

Sophie T. Breitbart

Research Software Engineer

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Education

University of Toronto, Toronto, ON, Canada 2018-2024
Ph.D., Ecology & Evolutionary Biology
Advisors: Drs. Marc Johnson and Helene Wagner

Wesleyan University, Middletown, CT, USA 2012-2016
B.A., Biology, Certificate in Integrative Genomics Sciences: Informatics & Modeling

Queen Mary, University of London, London, UK 1-5/2015
Study Abroad Program

Research & Professional Experience

Stock Assessment Data and Software Workflow Modeler, ECS 2024-present
Remote
Support NOAA Fisheries by developing R packages to streamline workflows, improve reproducibility, and enhance transparency of operational fisheries stock assessments.

Graduate Research Assistant, University of Toronto Mississauga 2018-2024
Mississauga, ON, Canada
PIs: Drs. Marc Johnson and Helene Wagner
Thesis title: Effects of Urbanization on the Evolutionary Ecology & Population Genetics of Common Milkweed (*Asclepias syriaca*)

Staff Scientist I, Princeton Hydro 2016-2018
South Glastonbury, CT, USA
Devising dam removal plan sets with AutoCAD, spatial analysis and map creation with ArcGIS, watershed management plan writing.

Aquatics Intern, Princeton Hydro 2016
South Glastonbury, CT, USA
Water quality testing, aquatic plant mapping, spatial analysis with ArcGIS.

Undergraduate Researcher, Wesleyan University 2014-2016
Middletown, CT, USA
PIs: Drs. Barry Chernoff and Helen Poulos
Dace (*Rhinichthys atratulus*, *Rhinichthys cataractae*) biogeography and phylogeography.

Undergraduate Researcher, Wesleyan University 2013-2014
Middletown, CT, USA
PI: Dr. Fred Cohan
Bacillus phylogeography and speciation.

Independent Study, Skidmore College 2009-2011
Saratoga Springs, NY, USA
PI: Dr. Bernard Possidente
Circadian locomotor activity in *Drosophila melanogaster*.

Publications

JOURNAL ARTICLES

5. **Breitbart, S.T.**, M.T.J. Johnson, H.H. Wagner. 2025. Anthropogenic Landscape Alteration, but Not Urbanization, Influences Non-Adaptive Evolution in Common Milkweed (*Asclepias syriaca* L.). *Ecology and Evolution* 15:e71250. <https://doi.org/10.1002/ece3.71250>
4. **Breitbart, S.T.**, A.A. Agrawal, H.H. Wagner, M.T.J. Johnson. 2023. Urbanization and a green corridor do not impact genetic divergence in common milkweed (*Asclepias syriaca* L.). *Scientific Reports* 13:20437. <https://doi.org/10.1038/s41598-023-47524-8>
3. **Breitbart, S.T.**, A. Tomchyshyn, H.H. Wagner, M.T.J. Johnson. 2023. Urbanization and a green corridor influence reproductive success and pollinators of common milkweed. *Urban Ecosystems* 26:31–43. <https://doi.org/10.1007/s11252-022-01278-9>
2. Miles, L.S.*, **S.T. Breitbart***, H.H. Wagner, and M.T.J. Johnson. 2019. Urbanization shapes the ecology and evolution of plant-arthropod herbivore interactions. *Frontiers in Ecology and Evolution* 7:1–14. <https://doi.org/10.3389/fevo.2019.00310>
1. **Breitbart, S.** and Weigel, E. February 2019, posting date. [Visualizing a disease outbreak using ESRI story maps](#). *Teaching Issues and Experiments in Ecology*, Vol. 15: Practice #1 [online].

BOOK CHAPTERS

1. Santangelo J.S., Miles, L.S., **Breitbart, S.T.**, Murray-Stoker, D., Rivkin, L.R., Johnson, M.T.J. and Ness, R.W., *Urban environments as a framework to study parallel evolution*. In: *Urban Evolutionary Biology*. Edited by Marta Szulkin, Jason Munshi-South and Anne Charmantier: Oxford University Press (2020). © Oxford University Press. <https://doi.org/10.1093/oso/9780198836841.003.0003>

OTHER PUBLICATIONS

3. Schiano, S., S. Saul, **S. Breitbart**, B. Li, K. Johnson, L. Ailloud, C. Askelrud, K. Doering, D. Hennen, E. Holmes, M. Oshima, M. Sculley, and B. Williams. 2026. Current Practices, Challenges, and Improvements to U.S. Federal Fisheries Assessment Workflows. NOAA Technical Memorandum NMFS-F/SPO-264, 29 p. (avail. at <https://doi.org/10.25923/c400-zq60>)
2. **Breitbart, S.** [Urban Evolution: A Brief Introduction](#). ESRI StoryMap. May 2020.
1. **Breitbart, S.**, Hildebrandt, A., Possidente, B. 2010. [Assessing effects of sex, mating status, and a white-eye mutation in a co-isogenic background on circadian locomotor activity in *Drosophila melanogaster*](#). *Drosophila Information Service* 93:171-175.

