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Megan S. Reich

EDUCATION

PhD Biology, Department of Biology, University of Ottawa, Canada *2019-2024*

- Thesis topic: Advancements in isotopic geolocation tools for insect migration research
  - Nominated for best thesis of 2024 at the University of Ottawa
  - Advisors: Profs Clément Bataille and Heather Kharouba
- MSc Earth Sciences; fast-tracked to PhD *2018-2019*

BSc Environmental Sciences, University of British Columbia, Canada *2011-2015*

- International exchange to the University of New South Wales, Australia *2013*
- 1st and 2nd year at the University of the Fraser Valley, Canada *2008-2010*

APPOINTMENTS

Postdoctoral Fellow, SAiVE lab with C. Bataille, Department of Biology, University of Ottawa, Canada *2024-present*

RECOGNITION

- Mitacs Globalink Research Award *2023*
- Ontario Graduate Scholarship *2022-2023*
- Best graduate talk, 18th Annual Ottawa-Carleton Institute of Biology Symposium *2021*
- Ontario Graduate Scholarship *2021-2022*
- Excellence Scholarship-Doctorate, University of Ottawa *2020-2023*
- ORIGIN Graduate Fellowship 2021, University of Utah *2020*
- Queen Elizabeth II Graduate Scholarship in Science and Technology *2020-2021*
- Danks Scholarship, Entomological Society of Canada *2020*
- Admission Scholarship-Doctorate, University of Ottawa *2019-2020*
- Admission Scholarship-Master's, University of Ottawa *2018-2019*

PUBLICATIONS

Summary

- Total of 14 peer-reviewed articles, including 1 article in review
  - 4 first author and 1 senior author articles
- Google scholar: Citations = 176; H-index = 8; i10-index = 7

Manuscripts in Review

Dargent, F., **Reich, M.S.**, Miller, M., Studens, K., Benvidi, N., Perrault, K., Aibueku, J., Holmes, B., Bataille, C., Candau, J-N. (*preprint 2025*). A novel integrated framework to identify and characterize regional-scale pest insect dispersal. *BioRxiv*. doi: 10.1101/2025.02.26.640127

Peer-reviewed Publications

13. **Reich, M. S.**, Shipilina, D., Talla, V., Bahleman, F., Kébé, K., Berger, J. L., Backström, N., Talavera, G., Bataille, C. P. (2025). Isotope geolocation and population genomics in *Vanessa cardui*: Short- and long-distance migrants are genetically undifferentiated. *PNAS Nexus*. 4(2): pgae586. doi: 10.1093/pnasnexus/pgae586
12. Le Corre, M., Dargent, F., Grimes, V., Wright, J., Côté, S. D., **Reich, M. S.**, Candau, J-N., Miller, M., Holmes, B., Bataille, C. P., Britton, K. (2025). An ensemble machine learning bioavailable strontium isoscape for Eastern Canada. *FACETS*, 10: 1-17. doi: 10.1139/facets-2024-0180

