Zachary G. MacDonald - Curriculum Vitae

Academic address:
La Kretz Center for California Conservation Science
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Highlights

- Published 18 articles (including 13 first or co-first author) in peer-reviewed journals; 5 articles in review; 12 articles under revision or in preparation
- Total of $726,871 (USD) of funding (using mean CAD-USD exchange rate for past decade):
    - Awarded $305,020 (USD) in personal scholarships, awards, and fellowships
    - Awarded $307,750 (USD) in personal research grants (all in the last 5 years)
    - Awarded $114,240 (USD) in collaborative research grants
- Currently hold a UCLA La Kretz Center for California Conservation Science Postdoctoral Fellowship
- Currently hold an NSERC Postdoctoral Fellowship
- Received University of Alberta's Graduate Student PhD Thesis Award for best thesis in the Faculty of Agriculture, Life, and Environmental Sciences, 2021/22
- Received the Faculty of Agriculture, Life, and Environmental Sciences' Silver Medal for academic excellence and service, University of Alberta
- Received the Hanski Prize for best student-led paper in animal ecology
- Articles in *Oecologia*, *Evolutionary Applications*, and *Heredity* featured on the journals' covers
- Invited member of the IUCN Species Survival Commission Butterfly and Moth Specialist Group
- Invited reviewer for 15 papers in 9 peer-reviewed journals
- Past instructor of a full-year undergraduate course at UCLA (Environment 180B/180C)
- Past assistant curator of the University of Alberta Dept. of Renewable Resources Wildlife Diversity and Ecology museum collection for two years (extensive entomological collection)

Professional positions

Postdoctoral Researcher, University of California, Los Angeles (UCLA) (2021/11 – present)
Advisors: Dr. H. Bradley Shaffer and Dr. Thomas Gillespie

Lecturer, University of California, Los Angeles (UCLA) (2022/09 – 2023/06)
Full year course: Environment 180B/180C Practicum in Environmental Science

Postdoctoral Researcher, University of Alberta (UofA) (2021/05 – 2021/09)
Advisor: Dr. Felix Sperling

Education

PhD, Conservation Biology, University of Alberta (2017/01 – 2021/05)
Advisors: Dr. Scott Nielsen, Mr. John Acorn
Committee members: Dr. Felix Sperling, Dr. Fangliang He

MSc, Conservation Biology, University of Alberta (2015/09 – 2017/01; switched to PhD)
Advisors: Dr. Scott Nielsen, Mr. John Acorn

BSc, Environmental and Conservation Sciences, University of Alberta (2011/09 - 2015/04)

Personal research grants

- (2023 – 2025) U.S. Fish and Wildlife research grant; Lange's and Mormon Metalmark Butterfly Conservation Genomics; Value: $100,000 (USD)
- (2023 – 2025) U.S. Fish and Wildlife research grant; Conservation Genomics of the Quino Checkerspot Butterfly; Value: $47,525 (USD)
- (2021 – 2024) California Conservation Genomics Project research grant; Value: $147,234 (USD)
- (2023) The Green Initiative Fund research grant; Los Angeles Habitat Connectivity; Value: $6,444.75 (USD)
- (2018 – 2020) Alberta Conservation Association Grants in Biodiversity; Alberta Conservation Association; Value: $9,380 (CAD)
- (2019) UofA Northern Research Award; UAlberta North (University of Alberta); Value: $4,220 (CAD)
- (2019) Northern Scientific Training Program research grant; Government of Canada; Value: $3,680 (CAD)

Collaborative research grants

- (2021-2024) Conservation Genomics of the Half-moon Hairstreak Butterfly (*Satyrium semiluna*). Contribution Agreement GC 1341, allocated in collaboration with Dr. Felix Sperling and the Wilder Institute/Calgary Zoo (Calgary Zoo Foundation); Value: $150,000 (CAD)

