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## RESEARCH FOCUS

I am a transdisciplinary scientist solving problems in biodiversity science, evolutionary ecology, socioecological dynamics, and science of science using complexity theories and computational statistics.

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## ACADEMIC POSITIONS

2023-present **Research Associate, McGill University** with Jennifer Sunday  
2020-2022 **Hakai Postdoctoral Fellow, University of British Columbia** with Mary O'Connor  
2016-2020 **Postdoctoral Associate, Rutgers University / Princeton University** with Malin Pinsky and Simon Levin  
2009-2016 **Ph.D. Biology, McGill University** with Andrew Gonzalez and Michel Loreau  
*Thesis: Spatial theories and experiments on the evolution of cooperation*  
2008-2009 **Incidental Studies in Biology, Eastern Washington University**  
2000-2006 **B.A.Sc. Engineering Physics, University of British Columbia**

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## AWARDS & GRANTS

2020-2022 Hakai Postdoctoral Fellowship (\$146,000)  
2020 Ecological Society of America – *Outstanding theory paper award* (\$200)  
2019-2020 Rutgers Earth, Ocean, and Atmospheric Sciences Seed Grant – *Theories and statistical evidence for multiple attractors in natural systems* (\$5,000 – lead applicant)  
2019 NSERC Chairs for Women in Science and Engineering National Chair Network Conference Grant – SWEET at CSEE 2019 (\$2,000 – lead applicant)  
2018 National Science Foundation INCLUDES seed grant, Columbia (\$10,000 – co-applicant)  
2011-2014 Fonds de recherche du Quebec nature et technologies: Doctoral Scholarship (\$60,000)  
2011 Philip Carpenter Fellowship in Biology (\$2,000)  
2010-2012 Quebec Centre for Biodiversity Science Excellence Award (\$5,000)  
2005 Alberta Heritage Foundation for Medical Research Studentship (\$5,200)

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## PUBLICATIONS (see [Google Scholar](https://scholar.google.com/citations?user=ewtekwa))

1. **EW Tekwa**, D Zurell, A Gonzalez, MI O'Connor. Introduction to Special Issue: Detecting and attributing the causes of biodiversity change: needs, gaps, and solutions. *Philosophical Transactions B* (2023). [10.1098/rstb.2022.0181](https://doi.org/10.1098/rstb.2022.0181).
2. **EW Tekwa**, MA Whalen, PT Martone, MI O'Connor. Theory and application of an improved species richness estimator. *Philosophical Transactions B* (2023). [10.1098/rstb.2022.0181.2022-0187](https://doi.org/10.1098/rstb.2022.0181.2022-0187).
3. **EW Tekwa**, KA Catalano, AL Bazzicalupo, MI O'Connor, ML Pinsky. The sizes of life. *PLOS ONE* (2023). [10.1371/journal.pone.0283020](https://doi.org/10.1371/journal.pone.0283020). (*Altmetric top 10,000 article of all time*)
4. L Elsler, A Quintana, A Giron-Nava, M Oostdijk, S Stefanski, X Basurto, M Nenadovic, MJ Espinosa-Romero, AH Weaver, SR Van Dyck, **EW Tekwa**. Strong collective action enables