11. **Reich, M. S.**, Ghouri, S., Zabudsky, S., Hu, L., Le Corre, M., Ng'iru, I., Benyamini, D., Shipilina, D., Collins, S. C., Martins, D. J., Vila, R., Talavera, G., Bataille, C. P. (2024) Trans-Saharan migratory patterns in Vanessa cardui and evidence for a southward leapfrog migration. *iScience*, 27, 111342. doi: 10.1016/j.isci.2024.111342
10. Suchan, T., Bataille, C. P., **Reich, M. S.**, Toro-Delgado, E., Vila, R., Pierce, N. E., Talavera, G. (2024). A trans-oceanic flight of over 4,200 km by painted lady butterflies. *Nature Communications,* 15(1), 5205. doi: 10.1038/s41467-024-49079-2
9. Gorki, J. L., López-Mañas, R., Sáez, L., Menchetti, M., Shapoval, N., Andersen, A., Benyamini, D., Daniels, S., García-Berro, A., **Reich, M. S.**, Scalercio, S., Toro-Delgado, E., Bataille, C. P., Domingo-Marimon, C., Vila, R., Suchan, T., Talavera, G. (2024). Pollen metabarcoding reveals the origin and multigenerational migratory pathway of an intercontinental-scale butterfly outbreak. *Current Biology*. S0960982224006808. doi: 10.1016/j.cub.2024.05.037
8. Ghouri, S., **Reich, M. S.**, Lopez-Mañas, R., Talavera, G., Bowen, G., Vila, R., Talla, V. N. K., Collins, S. C., Martins, D. J., & Bataille, C. (2024). A hydrogen isoscape for tracing the migration of herbivorous lepidopterans across the Afro-Palearctic range. *Rapid Communications in Mass Spectrometry*, 38(3), e9675. doi: 10.1002/rcm.9675
7. Talavera, G., García-Berro, A., Talla, V. N. K., Ng'iru, I., Bahleman, F., Kébé, K., Nzala, K. M., Plasencia, D., Marafi, M. A. J., Kassie, A., Goudégnon, E. O. A., Kiki, M., Benyamini, D., **Reich, M. S.**, López-Mañas, R., Benetello, F., Collins, S. C., Bataille, C. P., Pierce, N. E., Martins, D. J., Suchan, T., Menchetti, M., Vila, R. (2023). The Afrotropical breeding grounds of the Palearctic-African migratory painted lady butterflies (*Vanessa cardui*). *Proceedings of the National Academy of Sciences*, 120(16), e2218280120. doi: 10.1073/pnas.2218280120
6. Dargent, F., Candau, J.-N., Studens, K., Perrault, K. H., **Reich, M. S.**, & Bataille, C. P. (2023). Characterizing eastern spruce budworm's large-scale dispersal events through flight behavior and stable isotope analyses. *Frontiers in Ecology and Evolution*, 11, 1060982. doi: 10.3389/fevo.2023.1060982
5. **Reich, M.S.**, Kindra, M., Dargent, F., Hu, L., Flockhart, T., Norris, R., Kharouba, H., Talavera, G., Bataille, C.P. (2023) Metals and metal isotopes incorporation in insect wings: Implications for geolocation and pollution exposure. *Frontiers in Ecology and Evolution*, 11. doi: 10.3389/fevo.2023.1085903
4. Lindroos, E.E., Bataille, C.P., Holder, P.W., Talavera, G., **Reich, M.S.** (2023). Temporal stability of δ^2H in insect tissues: Implications for isotope-based geographic assignments. *Frontiers in Ecology and Evolution*, 11. doi: 10.3389/fevo.2023.1060836
3. López-Mañas, R., Pascual-Díaz, J.P., García-Berro, A., Bahleman, F., **Reich, M.S.**, Pokorny, L., Bataille, C.B., Vila, R., Domingo-Marimon, C., Talavera, G. (2022). Erratic spatiotemporal vegetation growth anomalies drive population outbreaks in a trans-Saharan insect migrant. *Proceedings of the National Academy of Sciences*, 119:19. 3-5. doi: 10.1073/pnas.2121249119
2. **Reich, M.S.**, Flockhart, D.T.T., Norris, D.R., Hu, L., Bataille, C.P. (2021). Continuous-surface geographic assignment of migratory animals using strontium isotopes: A case study with monarch butterflies. *Methods in Ecology and Evolution,* 1-13. doi: 10.1111/2041-210X.13707.
1. Amundrud, S.L., Clay-Smith, S.A., Flynn, B.L., Higgins, K.E., **Reich, M.S.**, Wiens, D.R.H., & Srivastava, D.S. (2019). Drought alters the trophic role of an opportunistic generalist in an aquatic ecosystem. *Oecologia*, 189:3. 1–12. doi: 10.1007/s00442-019-04343-x

RESEARCH FUNDING

Application in Review

Australian Research Council, Discovery Project

"Exchange networks and social resilience across the last deglaciation."