Fellowships, awards, and scholarships

- (2023 – 2025) NSERC Postdoctoral Fellowship; Natural Sciences and Engineering Research Council of Canada; Value: $115,000 (CAD)
- (2021 – 2022) UCLA La Kretz Postdoctoral Fellowship for California Conservation Science; Value: $74,000 (USD)
- (2021) Agriculture, Life, and Environmental Sciences (ALES) Graduate Student PhD Thesis Award; awarded to the single best dissertation in faculty for calendar year 2021; Value: $500 (CAD)
- (2018 – 2021) Alexander Graham Bell Canada Graduate Scholarship – Doctoral; Natural Sciences and Engineering Research Council of Canada; Value: $105,000 (CAD)
- (2018 – 2021) President's Doctoral Prize of Distinction; University of Alberta; Value: $21,600 (CAD)
- (2019) Hanksi Prize, awarded annually for best student paper in animal ecology; Editorial Board of Oecologia and Springer Nature Publishers; Value: $500 (USD)
- (2019/03) 1st place PhD oral presentation; R. E. Peter Biology Conference; Value: $100 (CAD)
- (2018) Canada-China Scholars' Exchange Program Senior Research Scholarship; Chinese Scholarship Council and Canadian Department of Foreign Affairs, Trade and Development Value: $8,000 (CAD)
- (2017) Queen Elizabeth II Graduate Scholarship – Doctoral; Province of Alberta; Value: $15,000 (CAD)

- (2016 – 2017) Walter H Johns Graduate Fellowship; University of Alberta; Value: $5,700 (CAD)
- (2016 – 2017) Alexander Graham Bell Canadian Graduate Scholarship – Master's; Natural Sciences and Engineering Research Council of Canada; Value: $17,500 (CAD)
- (2015 – 2016) Queen Elizabeth II Graduate Scholarship – Master's; Province of Alberta; Value: $10,800 (CAD)
- (2015 – 2016) NSERC Undergraduate Student Research Award; Natural Sciences and Engineering Research Council of Canada; Value: $4,500 (CAD)
- (2015) The Alberta Institute of Agrologists Medal; awarded to the graduating student with the highest academic standing in the faculty in fourth year; Alberta Institute of Agrologists and University of Alberta
- (2015) Travel Grant for undergraduate research; Entomological Society of Alberta; Value: $200 (CAD)
- (2015) Graham and Ethel Jones Memorial Scholarship; awarded to the student with the highest academic standing in the faculty in third year; Dept. of Resource Economics and Environmental Sociology, University of Alberta; Value: $2,000 (CAD)
- (2013 – 2015) 2 × Dean's List of Academic Excellence; University of Alberta
- (2012 – 2015) 3 × Jason Lang Scholarships; Province of Alberta; Value: $3,000 (CAD)
- (2012) First Class Standing Academic Excellence; University of Alberta

Publications

Articles published in peer-reviewed journals

MacDonald, Z.G., Dupuis, J.R., Glasier, J.R.N., Sissons, R., Moehrenschlager, A., Shaffer, H.B., and Sperling, F.A.H. (*In Press*) Genomic and ecological divergence support the recognition of a new species of endangered *Satyrium* butterfly (Lepidoptera, Lycaenidae). ZooKeys.

MacDonald, Z.G., Dupuis, J.R., Glasier, J.R.N., Sissons, R., Moehrenschlager, A., Shaffer, H.B., and Sperling, F.A.H. (2025) Whole-genome evaluation of genetic rescue: the case of a curiously isolated and endangered butterfly. Molecular Ecology, 34(4), e17657.

MacDonald, Z.G., Schoville, S., Escalona, M., Marimuthu, M.P., Nguyen, O., Chumchim, N., ... & Shaffer, H.B. (2024) A genome assembly for the Chryxus Arctic (*Oeneis chryxus*), the highest butterfly in North America. Journal of Heredity, esae051.

MacDonald, Z.G., Gillespie, T., Shaffer, H.B. (2024) The highest butterfly in North America, *Oeneis chryxus ivallda*. Frontiers in Ecology and the Environment: EcoPics, e2707.

