

## *Curriculum Vitae*

Canadian Centre for Evidence-Based Conservation  
Department of Biology and Institute of Environmental and Interdisciplinary Science  
Carleton University, Ottawa, ON, Canada  
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### UNIVERSITY EDUCATION

- Ph.D.** Carleton University, Ottawa, ON  
Biology Sept 2007 – Aug 2012
- Supervisor: Dr. Lenore Fahrig
  - Dissertation Title: The effects of species behavioural responses to roads and life history traits on their population level responses to roads
- M.Sc.** Carleton University, Ottawa ON  
Biology Sept 2004 – Apr 2006
- Supervisor: Dr. Lenore Fahrig
  - Thesis Title: The effect of road density on white-footed mice (*Peromyscus leucopus*) relative abundance in rural and urban landscapes in eastern Ontario
- B.Sc. with Honours** Cape Breton University, Sydney NS  
Biology Sept 2000 – Apr 2004
- Supervisor: Dr. David McCorquodale
  - Thesis Title: Plant use by native and non-native lady beetles (Coccinellidae) in Cape Breton Island, Nova Scotia
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### RESEARCH/FIELD EXPERIENCE

- Research Associate**, Carleton University Sept 2016-present  
Ottawa, ON
- Involved in conducting a number of systematic reviews and other evidence syntheses with the Canadian Centre for Evidence-Based Conservation. Systematic reviews are focused on evaluating: (1) the extent to which different types of fish removal activities targeted towards non-native species are effective; (2) the consequences of fish entrainment and impingement associated with hydroelectric dams on fish productivity; (3) the impacts of flow regime changes on fish productivity in temperate regions; (4) the effectiveness of spawning habitat creation or enhancement for substrate spawning temperate fish, (5) the effectiveness of captive breeding programs for freshwater SAR

fish and mussels at achieving conservation targets; and (6) the performance of fish passage facilities (including culverts) for fish movement in fragmented systems.

**Research Associate**, Carleton University  
Ottawa, ON

Sept 2015-Feb 2016

- Wrote a paper, collaborating with an international group of co-authors on the effectiveness of road mitigation measures at reducing road-kill.

**Contract Biologist**, Alterra, Wageningen University and Research Centre  
Wageningen, The Netherlands

Dec 2014-Jun 2015

- Conducted a comprehensive meta-analysis to assess the use and effectiveness of mitigation measures intended to decrease road related impacts on wildlife.

**Contract Biologist**, Eco-Kare International  
Ottawa, ON

July 2014

- Wrote a summary section on monitoring mitigation structure effectiveness for amphibians and reptiles. Summary included information on: knowledge gaps, general guidelines for study design, and adaptive management. The piece was included in a draft report entitled "Best Management Guidance Document for Mitigation of Road Effects on Species at Risk Amphibians and Reptiles in Ontario" submitted to Ministry of Natural Resources.

**Post-doctoral Fellow**, Carleton University  
Ottawa, Canada

June 2014-May 2015

- Wrote a publication on the influence of traffic mortality on forest bird abundance using data collected from an MSc thesis.
- Wrote a publication on predation release as the cause of small mammal positive responses to roads using data collected from an MSc thesis.
- Conducting a literature review of the use and effectiveness of road mitigation measures intended to decrease road related impacts on wildlife.

**Contract Biologist**, Canadian Wildlife Service (Ontario region)  
Ottawa, Canada

2014 (Feb-Apr)

- Conducted a literature review and summary report of road effect studies on Cerulean Warblers and other avian species.
- Wrote a report describing survey design options and recommendations for a road effects study on Cerulean Warblers in Ontario.

**Contract Biologist**, University of Melbourne  
Victoria, Australia

Dec 2013-May 2014

- Wrote a paper, collaborating with an international group of co-authors in setting out the need for and standards of using road mitigations as experiments.

**Research Associate**, Carleton University  
Ottawa, ON

Sept 2013-Jan 2014

- Wrote a publication on the effect of roads on painted turtle populations using data collected from an MSc thesis.