Invited Presentations

8. **Breitbart, S.** *Asclepias* in the Annex: How city life impacts the ecology and evolution of common milkweed. Public Seminar. Toronto Field Naturalists Lecture Series, Toronto, Canada. 9/10/2023.
7. **Breitbart, S.** A two-way street: Eco-evolutionary dynamics of common milkweed in urban environments. Public Seminar. New York Botanical Garden Ecoflora Project Seminar Series, The Bronx, New York. 11/29/2022.
6. **Breitbart, S.**, Anurag, A., Wagner, H., Johnson, M. A two-way street: Eco-evolutionary dynamics of common milkweed in urban environments. Guest Seminar. Kennesaw State University EEOB Seminar Series, Kennesaw, Georgia. 10/6/2022.

5. **Breitbart, S.**, Anurag, A., Wagner, H., Johnson, M. Uncovering the Roots of Phenotypic Divergence in Urban Milkweed. Flash Talk. Integrating Society, Ecology, Evolution, and Plasticity (SEEP) to Advance Urban Evolutionary Ecology. Workshop, Tempe, Arizona. 5/20/2022.
4. **Breitbart, S.**, Wagner, H., Johnson, M. Urbanization Affects the Ecology and Evolution of *Asclepias syriaca* (Common Milkweed). Guest Seminar. National Center for Ecological Analysis & Synthesis (NCEAS). 1/19/2022.
3. **Breitbart, S.** Urban Evolutionary Ecology & Career Path Advice. Invited Seminar Panel. Biodiversity and the City (EEB197), Toronto, Ontario. 1/28/2020.
2. **Breitbart, S.** Urban Evolution of Common Milkweed. Guest Lecture. Temperate Field Biology (EEB 405), King City, Ontario. 5/25/2019.
1. **Breitbart, S.** Ecological Niche Modeling with Maxent. Guest Lecture. Evolutionary and Ecological Bioinformatics (BIOL 327), Middletown, Connecticut. 11/19/2015.

Presentations

17. **Breitbart, S.** [Increasing the Accessibility of NOAA Fisheries Stock Assessment Reports](#). Presentation. NOAA Fisheries National Stock Assessment Seminar Series, Virtual. 6/4/2026.
16. **Breitbart, S.** [Increasing the Accessibility of Quarto-Based NOAA Fisheries Reports](#). Presentation. US-RSE, Philadelphia, USA. 10/7/2025.
15. Johnson, M., **Breitbart, S.**, et al. Bacteria, bugs, and bees oh my! The role of cities in shaping species interactions and communities. Presentation. Canadian Society for Ecology & Evolution (CSEE), Sherbrooke, Canada. 7/7/2025.
14. **Breitbart, S.**, Johnson, M., Wagner, H. How does the urban landscape affect genetic diversity and genetic differentiation in a native plant of conservation importance? Presentation. Evolution, Albuquerque, USA. 6/23/2023.
13. **Breitbart, S.**, Agrawal, A.A., Wagner, H., Johnson, M. Does Urbanization Promote Genetic Divergence of Functional Traits in *Asclepias syriaca* (Common Milkweed)? Presentation. Joint Annual Meeting of the Ecological Society of America (ESA) and Canadian Society for Ecology & Evolution (CSEE), Montreal, Canada. 8/16/2022.
12. **Breitbart, S.**, Agrawal, A., Wagner, H., Johnson, M. Urbanization Promotes Genetic Divergence of Functional Traits in *Asclepias syriaca* (Common Milkweed). Presentation. Evolution, Cleveland, USA. 6/25/2022.
11. **Breitbart, S.**, Wagner, H., Johnson, M. Testing for Genetic Clines in Phenotypic Traits Along an Urban-Rural Gradient in *Asclepias syriaca*. Presentation. Canadian Society for Ecology & Evolution (CSEE), Virtual Conference. 8/18/2021.
10. **Breitbart, S.**, Wagner, H., Johnson, M. Testing for Genetic Clines in Phenotypic Traits Along an Urban-Rural Gradient in *Asclepias syriaca*. Presentation. Evolution, Virtual Conference. 6/21/2021.
9. **Breitbart, S.** Applying to and Succeeding in Graduate School. Seminar Panel. Honors Biology Thesis Course (BIO481), Virtual Seminar. 11/27/2020.
8. **Breitbart, S.**, Wagner, H., Johnson, M. Effects of Urbanization on Reproductive Success in Common Milkweed. Presentation. University of Toronto Mississauga Graduate Research Colloquium, Virtual Conference. 5/27/2020.