Grether, G.F., Beninde, J., Beraut, E., Chumchim, N., Escalona, M., **MacDonald, Z.G.**, ... & Shaffer, H.B. (2023). Reference genome for the American rubyspot damselfly, *Hetaerina americana*. Journal of Heredity, 114(4), 385-394.

Roe, A.D., **MacDonald, Z. G.**, Snape, K.L., & Sperling, F.A. (2023) Genome-wide markers show continental structuring and mitonuclear discordance in the forest tent caterpillar (*Malacosoma disstria* Hübner) (Lepidoptera: Lasiocampidae). The Canadian Entomologist, 155, e26.

MacDonald, Z.G., Roe, A.D., Snape, K., Sperling, F.A.H. (2022) Host association, environment, and geography underlie genomic differentiation in a major forest pest. Evolutionary Applications, 15(11), 1749-1765.

Liu, J., **MacDonald, Z.G.**, Sic, X., Wud, L., Zenge, D., Huf, G., Dinge, P., Yue, P. (2022) SLOSS-based inferences in a fragmented landscape depend on fragment area and species–area slope. Journal of Biogeography, 49(6), 1075-1085.

Campbell, E.O.*, **MacDonald, Z.G.***, Gage, E.V., Gage, R.V., Sperling, F.A.H. (2022) Genomics and ecological modelling clarify species integrity in a confusing group of butterflies. Molecular Ecology, 31(8), 2400-2417. *** indicates co-first authorship**

Nelson, T.D.*, **MacDonald, Z.G.***, Sperling, F.A.H. (2022) Moths passing in the night: phenological and genomic divergences within a forest pest complex. Evolutionary Applications, 15(1), 166-180. *** indicates co-first authorship**

MacDonald, Z.G., Deane, D.C., Lamb, C.T., He, F., Acorn, J.H., Nielsen, S.E. (2021) Distinguishing effects of area *per se* and isolation from the sample-area effect for true islands and habitat fragments. Ecography, 44(7), 1051-1066.

MacDonald, Z.G., Dupuis, J.R., Davis, C.S., Acorn, J.H., Nielsen, S.E., Sperling, F.A.H. (2020) Gene flow and climate-associated genetic variation in a vagile habitat specialist. Molecular Ecology, 29(20), 3889-3906.

Sperling, J., **MacDonald, Z.G.**, Normandeau, J., Merrill, E., Sperling, F., Magor, K. (2020) Within-population diversity of bacterial microbiomes in winter ticks (*Dermacentor albipictus*). Ticks and Tick-borne Diseases, 101535.

MacDonald, Z.G., Acorn, J.H., Zhang, J., Nielsen, S.E. (2019) Perceptual range, perceptual ability, and visual habitat detection by greater fritillary butterflies. Journal of Insect Science, 19(4), 1-10.

MacDonald, Z.G., Anderson, I.D., Acorn, J.H., Nielsen, S.E. (2018) The theory of island biogeography, the sample-area effect, and the habitat diversity hypothesis: complementarity in a naturally fragmented landscape of lake islands. Journal of Biogeography, 45, 2730-2743.

MacDonald, Z.G., Anderson, I.D., Acorn, J.H., Nielsen, S.E. (2018) Decoupling habitat fragmentation from habitat loss: butterfly species mobility obscures fragmentation effects in a naturally fragmented landscape of lake islands. Oecologia, 186(1), 11-27.
Cover article and awarded **Hanski Prize** for best student-led paper in animal ecology

MacDonald, Z.G., Nielsen, S.E., Acorn, J.H. (2017) Negative relationships between species richness and evenness render common diversity indices inadequate for assessing long-term trends in butterfly diversity. Biodiversity and Conservation, 26(3), 617-629.

Articles in review

MacDonald, Z.G., Simberloff, D., Acorn, J.A.H., and Shaffer, H.B. (*In Review*) The failure of ecological integrity as a guiding conservation principle. Manuscript submitted for publication, Conservation Biology.