Chief Investigators: A. Mackay and A. Dosseto

Role: Partner investigator

Duration: 2026-2030

Awarded

Percy Sladen Memorial Fund Grant. The Linnean Society. (United Kingdom)

"Escaping the heat: Unravelling the migratory connectivity of aestivating Bogong Moths *Agrotis infusa* in the Australian Alps through a multi-isotope framework."

Principle Investigator: Megan Reich

Funding: £2,000

Duration: 2024-2025

BayCenSI Stepping Stones funding. Bayreuth Center for Stable Isotope Research in Ecology and Biogeochemistry (Germany)

"Exploring the migratory patterns of the pioneer caper white (*Belenois aurota*) and the African migrant (*Catopsilia florella*) with stable isotopes."

Principle Investigator: Megan Reich
Funding: in-kind (isotopic analysis)
Duration: 2024

Ministerio de Ciencia, Innovación y Universidades, Proyectos de I+D+i (PID2023-152239NB-I00) (Spain)

"Genomic and epigenomic signatures of migration in butterflies (MIGRASPHERE)."

Principle Investigator: G. Talavera
Role: working team member
Funding: 242,500€
Duration: 2024-2027

Red de Parques Nacionales, Ministerio para la transición ecological y el reto demográfico (Spain)

"Seasonal migratory insect biodiversity in protected coastal areas: monitoring, connectivity and impact".

Principle Investigator: G. Talavera
Role: working team member
Funding: 117,600€
Duration: 2025-2028

Natural Resources Canada, E.I.S. Small Research Fund (Canada)

"Tracking insect outbreak expansion: using moth trapping, genomics, and stable isotopic analyses to validate and refine understanding and predictions of regional moth dispersal."

Principle Investigator: C. Bataille
Role: Postdoctoral researcher
Funding: C$580,000
Duration: 2023-2026

CSIC (LINKA20399) (Spain)

"An interdisciplinary scheme to advance in the field of ecology and evolution of insect migration."

Principle Investigator: G. Talavera
Role: working team member
Funding: 24,000€
Duration: 2022-2024

Ministerio de Ciencia e Innovación, Proyectos de I+D+i (PID2020-117739GA-I00) (Spain)
"Behavioral and ecological genomics of insect migration (ENTOMIGROME)."

Principle Investigator: G. Talavera
Role: working team member
Funding: 196000€
Duration: 2021-2024

STUDENT SUPERVISION and MENTORING

(* indicates students who are coauthors on published papers)

- Research advising: J. Stewart (Queen Mary University of London) *2024-present*
- Member of Review Panel for Confirmation of Candidature: R. Lownds (Western Sydney University) *2024*
- Mentorship of high school science project: E. Chiariello (Fox Lane High School) *2023-2025*
- Supervision of undergraduate thesis: E. Lindroos* (University of Ottawa) *2021-2022*
- Mentorship of undergraduate thesis: S. Ghouri* (University of Ottawa) *2020-2021*
- Mentorship of undergraduate thesis: M. Kindra* (University of Ottawa) *2019-2020*

TEACHING

Courses Taught

Part-time Professor, University of Ottawa, EVS1101 – Introduction to Environmental Sciences *Summer 2025*

- Delivered engaging online lectures for 143 students, incorporating online tools (e.g., Wooclap)
- Designed the class syllabus, quizzes, and examinations
- Addressed academic misconduct following university protocols

Guest Lectures

Guest lecturer, University of Ottawa, GEO 5144 – Isotope Mapping and Provenance Applications *Fall 2024*

- Lecture title: "Geolocation and source tracing with lead isotopes"

Teaching Assistantships

University of Ottawa, GEO5191 - Global Biogeochemical Cycles *Fall 2022*

- Marked laboratory reports on the carbon cycle based on box modelling with Insight Maker