- valuable and sustainable fisheries for cooperatives. *Environmental Research Letters* (2022). [10.1088/1748-9326/ac9423](https://doi.org/10.1088/1748-9326/ac9423).
5. MA Colton, LC McManus, DE Schindler, PJ Mumby, SR Palumbi, MM Webster, TE Essington, HE Fox, DL Forrest, SR Schill, FJ Pollock, LB DeFilippo, **EW Tekwa**, T Walsworth, ML Pinsky. Coral conservation in a warming world must harness evolutionary adaptation. *Nature Ecology & Evolution* (2022). [10.1038/s41559-022-01854-4](https://doi.org/10.1038/s41559-022-01854-4).
  6. **EW Tekwa**, J Watson, ML Pinsky. Body size and food-web interactions mediate marine species range shifts under warming. *Proceedings of the Royal Society B* (2022). [10.1098/rspb.2021.2755](https://doi.org/10.1098/rspb.2021.2755). (*International Biogeography Society: best talk award 2022*)
  7. L DeFilippo, LC McManus, DE Schindler, ML Pinsky, MA Colton, H Fox, **EW Tekwa**, SR Palumbi, TE Essington, MS Webster. Assessing the potential for demographic restoration and assisted evolution to build climate resilience in coral reefs. *Ecological Applications* (2022). [10.1002/eap.2650](https://doi.org/10.1002/eap.2650).
  8. K Bodner, CR Firkowski, J Bennett, C Brookson, M Dietze, S Green, J Hughes, J Kerr, M Kunegellion, S Leroux, E McIntire, P Molnár, C Simpkins, **EW Tekwa**, A Watts, MJ Fortin. Bridging the divide between ecological forecasts and environmental decision-making. *Ecosphere* (2021). [10.1002/ecs2.3869](https://doi.org/10.1002/ecs2.3869). (*Wiley Top Downloaded Article Recognition*)
  9. LC McManus, DL Forrest, **EW Tekwa**, DE Schindler, TE Walsworth, MA Colton, MS Webster, TE Essington, SR Palumbi, PJ Mumby, ML Pinsky. Projected coral adaptation under warming in Fiji, the Caribbean, and the Coral Triangle. *Global Change Biology* (2021). [10.1111/gcb.15725](https://doi.org/10.1111/gcb.15725).
  10. JD Kong\*, **EW Tekwa**\*, SA Gignoux-Wolfsohn. Social, economic, and environmental factors influencing the basic reproduction number of COVID-19 among countries. \*co-first authors. *PLOS ONE* (2021). [10.1371/journal.pone.0252373](https://doi.org/10.1371/journal.pone.0252373).
  11. LC McManus, **EW Tekwa**, DE Schindler, TE Walsworth, DL Forrest, MA Colton, MS Webster, TE Essington, SR Palumbi, PJ Mumby, ML Pinsky. Evolution reverses the effect of network structure on metapopulation persistence. *Ecology* (2021). [10.1002/ecy.3381](https://doi.org/10.1002/ecy.3381).
  12. **EW Tekwa**, LC McManus, A Greiner, MA Colton, MS Webster, ML Pinsky. Geometric analysis of regime shifts in coral reef communities. *Ecosphere* (2021). [10.1002/ecs2.3319](https://doi.org/10.1002/ecs2.3319).
  13. **EW Tekwa**. Origami for community regime shift. *Bulletin of the Ecological Society of America* (2021). [10.1002/bes2.1830](https://doi.org/10.1002/bes2.1830).
  14. M Krkosek, M Jarvis-Cross, K Wadhawan, I Berry, JPR Soucy, K Bodner, A Greiner, L Krichel, S Penk, D Shea, JV Soto, **EW Tekwa**, N Mideo, P Molnar. Establishment, contagiousness, and initial spread of SARS-CoV-2 in Canada. *FACETS* (2021). [10.1139/facets-2020-0055](https://doi.org/10.1139/facets-2020-0055).
  15. **EW Tekwa**, EP Fenichel, SA Levin, ML Pinsky. Path-dependent institutions drive alternative stable states in conservation. *Proceedings of the National Academy of Sciences* (2019) 116, 689-694. [10.1073/pnas.1806852116](https://doi.org/10.1073/pnas.1806852116). (*Ecological Society of America: outstanding theory paper award 2020, F1000/Faculty Opinions recommended*)
  16. **EW Tekwa**, A Gonzalez, M Loreau. Spatial evolutionary dynamics produce a negative cooperation-population size relationship. *Theoretical Population Biology* (2019) 125, 94-101. [10.1016/j.tpb.2018.12.003](https://doi.org/10.1016/j.tpb.2018.12.003). (*F1000/Faculty Opinions recommended*)
  17. **EW Tekwa**, D Nguyen, M Loreau, A Gonzalez. Defector clustering is linked to cooperation in a pathogenic bacterium. *Proceedings of the Royal Society B* (2017) 284, 20172001. [10.1098/rspb.2017.2001](https://doi.org/10.1098/rspb.2017.2001).
  18. A Greiner, **EW Tekwa**, A Gonzalez, D Nguyen. Rapid inoculation and recovery of microbes in a microfluidic device. *Chips and Tips* (2017). [blogs.rsc.org/chipsandtips/2017/10/04/](https://blogs.rsc.org/chipsandtips/2017/10/04/).