MacDonald, Z.G.*, Beninde, J.*****, Matsunaga, K. Zhou, B., Gillespie, T.W., Shaffer, H.B. (*In Review*) Species distribution modeling for conservation science: new predictor layers, reproducible code, and evaluation of California protected areas. Manuscript submitted for publication, Diversity and Distributions. *** indicates co-first authorship**

MacDonald, Z.G., Schoville, S., Escalona, M., Marimuthu, M.P., Nguyen, O., Chumchim, N., ... & Shaffer, H.B. (*In Review*) The largest butterfly genome yet sequenced: The Sierra Nevada Parnassian (*Parnassius behrii*) and a review of butterfly genome sizes. Manuscript submitted for publication, Journal of Heredity.

Curti, J.N., **MacDonald, Z.G.**, Benham, P.M., Bowie, R.C.K., Delaney, K.S., Harrigan, R.J., Lohmueller, K.E., Riley, S.P.D., Shultz, A.J., Wayne, R.K., & Shaffer, H.B. (*In Review*). Why didn't the quail cross the road? Using whole-genome data to evaluate roadways as barriers to gene flow in a North American ground-dwelling bird. Manuscript submitted for publication, Molecular Ecology.

Keating, E.L., Glasier, J., Burns, L., Dupuis, J., Haines, L., Hébert, L., Henault, J., Heron, J., Linton, J., **MacDonald, Z.G.**, Sperling, F.A.H., & Sissons, R. (*In Review*) Assembling a structured decision-making rapid prototyping toolkit. Manuscript submitted for publication, Conservation Science and Practice. CSP2-24-0500.

Peer-reviewed book chapters

MacDonald, Z.G., Shaffer, H.B., Sperling, F.A.H. (2024) Impacts of land use and climate change on natural populations: the butterfly perspective. Chapter 8 In: Cork, S., Whiteside, D. (eds.) Case Studies in Eco Health. 5m Publishing, Sheffield, U.K.

Invited articles (not peer-reviewed)

Sperling, F.A.H., Sperling, W.A., **MacDonald, Z.G.** (2020) Canadian alpine butterflies deserve better monitoring. The Alpine Club of Canada's State of the Mountains Report, Volume 3, July 2020.

MacDonald, Z.G. (2018) The third generation of naturalists. Nature Alberta Magazine, 47(4). 25-28.

MacDonald, Z.G., Acorn, J.H., Nielsen, S.E. (2017) Using lake islands as natural models to resolve relationships between habitat fragmentation and butterfly diversity. Newsletter of the Biological Survey of Canada, 35(1), 6-9.

Online resources (not peer-reviewed)

MacDonald, Z.G. (2022) North America's highest butterfly. Online educational video for Vermont Center for Ecostudies.

MacDonald, Z.G. (2022) Conservation genomics of the highest butterflies in North America. California Conservation Genomics Project promotional video.

Acorn, J.H., **MacDonald, Z.G.** (2018) Outside the Visible: An Inside Look. Online educational video.

MacDonald, Z.G. (2015) Species identification pages for: *Enallagma annexum; Enallagma boreale; Enallagma erbium; Enallagma hageni*. E. H. Strickland Entomological Museum—virtual museum; University of Alberta Museums and Collections.

Acorn, J.H., **MacDonald, Z.G.** (2014) Net Benefits. eButterfly online educational video.

Acorn, J.H., **MacDonald, Z.G.** (2014) You Don't Have to Know the Species. eButterfly online educational video.

Invited seminars

MacDonald, Z.G., Dupuis, J.R., Glasier, J.R.N., Sissons, R., Moehrenschlager, A., Shaffer, H.B., and Sperling, F. A. H. (2024) Whole-genome evaluation of genetic rescue: the case of a curiously isolated and endangered butterfly. Parks Canada Eco Webinar; invited remote seminar for all National Parks in Canada.

MacDonald, Z.G. (2024) Unifying landscape ecology and population genomics for insect conservation. Invited in-person seminar at the Department of Entomology, Cornell University, Ithaca, USA.

MacDonald, Z.G. (2024) Unifying landscape ecology and population genomics for butterfly conservation. Invited in-person seminar at the McGuire Center for Lepidoptera and Biodiversity, University of Florida, Gainesville, USA.

