

Takuji Usui

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Research areas: Species range dynamics; Adaptation to global change; Species coexistence and community assembly; Invasion ecology & evolution

ACADEMIC POSITIONS

Faculty of Arts & Sciences Postdoctoral Fellow | 2023 – current
University of Toronto
PI: Prof. Megan Frederickson

Research Studentship | 2016 – 2017
University of New South Wales & University of Sydney
PI: Prof. Shinichi Nakagawa

Research Studentship | 2015 – 2016
University of Edinburgh
PI: Prof. Ally Phillimore

Field Assistant | 2015 – 2016
University of Edinburgh
PI: Prof. Jarrod Hadfield

EDUCATION

University of British Columbia | 2017 – 2023
PhD, Botany (*Excellence in Doctoral Research Award*)
Dissertation: Experimental evolution of species ranges and coexistence
PI: Prof. Amy Angert

University of Edinburgh | 2011 – 2015
BSc, Evolutionary Biology (*First Class Honours with Ashworth Medal and Prize*)
Thesis: Temporal shifts and temperature sensitivity of spring migratory phenology
PI: Prof. Ally Phillimore

PUBLICATIONS

In review

13. Usui, T. & Angert, A.L. (2024) Competition enables rapid adaptation to a warming range edge. In review, *Science* (preprint: doi.org/10.1101/2024.08.22.609250)

Published

12. Gillies, G.J., Angert, A.L., & Usui, T. (2024) Temperature-dependence and genetic variation in resource acquisition strategies in a model freshwater plant. *Functional Ecology*, 38, 1600–1610.

11. Usui, T. & Angert, A.L. (2024) Range expansion is both slower and more variable with rapid evolution across a spatial gradient in temperature. *Ecology Letters*, 27, e14406.

10. Usui, T., Lerner, D., Angert, A.L., Eckert, I., Garroway, C.J., Hargreaves, A.L., Lancaster, L.T., Lessard, J-P., Riva, F., Schmidt, C., van der Burg, K. & Marshall, K. (2023) The evolution of plasticity at geographic range edges. *Trends in Ecology & Evolution*, 38, 831–842.

9. Usui, T., Senior, A., MacLeod, M., McCann, S. & Nakagawa, S. (2021) Meta-analysis of variation suggests that embracing heterogeneity improves both replicability and generalizability in preclinical research. *PLoS Biology*, 19(5), e3001009.

8. Bontrager, M., Usui, T., Lee-Yaw, J.A., Anstett, D.N., Branch, H.A., Hargreaves, A.L. & Angert, A.L. (2021) Adaptation across geographic ranges is consistent with strong selection in marginal climates and legacies of range expansion. *Evolution*, 75, 1316–1333.

7. Germain, R.M., Angert, A.L., Bassar, R.D., Henao Diaz, F.L., Hart, S.P., Otto, S.P., Rolland, J., Sakarchi, J., Schluter, D., Siepielski, A.M., Turcotte, M.M., Usui, T. & Waters, M. (2020) On the origin of coexisting species. *Trends in Ecology & Evolution*, 36, 284–283.

6. Miller, T.E.X., Angert, A.L.A., Brown, C.D., Lee-Yaw, J.A., Lewis, M., Lutscher, F., Marculis, N.G., Melbourne, B.A., Shaw, A.K., Szűcs, M., Tabares, O., Usui, T., Weiss-Lehman, C. & Williams, J.L. (2020) Eco-evolutionary dynamics of range expansion. *Ecology*, 101, e03139.

5. Baur, J., Laurentino, T.G., Usui, T. & Eichhorn M. (2019) Liana abundance and relationships to sapling and tree hosts in an East African primary forest. *African Journal of Ecology*, 57, 130–136.
4. Usui, T. & Angert, A.L.A. (2018) Species Ranges. *Elsevier Reference Module in Life Sciences*.
3. Usui, T., Noble, D.W.A., O'Dea, R.E., Fangmeier, M.L., Lagisz, M., Hesselson, D. & Nakagawa, S. (2018) The French Press: a repeatable and high-throughput approach to exercising zebrafish (*Danio rerio*). *PeerJ*, e4292.
2. Fangmeier, M., Noble, D.W.A., O'Dea, R.E., Usui, T., Lagisz, M., Hesselson, D. & Nakagawa, S. (2018) Computer animation technology in behavioral sciences: a sequential, automatic, and high-throughput approach to quantifying personality in zebrafish (*Danio rerio*). *Zebrafish*, 15, 206–210.
1. Usui, T., Butchart, S.H.M. & Phillimore, A.B. (2017) Temporal shifts and temperature sensitivity of avian spring migration phenology: a phylogenetic meta-analysis. *Journal of Animal Ecology*, 86, 250–261.