University of Ottawa, BIO3333 - Entomology *Spring 2022*

- Guided students through the identification of insect families and the use of dichotomous keys
- Led students through experiments with bean beetles, Manduca sexta, and a cockroach dissection

University of Ottawa, GEO1111 - Introduction to Earth Systems *Spring 2019*

- Invigilated and marked exams; held office hours and answered student's questions

University of Ottawa, EVS3101 - Environmental Issues *Fall 2018*

- Guided students with the development of group projects on environmental issues; provided feedback on final presentations

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RESEARCH PRESENTATIONS

Conference Presentations (* presenter)

Reich, M.S.*, Talavera, G., Backström, N., Bataille, C.P. (May 2025). Assessing the Effects of Lead Exposure on the Flight Ability of Painted Lady Butterflies. Ontario Ecology Ethology Evolution Colloquium, Ottawa, Canada. [12 minute talk]

Reich, M.S.*, Ghouri, S., Talavera, G., Bataille, C. P. (July 2023). Isotope-based geographic assignment provides valuable insights into long-distance butterfly migration. Biology of Butterflies 2023, Prague, Czech Republic.

Talavera, G.*, Gorki, L., Toro-Delgado, E., López-Mañas, R., **Reich, M. S.**, Pascual-Díaz, J. P., García-Berro, A., Menchetti, M., Domingo-Marimon, C., Pierce, N. E., Vila, R., Suchan, T., Bataille, C. P. (July 2023). Migratory ecology and population dynamics of the Painted Lady butterfly, *Vanessa cardui*. Biology of Butterflies 2023, Prague, Czech Republic.

Ghouri, S.*, Talavera, G., **Reich, M. S.**, Bataille, C. P. (July 2023). Hydrogen and strontium isoscapes for the African Palearctic range to reconstruct insect migration and connectivity. Biology of Butterflies 2023, Prague, Czech Republic.

Bataille, C.P.*, **Reich, M.S.,** Hassler, A. (July 2023). Metals and their isotopes: An opportunity to study insect ecology and physiology. Goldschmidt 2023, Lyon, France.

Reich, M.S.*, Ghouri, S., Zabudsky, S., Talavera, G., Bataille, C.P. (April 2023). There and back again: Combining hydrogen and strontium isotopes refines the trans-Saharan migratory patterns of the butterfly *Vanessa cardui*. European Geosciences Union (EGU) General Assembly 2023, Vienna, Austria.

Talavera, G.*, Gorki, L., Toro-Delgado, E., López-Mañas, R., **Reich, M.,** Menchetti, M., Domingo-Marimon, C., Sáez, L., Pierce, N., Vila, R., Bataille, C., Suchan, T. (April 2023). Migration ecology in insects: integrative approaches to trace long-distance movements of the Painted Lady butterfly (*Vanessa cardui*). European Geosciences Union (EGU) General Assembly 2023, Vienna, Austria.

Reich, M.S.*, Shipilina, D., Talla, V., Bahleman, F., Khebe, K., Talavera, G., Bataille, C.P., Backström, N. (Nov 2022). Lack of population structure between trans-Saharan migrants for the butterfly *Vanessa cardui* revealed by hydrogen and strontium isotope-based geographic assignment and genomics. 2022 ESA, ESC, and ESBC Joint Annual Meeting, Vancouver, Canada. [20 minute talk]

Dargent, F.*, Benvidi, N., Candau, J-N., **Reich, M.S.,** Bataille, C.P. (Nov 2022). Dual sulfur-hydrogen assignment of a boreal pest species (*Choristoneura fumiferana*) using a novel foliar sulfur isoscape for eastern Canada. 2022 ESA, ESC, and ESBC Joint Annual Meeting, Vancouver, Canada.