MacDonald, Z.G. (2024) Applications of species distribution modeling in conservation genomics; Vrije Universiteit Amsterdam; invited remote seminar.

MacDonald, Z.G., Shaffer, H.B. (2024) Conservation genomics of the endangered Quino Checkerspot. Invited in-person seminar at the Butterfly Conservation Conference; San Diego Zoo, San Diego, USA.

Conference presentations (seven omitted for brevity)

MacDonald, Z.G., Dupuis, J.R., Glasier, J.R.N., Sissons, R., Moehrenschlager, A., Shaffer, H.B., and Sperling, F. A. H. (2024) Whole-genome evaluation of genetic rescue: the case of a curiously isolated and endangered butterfly. Conference presentation at the Ecological Society of America Meeting, Long Beach, USA.

MacDonald, Z.G., Deane, D.C., Lamb, C.T., He, F., Acorn, J.H., Nielsen, S.E. (2021) Messages from island butterflies: distinguishing effects of habitat area and isolation from the sample-area effect. Conference presentation at the Entomological Society of Canada, Virtual Meeting.

MacDonald, Z.G., Dupuis, J., Acorn, J.H., Nielsen, S.E., Sperling, F.A.H. (2019) Gene flow and hierarchical population structure within a butterfly metapopulation (*Papilio machaon dodi*). Conference presentation at the R. E. Peter Biology Conference, Edmonton, Canada.
Awarded best PhD presentation at conference.

MacDonald, Z.G., Acorn, J.H., Nielsen, S.E. (2017) Applications of insular biogeography to the conservation of terrestrial biodiversity. Conference presentation at the North American Forest Ecology Workshop, Edmonton, Canada.

MacDonald, Z.G., Acorn, J.H., Nielsen, S.E. (2017) Decoupling habitat fragmentation from habitat loss: Butterfly assemblages on lake islands support the habitat amount hypothesis. Conference presentation at the Canadian Society of Ecology and Evolution Meeting, Victoria, Canada.

MacDonald, Z.G., Acorn, J.H., Nielsen, S.E. (2016) Beyond island biogeography: spatial patterns of butterfly diversity support the habitat amount hypothesis. Conference presentation at the Entomological Society of Alberta General Meeting, Calgary, Canada.

MacDonald, Z.G., Acorn, J.H., Nielsen, S.E. (2016) Decoupling habitat fragmentation from habitat loss: butterfly assemblages on lake islands demonstrate scale-dependent relationships to fragmentation. Conference presentation at the R. E. Peter Biology Conference, Edmonton, Canada.

MacDonald, Z.G., Nielsen, S.E., Acorn, J.H. (2015) Measuring diversity within butterfly communities: a matter of richness and abundance. Conference presentation at the Entomological Society of Alberta General Meeting, Jasper, Canada.

MacDonald, Z.G. The birds of Cuba: passive passerine preservation (2014) Invited seminar at the Agriculture, Life, and Environmental Sciences International Symposium, Edmonton, Canada.

Teaching, mentorship, and curation

Instructor

- (2023) Practicum in Environmental Science (Environment 180B/180C); Instructor for full-year undergraduate course, University of California, Los Angeles (UCLA) (50% classroom and 50% field components)

Teaching assistant

- (2017 & 2018) Parks, Ecology, and Society; Graduate Teaching Assistant; University of Alberta
- (2017) Wildlife Biodiversity and Ecology; Lead Graduate Teaching Assistant; University of Alberta
- (2016) Parks, Ecology, and Society; Graduate Teaching Assistant; University of Alberta
- (2016) Wildlife Biodiversity and Ecology; Lead Graduate Teaching Assistant; University of Alberta
- (2015) Parks, Ecology, and Society; Graduate Teaching Assistant; University of Alberta

Curation

- (2017 & 2018) Assistant curator of the Dept. of Renewable Resources Wildlife Diversity and Ecology museum collection; University of Alberta
- (2015-2021) Researcher and volunteer at the E.H. Strickland Entomological Museum; University of Alberta