7. **Breitbart, S.**, Wagner, H., Johnson, M. Effects of Urbanization on Reproductive Success in Common Milkweed. Presentation. Annual Meeting of the North American Regional Association of the International Association for Landscape Ecology, Virtual Conference. 5/11/2020.
6. **Breitbart, S.**, Wagner, H., Johnson, M. Effects of Urbanization on Reproductive Success in Common Milkweed. Seminar Presentation. Swiss Federal Institute for Forest, Snow and Landscape Research, Birmensdorf, Switzerland. 7/10/2019.
5. **Breitbart, S.**, Wagner, H., Johnson, M. Effects of Urbanization on Reproductive Success in Common Milkweed. Flash Talk. International Association for Landscape Ecology World Congress, Milan, Italy. 7/2/2019.
4. **Breitbart, S.** Elevator Pitch. Atwood Colloquium, Toronto, Ontario. 4/13/2019.
3. **Breitbart, S.**, Poulos, H., Krackowski, M., Chernoff, B. (2016). Using GIS to Predict Effects of Landscape Metrics on Genetic Diversity in *R. atratulus*. Poster Presentation. Northeast Arc Users Group Spring Spatial Technologies Conference, Amherst, Massachusetts. 5/9/2016.
2. Chernoff, B., Krackowski, M., Angel, J., Meyer, A., Nash, C., Roman-Johnston, N., **Breitbart, S.** Over the Falls: Population Differentiation of Blacknose and Longnose Dace, *Rhinichthys atratulus* and *R. cataractae*, in Connecticut. Poster Presentation. Wesleyan Summer Research Symposium, Middletown, Connecticut. 7/31/2014.
1. **Breitbart, S.**, Hildebrandt, A., Possidente, B. (2010). Assessing Effects of Sex, Mating Status, and a White-Eye Mutation in a Co-Isogenic Background on Circadian Locomotor Activity in *Drosophila melanogaster*. University at Albany Undergraduate Research Symposium, Albany, New York. 4/29/2011.

Workshops

7. **Breitbart, S.**, Schiano, S. (2026). NOAA Fisheries Stock Assessment Workflows Workshop. Delivered eight times: at the National Stock Assessment Workshop, for each of the six NOAA Fisheries Science Centers, and for a general NOAA Fisheries audience. <https://nmfs-ost.github.io/workflows-workshop/>
6. **Breitbart, S.**, Filazzola, A. (2022). An Ecologist's Introduction to Data Science. Society for Open, Reliable, and Transparent Ecology and Evolutionary Biology (SORTEE) Webinar Series. https://sbreitbart.github.io/DataSci_for_Ecologists/
5. **Breitbart, S.**, Filazzola, A. (2022). An Ecologist's Introduction to Data Science. Joint Annual Meeting of the Ecological Society of America (ESA) and Canadian Society for Ecology & Evolution (CSEE). https://sbreitbart.github.io/DataSci_for_Ecologists/
4. **Breitbart, S.**, Filazzola, A. (2021). BGSS Fall Retreat 2021 Coding Workshop. University of Toronto Mississauga Biology Graduate Student Society Fall Retreat. https://sbreitbart.github.io/BGSS_Retreat_2021_Workshop/
3. Filazzola, A., **Breitbart, S.** (2021). Fast-R: Improving the Reproducibility and Efficiency of your Coding. Santa Barbara R Meetup. <https://afilazzola.github.io/SBMeetup2021-FastR/>
2. Filazzola, A., **Breitbart, S.** (2021). Fast-R: Making R Work Hard So That You Don't Have To. Canadian Society for Ecology & Evolution (CSEE) Annual Meeting. <https://afilazzola.github.io/FastR/>

1. Filazzola, A., **Breitbart, S.** (2021). Fast-R: Making R Work Hard So That You Don't Have To. Society for Open, Reliable, and Transparent Ecology and Evolutionary Biology (SORTEE) Annual Meeting. <https://afilazzola.github.io/FastR/>

Certifications & Training

Birdaro Training Program (2025). Selected for competitive 12-week program hosted by the Center for Scientific Collaboration and Community Engagement (CSCCE), training open-source leaders in project governance and documentation.