Reich, M.S.*, Lindroos, E., Kindra, M.K., Dargent, F., Hu, L., Flockhart, D. T. T., Norris, D.R., Talavera, G., Kharouba, H.M., Bataille, C.P. (September 2022). Testing the assumptions of geolocation using metals and metal isotopes in insect wings. 159th Annual General Meeting of the Entomological Society of Ontario, Virtual Meeting. [12 minute talk]

Reich, M.S.*, Lindroos, E., Kindra, M.K., Dargent, F., Hu, L., Kharouba, H.M., Bataille, C.P. (June 2022). Are insect wings really 'inert'? Testing a core assumption of isotope-based geographic assignment. IsoEcol: 12th International Conference on the Applications of Stable Isotope Techniques to Ecological Studies, 2022, Gaming, Austria. [20 minute talk]

Reich, M.*, Flockhart, D. T. T., Norris, D. R., Hu, L., Bataille, C.P. (June 2021). Geographic assignment of monarch butterflies using strontium isotopes. 18th Annual Ottawa-Carleton Institute of Biology Symposium, 2021, Virtual Meeting. [12 minute talk]

Reich, M.*, Flockhart, D. T. T., Norris, D. R., Bataille, C.P. (Nov 2020). Combining strontium and hydrogen isotopes to estimate the provenance of monarch butterflies. Entomological Society of America Annual Meeting, 2020, Virtual Meeting. [10 minute talk]

Poster Presentations

Reich, M.S., Ghouri, S., López-Mañas, R., Suchan, T., Talavera, G., Bataille, C.P. (Jul 2024). Isotopic insights into the migratory patterns of the painted lady butterfly *Vanessa cardui* during an outbreak year. IsoEcol: 13th International Conference on the Applications of Stable Isotope Techniques to Ecological Studies, Fredericton, Canada. [Poster]

Reich, M., Flockhart, D. T. T., Norris, D. R., Hu, L., Bataille, C.P. (May 2021). Continuous-surface geographic assignment of monarch butterflies using strontium isotopes. IsoEcol: 11.5 International Conference on the Applications of Stable Isotope Techniques to Ecological Studies, 2021, Virtual Meeting. [Poster]

Reich, M., Flockhart, D. T. T., Norris, D. R., Bataille, C.P. (Aug 2020). Conservation of monarch butterflies using a novel strontium isotope geolocation tool. Ecological Society of America Annual Meeting, 2020, Virtual Meeting. [Poster]

Invited Presentations (* presenter)

Reich, M.S.* (Feb 2024). Multi-isotope geographic assignment for tracing the migratory connectivity of monarch butterflies. Trilateral Scientific Group Meeting on the Monarch Butterfly, Mexico City, Mexico: oral presentation

Reich, M.S.* (May 2022). Isotope tools for geolocation of migratory insects. 1st Meeting on Butterfly Migration, Barcelona, Spain: oral presentation

Reich, M.S.* (Feb 2021). Geographic assignment of migratory butterflies using hydrogen and strontium isotopes. International Day of Women and Girls in Science Seminar, Department of Earth and Environmental Sciences, University of Ottawa, Canada: oral presentation

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CONSERVATION and POLICY

Bogong Moth Summit, Canberra, Australia *Feb/25*

- Invited as part of the Bogong Watch Project Team to advise on isotope-based methods to map the Bogong moth migration with the intent of informing conservation activities for the recovery of the Bogong moth population

Trilateral Scientific Group Meeting on the Monarch Butterfly, Mexico City, Mexico *Feb/24*

- Invited as part of a Canadian delegation to Mexico to develop a science-based action plan for the recovery of the monarch butterfly, based on my expertise with respect to migration ecology

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PROFESSIONAL SERVICE

Committees and Associations

- Biology Graduate Student Association – Executive Member Councillor *2020-2022*
- Graduate Students Association des Étudiant.e.s Diplômé.e.s (GSAÉD)–Director *2020-2022*
- Informal Seminar Without A Name (ISWAN) – Organizer *2020-2021*
- GSAÉD Social Committee – Member *2020-2021*
- UBC Environmental Sciences Student Association – Executive Member *2011-2014*

