# MATTHEW M. OSMOND

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## Academic history

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|---|---|---|
| **Asst. Prof.** | Department of Ecology & Evolutionary Biology<br>University of Toronto | 2021- |
| **PDF** | Center for Population Biology & Banting Fellow<br>University of California - Davis<br>Mentors: Graham Coop, Sebastian Schreiber, Andrew Whitehead | 2018-2020 |
| **PhD** | Zoology, University of British Columbia<br>Supervisor: Sarah Otto | 2013 - 2018 |
| **MSc** | Biology, McGill University<br>Supervisor: Claire de Mazancourt | 2010 - 2012 |
| **BSc** | Mathematics & Biology, Queen's University | 2004 - 2008 |

## Selected awards and grants

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|---|---|---|
| 2024-2027 | UofT-CNRS PhD Mobility Award | $150,000 |
| 2021-2027 | Discovery Grant, NSERC | $240,000 |
| 2019-2020 | Banting Postdoctoral Fellowship, Canada | $140,000 |
| 2018-2020 | Center for Population Biology Postdoctoral Fellowship, UC Davis | $125,000 |
| 2018-2020 | Postdoctoral Fellowship, NSERC (offered but declined) | $90,000 |
| 2013-2017 | Alexander Graham Bell Canada Graduate Scholarship, NSERC | $105,000 |
| 2011-2012 | Alexander Graham Bell Canada Graduate Scholarship, NSERC | $17,500 |
| 2007 | Undergraduate Student Research Award, NSERC | $4,500 |

# Publications

20. Xu K, **Osmond M**. 2025. When does the probability of evolutionary rescue increase with the strength of selection? *bioRχiv* 10.1101/2024.07.19.604382v3.

19. Deraje P, Kitchens J, Coop G, **Osmond M**. 2025. The promise and challenge of spatial inference with the full ancestral recombination graph under Brownian motion. *bioRχiv* 10.1101/2024.04.10.588900v2.

18. Ackermann S, **Osmond M**. 2024. The role of the unicellular bottleneck and organism size in mediating cooperation and conflict among cells at the onset of multicellularity. *bioRχiv* 10.1101/2023.07.17.549265v2.

17. Carlson C, Frederickson M, **Osmond M**. 2025. How genotype-by-environment interactions can maintain variation in mutualisms. *The American Naturalist* (accepted).

16. **Osmond M**, Coop G. 2024. Estimating dispersal rates and locating genetic ancestors with genome-wide genealogies. *eLife* 72177.

15. Lyberger K, **Osmond M**, Schreiber S. 2021. Is evolution in response to extreme events good for population persistence? *The American Naturalist* 198:44-52.

14. Klausmeier C, **Osmond M**, Kremer C, Litchman E. 2020. Ecological limits to evolutionary rescue. *Philosophical Transactions of the Royal Society B.* 375:20190453

13. Henriques GJB, **Osmond M**. 2020. During environmental change, cooperation can promote rescue or lead to evolutionary suicide. *Evolution* 74:1255-1273.

12. **Osmond M**, Coop G. 2020. Genetic signatures of evolutionary rescue by a selective sweep. *Genetics* 215:813-829.

11. **Osmond M**, Otto SP, Martin G. 2020. Genetic paths to evolutionary rescue and the distribution of fitness effects along them. *Genetics* 214:493-510.

10. Thompson K, **Osmond M**, Schluter D. 2019. Parallel genetic evolution and speciation from standing variation. *Evolution Letters* 3:129-141.

9. Edwards K, Kremer C, Miller E, **Osmond M**, Litchman E, Klausmeier C. 2018. Evolutionary stable communities: a framework for understanding the role of trait evolution in the maintenance of diversity. *Ecology Letters* 21:1853-1868.

8. Scott M*, **Osmond M***, Otto S. 2018. Haploid selection, sex ratio bias, and transitions between sex-determining systems. *PLoS Biology* 16:e2005609. [* joint first authors]

7. **Osmond M**, Klausmeier C. 2017. An evolutionary tipping point in a changing environment. *Evolution* 71:2930-2941.