Honors & Awards

RESEARCH GRANTS

University of Toronto EEB PhD Research Grant (\$2,000)	2021
Centre for Urban Environments Research Grant (\$1,940)	2021
Sigma Xi Grant in Aid of Research (\$1,000)	2020
Centre for Urban Environments Workshop/Symposium Grant (\$2,500)	2020
<i>Co-applicants: L. Miles, H. Abdel Hafez.</i>	
NSERC CREATE Enviro Trainee (\$23,700)	2018-2019
<i>Primary applicants: H. Wagner, M. Johnson.</i>	
Wesleyan University College of the Environment Summer Research Fellowship (\$4,000)	2014
Wesleyan University Carol and Robert Lynch Student Research Fund Grant (\$905)	2013
Wesleyan University Howard Hughes Medical Institute Grant (\$884)	2013

SCHOLARSHIPS & AWARDS

Society for the Study of Evolution Conference Travel Award (\$500)	2023
Zimmerman/Weis Graduate Award (\$10,950/year)	2020, 2021
International Association for Landscape Ecology Conference Travel Award (\$600)	2019
Joseph Scacalossi Scholarship (\$4,000)	2012

Teaching & Supervisory Experience

TEACHING

University of Toronto Mississauga

Teaching Assistant , Evolutionary Biology (BIO342)	2021, 2022, 2023, 2024
Teaching Assistant , Biometrics (BIO360)	2019, 2020, 2021
Teaching Assistant , Introduction to Evolution & Evolutionary Genetics (BIO152)	2019
Teaching Assistant , Ecology (BIO205)	2018

Princeton Hydro

Intern Manager , New England Regional Office	2017
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Wesleyan University

Professorial Assistant, Peer Tutor, Cartographer , GIS Assistant Program	2015-2016
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Community Involvement

REVIEWER FOR

US-RSE conference submissions

DEPARTMENTAL SERVICE

UTM Representative (elected), EEB Graduate Student Association	2021-2023
Fundraising Representative (elected), EEB Graduate Student Association	2020-2021
Treasurer , UTM Biology Graduate Student Society	2020-2021
Undergraduate Mentor , Grad Connect Mentorship Program	2020-2021
Volunteer , School of Graduate Studies Listening Sessions for Women in STEM	2020
Organizer & Guide , Greenhouse Tour (Wellness Event for UTM Grads)	2019
Peer Mentor , EEB Mentorship Program	2019-2024
Volunteer , "Biodiversity in the City" Public Panel Discussion, Royal Ontario Museum	2019
Volunteer , Alumni and Friends Family Day at the Koffler Scientific Reserve	2019
Member , UTM Biology Graduate Student Society	2018-2024

ACADEMIC SERVICE

Data Scientist , NSERC Alliance Knowledge Translation Project: "Implementing Landscape Connectivity Assessment for Biodiversity Management and Land-use Planning in Alberta"	2023-2024
Workshop Co-organizer , "Getting to Know Open Science: How to Engage and Flourish in the Growing Open Science Community". 2023 Ecological Society of America (ESA) Conference	2023
Data Scientist , University of Toronto & University Health Network Project: "#Team Vaccine: Exploring the History of Toronto's COVID-19 Vaccination Initiative through Social Media"	2023
Executive Committee Member , University of Toronto Coders	2022-2024
Symposium Co-organizer , "Landscape Genetics as a Tool for Managing Human-Impacted Landscapes". 2020 IALE-North America Conference	2019-2020
Mentor , MentorNet	2019
Steering Committee Member , Wesleyan Women in Science	2013-2016
Panelist , Wesleyan Women in Science Summer STEM Internship Info Session	2016
Science Facilities Tour Guide , WesFest (Wesleyan's Admitted Students Recruitment Event)	2014
Member , Wesleyan Women in Science	2012-2013

ORGANIZATIONS & MEMBERSHIPS

Member , United States Research Software Engineers (US-RSE)	2025-present
Certified Instructor , The Carpentries	2021-present
Member , Society for the Study of Evolution (SSE)	2021-2024
Member , Sigma Xi: The Scientific Research Honor Society	2021-2024
Chapter Coordinator , Canadian Association for Girls in Science- Toronto Chapter	2020-2022
Volunteer , Canadian Association for Girls in Science- Toronto Chapter	2019-2020
Founder & Leader , Walking in the Woods with Words (Forest Bathing Club)	2019-2020
Member , Canadian Society of Ecology and Evolution (CSEE)	2018-2024
Volunteer , High Park Nature Stewards	2018-2020

SCIENCE COMMUNICATION

Volunteer , Skype a Scientist (3 classes)	2020-2021
Interviewee , "Scientific Names", <i>Toronto Nature Now</i> Radio Show	2020
Writer , <i>Life in the City Urban Evolution Blog</i> , www.urbanevolution-litc.com	2018-2024