Field courses

- (2023) Practicum in Environmental Science (Environment 180B/180C); Instructor for full-year undergraduate course, University of California, Los Angeles (UCLA) (50% classroom and 50% field components)
- (2018) Guest instructor in Environmental and Conservation Sciences Field School (REN R 465) "Field methods in conservation biology" (three days of instruction in remote field settings); University of Alberta
- (2017) Guest instructor in Environmental and Conservation Sciences Field School (REN R 465) "Field methods in conservation biology" (four days of instruction in remote field settings); University of Alberta

Guest lectures

- (2024) Guest presenter in a Species Distribution Modeling workshop; "Adventures in SDMing" (75 minutes); Vrije Universiteit Amsterdam
- (2024) Guest lecturer in Upper Division Ecology (EEB 122); "Conservation genomics of fragmented populations" (75 minutes); University of California, Los Angeles (UCLA)
- (2022) Guest lecturer in Graduate Research Seminar (EEB 297 section 2); "Spatial analyses and species distribution modelling in R" (120-minute seminar); University of California, Los Angeles (UCLA)
- (2019) Guest lecturer in Wildlife Biodiversity and Ecology (REN R 205); "Philosophy of ecology and conservation" (180-minute lecture); University of Alberta
- (2018) Guest lecturer in Wildlife Biodiversity and Ecology (REN R 205); "History and philosophy of science" (180-minute lecture); University of Alberta
- (2017) Guest lecturer in Parks, Ecology, and Society (REN R 462/766); "Environmental ethics and the idea of wilderness" (90-minute lecture); University of Alberta
- (2016) Guest lecturer in Wildlife Biodiversity and Ecology (ENCS 201) "Measuring biological diversity" (180-minute lecture); University of Alberta
- (2016) Guest lecturer in Parks, Ecology, and Society (REN R 462/766); "On the extension of ethics to wilderness" (90-minute lecture); University of Alberta

Mentorship experience

- (2024 – 2025) Undergraduate thesis advisor; Kentaro Matsunega; University of California, Los Angeles
- (2023 – present) Organizer and leader of the La Kretz Undergraduate Species Distribution Modelling Group; University of California, Los Angeles
- (2022 – 2023) Undergraduate thesis advisor; Sasha Vagramov; University of California, Los Angeles
- (2019 – 2020) Undergraduate research project advisor; Marianne Legare-Matte (BIOL 399); University of Alberta
- (2018 – 2020) Undergraduate thesis advisor; Aidan Sheppard (REN R 499); University of Alberta
- (2016 – 2017) Undergraduate thesis advisor; Amy Carruthers (REN R 499); University of Alberta
- (2011 – 2014) High performance tennis program coach and tournament coordinator; St. Albert Tennis Club (head tennis professional) and Tennis Alberta (Little Aces program coach)

Community outreach and volunteer activities

- (2024) Invited presenter; UCLA La Kretz donor event; UCLA
- (2023) Invited presenter; UCLA La Kretz public lecture; UCLA
- (2022) Butterfly walk leader; UCLA biodiversity outreach; Stunt Ranch Field Station
- (2022) Leader of the Yosemite Annual Butterfly Count; North American Butterfly Association; Yosemite National Park
- (2020) Invited lecturer; Family Nature Nights; Devonian Botanical Gardens
- (2018) Invited lecturer; Communist Party of China—Students of Ecology and Evolution
- (2018) Invited lecturer; Edmonton Nature Club public lecture series; Edmonton Nature Club
- (2017) Invited lecturer and event coordinator; Nature Alberta Family Nature Nights; Nature Alberta
- (2016 – 2017) Three times invited lecturer; Edmonton Lifelong Learners Association
- (2014 – 2015) Weekly Interpretive/Nature Walk leader; Environmental and Conservation Sciences Student Association and The Magpie Club
- (2013 – 2015) Vice President; Environmental and Conservation Sciences Student Association
- (2013 – 2015) Volunteer Tennis Instructor; Little Aces—Tennis Alberta
- (2014) Student Volunteer; one week; University of Alberta Alternative Reading Week: Cuba
- (2013) Volunteer research staff/community outreach; two weeks; Marine Conservation Cambodia