Conference organization

ESA, ESC, and ESBC Joint Annual Meeting, Vancouver, BC, Canada *2022*

- Organized a member symposium: "Leveraging Isotopic Tools to Understand Insect Ecology"

Manuscript Peer-reviewing

- Russian Entomological Journal *2025*
- iScience *2024*
- Scientific Reports *2024*
- Proceedings of the Royal Society B *2023*
- Ecography *2022*
- Biological Journal of the Linnean Society *2022*
- Science of the Total Environment (2) *2021*

PROFESSIONAL EXPERIENCE

Research Experience

Postdoctoral Fellow, SAiVE lab with C. Bataille, Department of Biology, University of Ottawa, Canada *Jan/24-present*

- Collaboratively worked with the Canadian Forestry Service to use isotope geolocation to understand dispersal movements of an economically important forestry pest, eastern spruce budworm, *Choristoneura fumiferana*
- Developed and applied sulfur, strontium, hydrogen, and lead isotopes for insect geolocation

Visiting Fellow, lab of K. Umbers, School of Science, Western Sydney University, Australia *Feb/25-present*

- Mentored lab members in protocols for preparing insect and plant samples for isotopic analysis
- Conducted fieldwork in the Australian Alps, collecting aestivating Bogong moths, *Agrotis infusa,* for isotopic analysis to quantify migratory connectivity and locate important breeding areas

PhD Student, SAiVE lab with C. Bataille, Department of Biology, University of Ottawa, Canada *Sep/18-Jan/24*

- Created a strontium isoscape of eastern North America using random forest regression to trace the migratory patterns of the monarch butterfly, *Danaus plexippus*
- Explored the pathways of metal incorporation into insect wings through laboratory experiments
- Described the migratory patterns and connectivity of painted lady butterflies, *Vanessa cardui,* across the Sahara by leveraging hydrogen and strontium isotope-based geographic assignment
- Combined isotope-based phenotyping with whole-genome resequencing to detect panmixia in painted lady butterflies across the Sahara and no signature of selection on the genome with migratory distance

Visiting PhD researcher, lab of N. Backström, Department of Ecology and Genetics, Uppsala University, Sweden

- Tested the effect of host plant quality on the migratory ability of *V. cardui* using flight mill assays and differential gene expression analysis *Jan/23-Jun/23*
- Found that natural levels of Pb exposure do not have a detectable impact on the migratory ability of *V. cardui*

Assistant, Canadian Museum of Nature - Research Collection *May/19-Aug/19*

- Museum curation in the entomological collection (beetles)
- Specimen preparation and collection organization and labelling

Graduate Research Assistant, University of Guelph *Apr/18-June/18*

- Fieldwork for graduate thesis
- Collected over 155 *Asclepias* spp. (milkweed) samples from 22 states in the eastern USA
- Created a volunteer network to assist with sample collection

Research Assistant, PhytoInformatix *May/17-Sept/17*

- Performed pesticide screening trials and efficacy assessments in an agricultural setting

Field Coordinator in Nepal, Projects Abroad - Himalayan Mountain Conservation Project *Mar/16-Feb/17*

- Analyzed survey data and wrote monthly reports to the Annapurna Conservation Area Project; responsible for data management
- Led international volunteers in biological surveys of butterflies, birds, primates, mammals, and herpetological species using non-invasive methods (visual surveys and camera traps)
- Conducted volunteer feedback interviews, reported incidents, and created action plans

Field Assistant, University of British Columbia *Aug/15-Dec/15*

- Assisted PhD student in sampling aquatic insect ecosystems within bromeliads along an elevation gradient in Monteverde, Costa Rica to explore the potential effects of climate change on this system
- Assisted in carrying out ecological and physiological experiments

Work Experience

Greenhouse staff, University of Ottawa *Jan/21-Aug/22*

- Watering and monitoring of plants in the Department of Biology's research greenhouse