19. **EW Tekwa**, D Nguyen, D Juncker, M Loreau, A Gonzalez. Patchiness in a microhabitat chip affects evolutionary dynamics of bacterial cooperation. *Lab on a Chip* (2015) 15, 3723-3729. [10.1039/C5LC00576K](https://doi.org/10.1039/C5LC00576K).
  20. **EW Tekwa**, A Gonzalez, M Loreau. Local densities connect spatial ecology to game, multilevel selection and inclusive fitness theories of cooperation. *Journal of Theoretical Biology* (2015) 380, 414-425. [10.1016/j.jtbi.2015.06.016](https://doi.org/10.1016/j.jtbi.2015.06.016).
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#### PAPERS IN REVIEW/PREPRINT

1. **EW Tekwa**, V Junquera. A generalized adaptive harvesting model exhibits cusp bifurcation, noise, and rate-associated tipping pathways. *bioRxiv* (2022). [10.1101/2022.12.01.518756](https://doi.org/10.1101/2022.12.01.518756) (*In prep*).
  2. L Elsler, M Oostdijk, JA Gephart, CM Free, J Zhao, **EW Tekwa**, EM Bochniewicz, A Girón-Nava, AF Johnson. Global trade network patterns are coupled to fisheries sustainability (*In review*).
  3. **EW Tekwa**, RK Giles, ACD Davis. Theoretical foundation and empirical assessment of representation and meritocracy in academia. *SocArXiv* (2022). [10.31235/osf.io/4bd9r](https://doi.org/10.31235/osf.io/4bd9r) (*In prep*).
  4. **EW Tekwa**, M Krkošek, ML Pinsky. Inferring models with alternative stable states from independent observations. *bioRxiv* (2020). [0.1101/2020.02.07.939413](https://doi.org/0.1101/2020.02.07.939413) (*In prep*).
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#### PRESENTATIONS

1. **EW Tekwa** (2023). Theories and empirical assessments of diversity and adaptation - from biosphere to society. *Invited*, Eawag / University of Bern Ecology and Macroevolution Seminar Series. Bern.
2. **EW Tekwa** (2022). Multilevel biological adaptation, socioecological interaction, and academic composition. *Invited*, University of Alberta Biology Departmental Seminar, Edmonton.
3. **EW Tekwa** (2022). Meritocracy, affirmative action, and the American Dream. *Invited*, University of Pennsylvania MindCORE seminar, Philadelphia.
4. **EW Tekwa**, V Junquera (2022). A generalized adaptive harvesting model exhibits cusp bifurcation and multiple tipping pathways. INTECOL, Geneva.
5. **EW Tekwa** (2022). Using openly accessible surname-publication data to infer diversity and meritocracy in academia. *Invited*, Ecological Society of America, Montreal.
6. **EW Tekwa** (2022). Being different. *Invited*, University of British Columbia Institute for the Oceans and Fisheries: Storytime with Ocean Leaders.
7. **EW Tekwa** (2022). Confronting biases in biodiversity science. *Invited*, University of Washington School of Aquatic and Fishery Sciences: Quantitative Seminars.
8. **EW Tekwa** (2021). Uncovering biases in biodiversity and conservation sciences. *Invited*, York University Aquatic Research Group Seminar.
9. **EW Tekwa**, M O'Connor (2021). Estimating true biodiversity and temporal change. Canadian Society for Ecology and Evolution.
10. **EW Tekwa**, ML Pinsky, J Bonachela (2021). Institution adaptation speed influences extinction. Ecological Society of America.
11. **EW Tekwa**, J Watson, ML Pinsky (2021). Body size and food web interactions influence marine species range shifts under warming. Association for the Sciences of Limnology and Oceanography.
12. **EW Tekwa**, LC McManus, A Greiner, MA Colton, MS Webster, ML Pinsky (2020). Origami for community regime shift. Western Society of Naturalists.
13. **EW Tekwa** (2020). Body size distributions in nature. *Invited*, University of British Columbia/Hakai Lecture Series.

14. **EW Tekwa**, KA Catalano, AL Bazzicalupo, ML Pinsky (2020). The sizes of life. Ecological Society of America.
15. **EW Tekwa** (2019). Evidence for alternative stable states in coral reef, resource conservation, and multicellularity. *Invited*, Integrative Biology Seminar. University of Guelph.
16. **EW Tekwa** (2019). Theories and tests for path-dependence in conservation behaviour. Student Conference on Conservation Science, New York.
17. **EW Tekwa**, M Krkošek, ML Pinsky (2019). Statistical inference for alternative-stable-state models with application to coral-macroalgal bistability. Canadian Society for Ecology and Evolution, Fredericton.
18. **EW Tekwa**, KA Catalano, ML Pinsky, SA Levin (2019). Spatial cooperation and competition shape the body-size-biomass distribution across taxa. Evolution, Providence, RI.
19. **EW Tekwa**, EP Fenichel, SA Levin, ML Pinsky (2018). Global harvesting patterns are path-dependent due to social-ecological feedback. 4<sup>th</sup> North American Congress for Conservation Biology, Toronto.
20. **EW Tekwa**, A Gonzalez, M Loreau (2018). Spatial dynamics govern the relationship between cooperation and population size. Canadian Society for Ecology and Evolution, *Peter Yodzis Colloquium in Fundamental Ecology*, Guelph.
21. **EW Tekwa**, EP Fenichel, SA Levin, ML Pinsky (2018). Global fishing patterns reveal path-dependence. Fields Institute Workshop on Human-Environment Systems, Toronto.
22. **EW Tekwa**, EP Fenichel, SA Levin, ML Pinsky (2016). Why do fisheries evolve different harvest rates? EcoSummit. Montpellier, France.
23. **EW Tekwa**, M Loreau, A Gonzalez (2013). Habitat structure influences the evolution of cooperation. International Association for Ecology Congress, London, UK.

