. Talk.
- 2012 Genetic diversity among captive cheetahs and implications for wild populations. Colorado State University, CO. Talk.

TEACHING CERTIFICATIONS

- 2023 Addressing Academic Adjustment and Auxiliary Aid Accommodation Requests
- 2022 Quality Matters: Think Beyond the Syllabus
- 2020 Practitioner in Digital Teaching and Learning Blackboard Certification
- 2019 Teaching Minor in College Biology, University of Pittsburgh
- 2019 Pedagogy Badge, University of Pittsburgh
Concentrations in Educational Technology, Pedagogy, and Diversity

TEACHING EXPERIENCE

Governors State University. IL

- 2023 FA BIOL 1511 General Biology II Lab
BIOL 4990 Undergraduate Research I
BIOL 7110 Graduate Seminar
- 2023 SU BIOL 4000 Women in Science
- 2023 SP BIOL 1510 General Biology II
BIOL 1511 General Biology II Lab

2022 FA BIOL 4965 Capstone Evolution
 BIOL 7110 Graduate Seminar
 BIOL 1510 General Biology II
 BIOL 1511 General Biology II Lab
 BIOL 4080 Special Topics: Developmental Biology (Undergraduate)
 BIOL 6080 Special Topics: Developmental Biology (Graduate)
 2022 SP BIOL 1510 General Biology II
 BIOL 1511 General Biology II Lab
 BIOL 4965 Capstone Evolution
 BIOL 7110 Graduate Seminar

Haskell Indian Nations University, KS

2021 SP BIOL 290 Wildlife Biology
 2020 FA BIOL 103 General Biology Lecture

University of Pittsburgh, PA

2019 SU BIOSC 0057 Foundations of Biology Research Lab 1
 2018 SU BIOSC 0160 Foundations of Biology II
 2018 SP BIOSC 1000 Biochemistry
 2017 FA BIOSC 0150 Foundations of Biology I
 2017 SU BIOSC 1610 Conservation Biology
 2017 Inquiry Based Learning Workshop, co-organizer/developer
 2017 SP BIOSC 0150 Foundations of Biology I Diversity Workshops
 2016 FA BIOSC 0150 Foundations of Biology I Diversity Workshops
 2016 SU Howard Hughes Medical Institute summer workshop
 2016 SP BIOSC 0350 Genetics
 2015 FA BIOSC 0350 Genetics
 2015 SU Howard Hughes Medical Institute summer workshop
 2015 SP BIOSC 0350 Genetics TA
 2014 FA BIOSC 0350 Genetics TA

MENTORING EXPERIENCE

2022-present IRACDA Fellow Teaching Mentor
 Role: Mentored NIH IRACDA Postdoctoral Fellows through teaching independent courses and conducting education research
 2020-2022 Graduate research mentor
 Role: Co-mentorship of thesis track Masters Student at the University of Kansas, assisted in project design, implementation, navigating the literature
 2016-2017 Ivy McManus Diversity Fellow
 Role: Mentorship of 2 post-baccalaureate students and 109 undergraduates from underrepresented groups through individual meetings and weekly workshops
 2016-2017 Biological Sciences Teaching Assistant/Fellow Mentor
 Role: Mentorship of 11 graduate student TAs
 2015-2018 Reaching inside Your Soul for Excellence Coach

- Role: Coached 27 students categorized as underrepresented in science with an aim for academic success and retention
- 2013-present Undergraduate research mentor
 Role: Mentored 14 undergraduates through research projects, including 7 women and two students belonging to an underrepresented demographic.

PROFESSIONAL SERVICE ACTIVITIES

- 2023 First Year Faculty Program co-chair
- 2023 Reviewer, Governors State University Student Foundation Scholarships
- 2022-2024 Academic Program Review Committee Member, Governors State University
- 2022 CAS Dean Search Committee Member, Governors State University
- 2022 Biology Education Faculty Search Committee Member, Governors State University
- 2022 Reviewer, NSF GRFP
- 2022 Poster Judge, UIC College of Pharmacy Research Day
- 2018-2020 Society for the Study of Evolution Graduate Student Advisory Council
 Role: Disseminate and promote research conducted by early career researchers through society Twitter account and newsletter, organize graduate events at annual Evolution conference, review graduate research grant proposals, and provide resources to the general graduate community.
- 2018 Three Rivers Evolution Event co-chair, Pittsburgh, PA
 Role: Established and oversaw subcommittees for the second annual conference, arranged keynote speaker address, and organized mentorship activities for undergraduates and early career researchers.
- 2017 Three Rivers Evolution Event co-founder and organizer, Pittsburgh, PA
 Role: Designed, implemented and established funding for a free, regional one-day evolution conference which brought together over 160 scientists in its inaugural year.

PUBLIC SERVICE ACTIVITIES

- 2022-2023 Annual monarch migration tagging at theNate, University Park, IL
- 2017 Absolute Truth, Steel City Improv Theater, Pittsburgh, PA
- 2015-2016 ASSEMBLE summer camp and after school program design and implementation
- 2015 Pitt Make a Difference Day Volunteer
- 2014 SciTech Days Presenter, Carnegie Science Center. Pittsburgh, PA
- 2014 Girty’s Run Watershed Citizen’s Summit. Pittsburgh, PA.
- 2013 SciTech Days Presenter, Carnegie Science Center. Pittsburgh, PA.

OTHER SCIENTIFIC PARTICIPATION

- 2022 Evolution 2022. Virtual
- 2020 Arthropod Genomics Conference, virtual.
- 2020 IDeA National Resource for Proteomics Workshop, Little Rock, AR.
- 2020 Great Plains Genetic Conflict Meeting, Lawrence, KS.
- 2020 Society for Integrative and Comparative Biology, Austin, TX.
- 2019 Evolution 2019. Providence, RI.
- 2019 Biology of Spermatozoa conference. Nynäshamn, Sweden.

2018 Evolution 2018. Montpellier, France.
2017 Biological Sciences Graduate Student Organization Secretary
2017 Society for Integrative and Comparative Biology, New Orleans, LA.
2016 Evolution 2016. Austin, TX
2016 Society for Integrative and Comparative Biology, Portland, OR.
2015 Phylogenetics workshop, Society of Systematic Biologists, Guarujá, Brazil.
2015 Evolution 2015. Guarujá, Brazil.
2014 International Society for Behavioral Ecologists meeting. New York, NY.
2013-2014 Graduate Student Organization Invited Speaker Committee
2013 CLC Genomics Workbench Workshop. University of Pittsburgh, PA.
2013 American Genetics Association Annual Symposium. Ithaca, NY.
2013 Non-Model Organism Genomics Workshop, American Genetics Association.
Ithaca, NY
2012 Biological Summer Undergraduate Research Experience, Colorado State
University.

SOCIETY MEMBERSHIPS

American Society of Naturalists
Entomological Society of America
Sigma Delta Epsilon (Graduate Women in Science)
Society for Advancing Chicanos/Hispanics and Native Americans in Science
Society for Integrative and Comparative Biology
Society for Molecular Biology and Evolution
Society for the Study of Evolution

PEER REVIEWER

Annals of the Entomological Society of America
Behavioral Ecology
Comparative Physiology A
Evolution
Integrative and Comparative Biology
Insect Science
PeerJ
Scientific Reports