Selected press coverage:

- Birds migrating earlier as temperatures rise (BBC News)
- Climate change driving birds to migrate early (The Guardian)

FELLOWSHIPS & GRANTS

2024	Faculty of Arts & Science Postdoctoral Fellowship University of Toronto	\$96,000
2023	Postdoctoral Research Funds University of Toronto	\$120,000
2017	International Doctoral Fellowship University of British Columbia	\$138,000
2017	Scientia PhD Scholarship University of New South Wales (<i>Declined</i>)	\$200,000
2017	Graduate Research Scholarship University College London (<i>Declined</i>)	£52,660
2017	Overseas Research Scholarship University College London (<i>Declined</i>)	£78,480

2017	NERC Science and Solutions for a Changing Planet Doctoral Training Partnership Imperial College London (<i>Declined</i>)	£62,935
2016	Research Studentship University of New South Wales	\$14,000
2015	Research Studentship University of Edinburgh	£2500

HONOURS & AWARDS

2024	<u><i>Evolution Early Career Award</i></u> University of Wisconsin–Madison	\$150
2024	Postdoctoral Travel Award Canadian Society for Ecology & Evolution	\$700
2023	<u><i>Excellence in Doctoral Research Award</i></u> Canadian Society for Ecology & Evolution	\$600
2023	Graduate Student Travel Award University of British Columbia	\$500
2022	Student Travel Award ESA Plant Population Ecology Section	\$600
2022	President's Academic Excellence Initiative PhD Award University of British Columbia	\$540
2021	<u><i>Best Talk Award</i></u> Botany & Zoology Conference, University of British Columbia	–
2021	President's Academic Excellence Initiative PhD Award University of British Columbia	\$1030
2021	Faculty of Science Graduate Award University of British Columbia	\$100
2021	<u><i>Student Research Award</i></u> American Society of Naturalists	\$2000
2020	President's Academic Excellence Initiative PhD Award University of British Columbia	\$1000
2019	<u><i>GREG Lewontin Award</i></u> Society for the Study of Evolution	\$2000

2018	<u>Vladimir J Krajina Prize in Plant Ecology</u> University of British Columbia	\$2000
2018	<u>Best Poster Award</u> Brackendale Ecology & Evolution Conference	–
2015	<u>Ashworth Medal and Prize for highest grade in Evolutionary Biology Honours</u> University of Edinburgh	£250
2015	Travel Award for National Biodiversity Network Conference University of Edinburgh	£100
2015	Travel Award British Ecological Society	£400

INVITED PRESENTATIONS

Rapid evolution of species geographical ranges and coexistence

Evolution Early Career Award Talk, University of Wisconsin–Madison, WI | 2024

Debunking dry arguments against wet simulation: Experimental evolution as a tool to test range expansion theory

Symposium on linking theory and empirical research, CSEE, BC | 2024

Using machine learning for automated lineage tracking in duckweeds

Duckweeds, microbes & symbiosis, University of British Columbia, BC | 2024

On the origins of coexistence (and the curious paradox of the duckweed)

Doctoral Award Symposium, CSEE, MN | 2023

The evolution of coexistence across the species boundary

Duckweeds: A new frontier in symbiosis research, University of Toronto, ON | 2022

How can we embrace heterogeneity to improve replicability?