Press

- Scientists Look to a Rare Butterfly's Next of Kin; Article published by *Bay Nature*; March 2024
- The Highest Butterfly in North America Recorded. Article published by *e-Butterfly*; March 2024
- UCLA researchers take lead in genetics study of California's native species. Article published in *Daily Bruin*; February 2023
- Geneticists are advancing the cause of conservation. Article published in *LA Times*; January 2023
- Butterfly Effect: Monitoring butterflies could help scientists understand rapidly changing alpine environments. Article published in *University of Alberta Alumni Magazine*; December 2020
- Butterflies are 'sentinels' of climate change in mountain ecosystems, say researchers. Article published in *Folio*; September 2020
- Butterfly Vision. Article published in *Science World Magazine*; Scholastic; January 20, 2020; Vol 76 No. 6; ISSN 1041-1410
- The Eyes Have It: How Butterflies Navigate to Suitable Habitat. Article published in *Entomology Today*; Entomological Society of America; July 2019
- Island Butterflies. Article published in *Westend Weekly*; August 2016

Courses and workshops recently completed

University calendar courses

- EEB 297 – Species Distribution Modelling (University of California, Los Angeles, fall/winter, 2022, audit)
- BIOL 633 – Bioinformatics (University of Alberta, fall, 2018, credit)
- REN R 604 – Graduate Research Seminar (University of Alberta, winter, 2017, credit)
- BIOL 380 – Genetic Analysis of Populations (University of Alberta, winter, 2017, audit)
- BIOL 592 – Laboratory Techniques in Molecular Ecology and Systematics (University of Alberta, winter, 2017, A+)
- BIOL 571 – Landscape Ecology and Applications (University of Alberta, winter, 2016, A)
- ENT 527 – Advanced Terrestrial Arthropod Diversity (University of Alberta, fall, 2015, A+)
- REN R 603 – Graduate Research Skills (University of Alberta, fall, 2015, credit)

- REN R 711 – Experimental Design and Data Analysis in Environmental Sciences (University of Alberta, fall, 2015, A+)

Workshops completed

- Elevate Your Communication Skills: An Introduction to the ABT Framework (winter, 2024)
- UCLA Research Mentor Training (University of California, Los Angeles, spring, 2023)
- UCLA Equity, Diversity, and Inclusion in Mentorship (University of California, Los Angeles, spring, 2023)
- Eukaryotic Genome Assembly Using PacBio and Hi-C (Wellcome Sanger Institute, fall, 2022)
- Population genomic inference from low-coverage whole-genome sequencing data (Cornell University & Imperial College London, fall, 2020)
- UCLA/La Kretz Conservation Genomics Workshop (University of California, Los Angeles, spring, 2019)
- Introduction to Species Distribution Modelling (summer, 2018, Peking University & ETH Zurich)
- Introduction to Bayesian mixed models (winter, 2018, Highland Statistics)
- Landscape Genetics – Distributed Graduate Seminar (winter, 2017, University of Alberta)

Certificates

- Standard First Aid
- Wilderness First Aid
- Avalanche Safety Training Level 1 – Alpine Club of Canada
- Safety in Ski Mountaineering – Alpine Club of Canada
- Electrofishing Crew Leader certificate – University of Alberta

Work experience

- (2015) Undergraduate researcher; Applied Conservation Ecology Lab, University of Alberta
- (2014) Research intern; Beaverhill Bird Observatory
- (2011 – 2014) Head tennis professional; St. Albert Tennis Club
- (2010) Tournament/junior performance coordinator; Tennis Alberta

Professional memberships

- IUCN SSC Butterfly and Moth Specialist Group; IUCN Species Survival Commission
- Entomological Society of America
- Ecological Society of America
- Canadian Society for Ecology and Evolution
- Nature Alberta
- Entomological Society of Alberta
- The Lepidopterists' Society