Water Literacy Coordinator, Fraser Riverkeeper/Swim Drink Fish Canada *Nov/17-Mar/18*

- Organized the 11th Annual Fraser River Clean-up, where 650 volunteers collected 12 tonnes of garbage from the riverbank
- Delivered water literacy presentations to schools and community groups to encourage sustainable use of our local waterbodies
- Managed social media accounts

British Columbia Tree Fruits Cooperative, Survey Technician *May/15-Aug/15*

- Evaluated 110,000 cherries for insect infestation using a dissecting microscope in order to fulfill the Government of Japan's survey requirements
- Extracted and assessed the quantity of plant-parasitic nematodes present in soil samples

Government of Canada - Internal Integrity and Security, Marketing & Communications Strategy Agent *Sept/14-Apr/15*

- Facilitated Security Awareness Week to increase security awareness of employees
- Organized an in-person focus session of managers and team leaders that reviewed policies and procedures to generate constructive feedback and recommendations, and create new user guides

Volunteering

Canadian Museum of Nature - Entomological Research Collection (*5 hours per week)* *2018-2020*

- Mount and label specimens, organize the collection, and perform other curatorial tasks

Girl Guides of Canada

- Unit Leader for the 16th Guides Ottawa (*3 hours per week*) *2018-2021*
  - Mentor girls aged 9-11 in games and activities to develop their leadership skills
  - Organize camping trips and community engagement activities
- Unit Leader for the 43rd Guides Vancouver (*3 hours per week*) *2011-2015*
  - Managed unit finances

MEDIA and OUTREACH

Science Journalism

Reich, M. (2021). "Strontium isotopes can map monarch butterfly migrations and help conservation efforts". The Conversation (Canada), September 28, 2021. Available at: https://theconversation.com/strontium-isotopes-can-map-monarch-butterfly-migrations-and-help-conservation-efforts-168031?utm_source=dlvr.it&utm_medium=twitter

Selected Media Coverage

Sheena Goodyear (Apr 2025). "Chasing butterflies around the globe changed this photographer's worldview." CBC Radio: As It Happens. https://www.cbc.ca/radio/asithappens/painted-lady-butterfly-migration-1.7515878

Jesse Greenspan (Apr 2025). "This Butterfly's Epic Migration Is Written into Its Chemistry." Scientific American. https://www.scientificamerican.com/article/this-butterflys-epic-migration-is-written-into-its-chemistry/

Alan Neal (Feb 2025). "The Odyssey of the Painted Lady Butterfly." CBC's All in a Day with Alan Neal, CBC Radio. https://www.cbc.ca/listen/live-radio/1-92-all-in-a-day/clip/16128076-the-odyssey-painted-lady-butterfly

Diego Sánchez Martínez (Aug 2024). "El misterio de las mariposas que aparecieron al otro lado del Atlántico." El País. https://elpais.com/clima-y-medio-ambiente/2024-08-26/el-misterio-de-las-mariposas-que-aparecieron-al-otro-lado-del-atlantico.html#?prm=copy_link

Taylor Nicioli. (July 2024). "How a group of butterflies flew 2,600 miles across the Atlantic Ocean without stopping." CNN Science. https://www.cnn.com/2024/07/01/science/painted-lady-butterfly-cross-oceans-scn

Andrew Carter. (July 2022). "The Andrew Carter Morning Show (Monday July 25, 2022)." The Andrew Carter Podcast, CJAD 800AM, iHeart Radio. https://omny.fm/shows/the-andrew-carter-morning-show/the-andrew-carter-morning-show-monday-july-25-2022

Nicole Chu. (Oct 2021). "Tracking isotopic "fingerprints" of monarch butterflies." Episode 92, Beats Research Radio, University of Ottawa Heart Institute. http://beatsresearch.com/Radio.php

David Frey. (Oct 2021). "Isotope mapping sheds light onto monarch journeys." The Wildlife Society. https://wildlife.org/isotope-mapping-sheds-light-onto-monarch-journeys/