Metascience Conference, Centre for Open Science | 2021

CONTRIBUTED PRESENTATIONS

† Poster ‡ Talk [‡]Award

2023 EEB Seminar Series, University of Toronto, ON[‡]

2023 Botany Seminar Series, University of British Columbia, BC[‡]

- 2023 Asilomar Conference, Society of American Naturalists, CA[†]
- 2022 Joint Annual Meeting of ESA & CSEE, QB[†]
- 2021 Botany & Zoology Meeting, University of British Columbia, BC^{†ψ}
- 2019 Brackendale Ecology & Evolution Conference, BC[†]
- 2018 Brackendale Ecology & Evolution Conference, BC^{†ψ}
- 2017 Brackendale Ecology & Evolution Conference, BC[†]

SYNERGISTIC RESEARCH ACTIVITIES

Member of working group: **Plasticity Across Species' Ranges**, UBC | 2023
PI: Katie Marshall (UBC) and Jean-Philippe Lessard (Concordia University)

Member of workshop: **Bayesian Modelling in JAGS**, UBC | 2023
PI: Anne Bjorkman (University of Gothenburg)

Member of working group: **Coexistence Across Evolutionary Scales**, UBC | 2019
PI: Rachel Germain (UBC) and Adam Siepielski (University of Arkansas)

Member of working group: **Eco-Evo Dynamics of Range Expansion**, UBC | 2018
PI: Tom Miller (Rice University) and Jennifer Williams (UBC)

Member of tropical field research course: **Kibale National Park**, Uganda | 2015
Group: Tropical Biology Association (University of Cambridge)

TEACHING & MENTORING

Teaching Assistant | 2020 – 2023

BIOL 121: Genetics, Ecology & Evolution

BIOL 300: Biostatistics

BIOL 336: Fundamentals of Evolution (Lead/Senior TA, 2021 and 2023)

BIOL 406: Plant Ecology (Lead TA in re-designing tutorials, 2021)

Undergraduate Supervision | 2018 – current

Jerry Yu (Work-learn 2023; KSR USRA 2024; Honours student 2023–current)

Joshua Dyer (NSERC Undergraduate Student Research Award 2023–current)

Amy Wong (Work-learn 2022 & 2023)

Burak Ozkan (Research volunteer 2022)
Kenzie Chute (Research volunteer 2022)
Sourena Oveisi (Work-learn 2022)
Vicky Kim (Research volunteer 2022)
Graydon Gillies (NSERC Undergraduate Student Research Award 2020 & 2021)
Chris Spangenberg (Work-learn 2020 & 2021)
Hafsa Ahmed, UBC (Work-learn 2019)
Emma Menchions, UBC (Work-learn 2018)

Mentorship Programs | 2020 – 2022

Indigenous Undergraduate Research Mentorship Program
Botany Department Peer Mentor for Incoming Graduates

SERVICE ACTIVITIES

Manuscript reviews

American Journal of Botany; American Naturalist; Ecography; Evolution; Global Change Biology; Journal of Animal Ecology; Journal of Avian Biology; Journal of Biogeography; Nature Ecology & Evolution; Perspectives in Plant Ecology, Evolution and Systematics

Professional memberships

American Naturalist Society; Botanical Society of America; Canadian Society for Ecology & Evolution; National Biodiversity Network; Society for the Study of Evolution; Tropical Biology Association

Committee service

- 2024 Judge Panel for Excellence in Doctoral Awards
Canadian Society for Ecology & Evolution
- 2023 Lead Organizer for Make Your Own Model Origami Organism
University of British Columbia
- 2021 Conference Planning Committee
Canadian Society for Ecology & Evolution
- 2020 Graduate Student Representative for Biodiversity PDF Selection Committee
University of British Columbia
- 2020 Selection Committee for Annual Evolution Lecture
University of British Columbia

- 2019 Lead Organizer and Host for Annual Evolution Lecture
University of British Columbia
- 2019 Co-director for Annual Zoology/Botany Show
University of British Columbia

SELECT MEDIA FEATURES

- 2024 **Computing and the future of AI in EEB**
The EEQ Quarterly, University of Toronto
- 2023 **Using experimental evolution of duckweeds to understand spatiotemporal patterns of biodiversity**
International Duckweed Forum
- 2022 **Teaching Spotlight: Getting to know diverse scientists**
BioNews, University of British Columbia
- 2021 **Meta-analysis of variation suggests that embracing variability improves both replicability and generalizability**
Partnership for Assessment and Accreditation of Scientific Practice
- 2020 **How species distributions are moving in response to climate change**
Researchers Revealed, University of British Columbia
- 2016 **Bird migration and global warming**
World Service News, BBC
- 2016 **Early birds miss out**
The Times
- 2016 **Climate change driving birds to migrate early, research reveals**
The Guardian
- 2016 **Global temperature rises causing birds to migrate early**
The Independent