6. **Osmond M**, Otto S, Klausmeier C. 2017. When predators help prey adapt and persist in a changing environment. *The American Naturalist* 190:83-98. [F1000Prime Recommended]

5. **Osmond M**, Barbour M, Bernhardt J, Pennell M, Sunday J, O'Connor M. 2017. Warming induced changes to body size stabilize consumer-resource dynamics. *The American Naturalist* 189:718-725.

4. Toews D, Delmore K, **Osmond M**, Taylor P, Irwin D. 2017. Migratory orientation in a narrow avian hybrid zone. *PeerJ* 5:e3201.

3. **Osmond M**, Otto S. 2015. Fitness-valley crossing with generalized parent-offspring transmission. *Theoretical Population Biology* 105:1-16.

2. **Osmond M**, Reudink M, Marra P, Germain R, Nocera J, Boag P, Ratcliffe L. 2013. Relationships between carotenoid-based female plumage and age, reproduction, and mate colour in the American Redstart. *Canadian Journal of Zoology* 91:589-595.

1. **Osmond M**, de Mazancourt C. 2013. How competition affects evolutionary rescue. *Philosophical Transactions of the Royal Society B: Biological Sciences* 368:20120085.

# Invited talks

2024 – Workshop on Ecology and Evolution of Cancer, Field's Institute
– Modeling and Theory in Population Biology, Banff International Research Station
2023 – Bob Holt's Lab Meeting, University of Florida (virtual)
2022 – Society for Molecular Biology and Evolution Satellite Meeting on Evolutionary Rescue, Kiel
2021 – Biological Sciences Seminar, Northern Arizona University (virtual)
2020 – Computational and Theoretical Evolutionary Genetics Seminar, University of California - Berkeley (virtual)
– Rescue Team Seminar, Max Planck Institute for Evolutionary Biology (virtual)
2018 – Department of Ecology and Evolutionary Biology Seminar, University of Toronto
– Mathematical Biology Seminar, University of British Columbia
– Center for Population Biology Seminar, University of California - Davis
2016 – Stochastic Models for the Inference of Life Evolution Group Meeting, College de France
– Institute National de la Recherche Agronomique Seminar, Montpellier
– Stochastic and Deterministic Models for Evolutionary Biology Workshop, Oaxaca
2013 – Pacific Institute for the Mathematical Sciences Seminar, University of British Columbia
2011 – Mick Follows's Lab Meeting, Massachusetts Institute of Technology

# Graduate and postdoc supervision

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| 2024- | Rebekah Hall | PhD |
| 2023- | Kuangyi Xu | PDF |
| 2022- | Chris Carlson | PhD |
| 2022- | Mete Yuksel | PhD |
| 2021- | Puneeth Deraje | PhD |
| 2021-2022 | Sydney Ackermann | MSc |

# Undergraduate supervision

2025 Tabris Cao, Raghav Singhal
2024 Catherine Yan, Tabris Cao
2023 Tam Ly, Litong Zheng
2022 Jahin Kabir, Anthony McCanny
2021 Pam Alamilla, Esther Cho, Nadine Richard, Alex Whitman

# Teaching

Mathematical modeling in ecology and evolution
- 2021, 2022, 2024

Seminar in ecology and evolution
- 2021, 2024

# Service

**Associate Editor** *Theoretical Population Biology* (2021-)

**Reviewer** *The American Naturalist* (18), *Genetics* (9), *Theoretical Population Biology* (5), *Evolution* (5), *Ecology Letters* (2), *Evolution Letters* (2), *Journal of Theoretical Biology* (2), *Proceedings of the Royal Society of London B* (2), *Biological Journal of the Lineann Society* (1), *Ecology* (1), *Ecology and Evolution* (1), *eLife* (1), *Frontiers in Ecology and Evolution* (1), *Global Change Biology* (1), *Heredity* (1), *Journal of Evolutionary Biology* (1), *Journal of Mathematical Biology* (1), *Journal of Statistical Mechanics* (1), *Molecular Biology and Evolution* (1), *Molecular Ecology* (1), *Nature Communications* (1), *Nature Ecology and Evolution* (1), Natural Sciences and Engineering Research Council (1), *Peer Community In Evolutionary Biology* (1), *Philosophical Transactions of the Royal Society of London B* (1), *PLoS Computational Biology* (1), *Proceedings of the National Academy of Science USA* (1), *Science* (1), Swiss National Science Foundation (1)