## COMMUNICATION AND OUTREACH

### 2019-present **Scientific Communications**

- Connected research with culture through social media and interviews including with BBC, CBC, and NPR (2 articles with Altmetric attention scores in the 99.99<sup>th</sup> percentile and 2 articles in the 98<sup>th</sup> percentile)

### 2020-2021 **Organizer, Broadening Representation & Equity with Science (BREWS), Toronto**

- Led evidence-based discussions and invite speakers on diversity and inclusion issues

### 2018-2019 **Committee Member, Symposium for Women Entering Ecology and Evolution Today (SWEEET), Guelph, ON / Fredericton, NB**

- Planned two symposia on gender equity and intersectionality

### 2016-2018 **Committee Member and Rutgers Representative, NSF INCLUDES, Columbia**

- Developed STEM opportunities for underrepresented high school students

## WORKING GROUPS

### 2022-present **Member, Designing Canada's Biodiversity Observation Network (CAN BON), CIEE**

- Coordinated with researchers across Canada to produce monitoring protocol

### 2022 **Member, Using Rules of Life Workshop and Incubator, NSF**

- Brainstormed major research themes that inform future NSF grant targets

- Recruited postdocs from underrepresented backgrounds to synthesize the relationships between diversity, transdisciplinarity, and funding gaps
- 2020-2021 **Member, Canadian Ecological Forecasting Initiative (CEFI), CIEE**
- Integrated ecological forecasting with resource management
- 2021 **Leader, Fashion, Ecology, and Public Relations, Virtual**
- Discussed the role and meaning of fashion for representation and inclusion in ecology
- 2017-2020 **Advisor, SESYNC Graduate Pursuit, University of Maryland**
- Guided an international team of seven interdisciplinary graduate students researching trade effects on fishery sustainability

## EDITORIAL WORK

- 2021-present **Lead Editor, Philosophical Transactions B Thematic Issue**  
<https://royalsocietypublishing.org/toc/rstb/2023/378/1881>
- Proposed issue on “Detecting and attributing the causes of biodiversity change”
  - Secured 16 contributions from international experts and diverse researchers
- 2016-present **Reviewer**
- Peer reviewed for *PNAS*, *Sci. Adv.*, *Ecol. Let.*, *Phil. Trans. B.*, *PLOS ONE*, *Ecol. Model.*, *Evol. Biol.*, *Food Webs*, *Biol. Let.*, and *J. Theor. Biol.*

## TEACHING & MENTORING

- 2021 **Instructor, EEB 491: Biodiversity and Conservation Biology, University of Toronto**
- Investigated diverse origins and practices of conservation
- 2020 **Instructor, EEB1452H: Classic Papers, University of Toronto**
- Introduced diverse and sometimes marginalized scientists that revolutionized biology
- 2010-present **Undergraduate Research Supervisor, McGill/Rutgers**
- Supervised five undergraduate students
- 2010, 2011 **Teaching Assistant, BIOL 310: Biodiversity and Ecosystems, McGill**
- Created and graded assignments, and ran field and computer lab sessions

## JOBS

- 2006-2009 **Field Engineer, FONAR Corporation, Spokane, WA**
- Installed, repaired, and facilitated operation of MRI scanners at clinics
- 2005 **Research Intern, University of Ljubljana, Slovenia**
- Investigated numerical power flow computation methods
- 2005 **Research Intern, University of Calgary**
- Set up sensors and force-feedback controller to emulate touch for a laser tip
- 2003 **Research Intern, University of Würzburg, Germany**
- Experimented with semiconductor laser coating methods