Maryam Rana. (Sep 2021). "Monarch Butterflies: From strontium isotope mapping to migratory routes." The Fulcrum. https://thefulcrum.ca/sciencetech/monarch-butterflies-from-strontium-isotope-mapping-to-migratory-routes/

Classroom Visits

- Guest speaker to Lac La Hache Elementary School, Grade 1-2 *Jun/22 & May/23*
- Guest speaker to Scriber Lake High School *Feb/21 & Apr/21*

Skype a Scientist (virtual classroom visits)

- University of Houston, PED331- Science Teaching *Sep/22*
- University of Houston, EED3315-Effective Teaching Strategies: Science Education *Sep/22*
- Amana Academy, Grade 3 *Oct/21*

PROFESSIONAL SKILLS

Data analysis skills

- Expertise in spatial ecology and spatial modelling
- Expert in developing maps of isotopic variation ("isoscapes")
- Proficient with machine learning (e.g., random forest and ensemble machine learning)
- Experience with Bioinformatic Pipelines (whole-genome sequencing, RNA-seq)
- Experience with geometric morphometric analysis
- Confident with basic statistics (e.g., linear mixed models, PCA)

Computing skills

- Expertise in data analysis and visualization with R
- Experience with ArcGIS
- Experience with bash scripting and High-performance Computing
- Professional development:
    - Bioinformatics: Analysis of RNA-Sequencing Data, Compute Ontario *2024*
    - Introduction to High-Performance Computing, IT Solutions, University of Ottawa *2024*
    - Introduction to the UNIX/LINUX Commandline, Lund University *2020*
    - Python Workshop, IT Solutions, University of Ottawa *2020*
    - Programming in R Workshop, IT Solutions, University of Ottawa *2020*

Laboratory skills: Isotope Mass Spectrometry

- Extensive experience in geochemistry clean labs (UOttawa, Carleton University, UBC)
- Column chromatography (Sr, Pb, and Ca isotopes)
- Preparing organic samples for metal isotope analysis (Sr, Pb, Ca) and stable isotope analysis (S, H)
- Operating Multicollector Inductively Coupled Plasma Mass Spectrometers (MC-ICP-MS)
- Operating 8900 Triple Quadruple ICP-MS for trace element analysis
- Data quality control and analysis
- Professional development:
    - Spill Response Training, University of Ottawa *2019*
    - WHMIS 2015 - for laboratory workers *2018*

Laboratory skills: Behavioural Ecology

- Experience with rearing insects and butterfly husbandry
- Designing and executing behavioral assays (e.g., Flight mill assays of migratory capacity)

Field Ecology

- Professional development:
    - Remote First Aid & CPR/AED Level C, OFA Level 1 (expires: *Nov/27*)
    - Field Technician, Canadian Aquatic Biomonitoring Network (CABIN) *2017*
- Extensive international field experience and competence:
    - 2 months in the Australian Alps collecting moth samples
    - Multiple trips to Europe collecting butterfly samples (e.g., Portugal, Spain, Cyprus, Malta)
    - 2 weeks fieldwork in Morocco
    - 2.5 months in the USA collecting plant samples
    - 12 months in the Annapurna region, Nepal as an ecotourism field coordinator
    - 3.5 months in Monteverde, Costa Rica as a research assistant

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LANGUAGE

English (native language)

PROFESSIONAL SOCIETIES

- Moths and Butterflies Australasia *2024-2025*
- British Ecological Society – Student Member *2022-2024*
- Earth Science Women's Network *2022-2024*
- Entomological Society of Ontario - Student Member *2018-2024*
- Entomological Society of Canada - Student Member *2015-2022*
- Entomological Society of British Columbia - Student Member *2015-2019, 2022*
- Ecological Society of America - Student Member *2020*
- Entomological Society of America - Student Member *2016-2018, 2020*