**Contract Biologist**, Concordia University  
Montreal, QC

Dec 2012- Jan 2013

- Developed an individual based simulation model (and manual) of population dynamics in a fragmented landscape which can be used to generate predictions concerning various landscape and/or road ecology issues.

**Graduate Student**, Carleton University  
Ottawa, ON

2008-10

- Conducted field work involving footprint tracking of mammals of various body sizes (small mammals to black bear) to obtain relative abundance estimates.
- Conducted vegetation surveys to determine mammal habitat associations.
- Organized and managed two undergraduate research assistants in the field.

**Crew Leader/Research Ecologist**, University of New Brunswick  
Fundy National Park, NB

2006-07

- Organized and managed a research crew of 4-7 researchers for a long-term study of the population dynamics of the northern flying squirrel in relation to habitat fragmentation.
- Conducted field work involving trapping, radio-tracking and translocation of flying squirrels, and collected general demographic information (e.g., age, sex, weight, reproductive status etc.).

**Contract Biologist**, Agriculture Canada (sub-contract from Adam Smith) 2007 (Mar-Apr)  
Ottawa, ON

- Conducted a literature review and compiled a database of life history traits and habitat threshold information for 320 species of farmland birds.

**Contract Biologist**, Aquila Conservation & Environment Consulting 2007 (Feb-Mar)  
(sub-contract from David Anthony Kirk), Ottawa, ON

- Compiled information on the risks and benefits of agroforestry on biodiversity used to create a document synthesizing the scientific literature relevant to potential effects of agroforestry and afforestation on biodiversity in the Prairie Provinces of Canada for Ducks Unlimited Canada.

**Graduate Student**, Carleton University  
Ottawa, ON

2005

- Conducted field work involving live trapping, handling and footprint tracking of small mammals to obtain relative abundance estimates.
- Conducted vegetation surveys to determine small mammal habitat associations.
- Organized and managed six undergraduate research assistants in the field.

**Research Assistant**, Cape Breton University  
Sydney, NS

2003 (summer)

- Conducted field work involving sweep netting and identification of lady beetles, and plants to determine plant use by lady beetles in disturbed habitats on Cape Breton Island.

**Volunteer Atlasser**, Nova Scotia Herpetofaunal Atlas Project  
Cape Breton, NS

2003 (spring)

- Conducted visual and call surveys to map the distribution and status of Nova Scotia's reptiles and amphibians.

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## PUBLICATIONS IN REFEREED JOURNALS

(as of Feb 2019)

Harrison PM, Martins EG, Algera DA, **Rytwinski T**, Mossop B, Leake AJ, Power M, Cooke SJ (2019) Turbine entrainment and passage of potadromous fish through hydropower 1 dams: developing conceptual frameworks and metrics for moving beyond turbine 2 passage mortality. *Fish and Fisheries* 00:000 (online: <https://doi-org.proxy.library.carleton.ca/10.1111/faf.12349>).

**Rytwinski T**, Taylor JJ, Donaldson LA, Britton JR, Browne D, Gresswell RE, Lintermans M, Prior K, Pellatt MG, Vis C, Cooke SJ (2018) The effectiveness of non-native fish removal techniques in freshwater ecosystems: a systematic review. *Environmental Reviews* 00:000 (online: <https://doi.org/10.1139/er-2018-0049>).

Haddaway NR, **Rytwinski T** (2018) Meta-analysis in not an exact science: call for guidance on quantitative synthesis decisions. *Environment International* 114:357-359 (online: <https://doi.org/10.1016/j.envint.2018.02.018>)

Cooke SJ, Rous AM, Donaldson LA, Taylor JJ, **Rytwinski T**, Prior KA, Smokorowski KE, Bennett JR (2018) Evidence-Based Restoration in the Anthropocene – From Acting with Purpose to Acting for Impact. *Restoration Ecology* 26:201-205 (online: DOI: 10.1111/rec.12675).

Taylor JJ, **Rytwinski T**, Bennett JR, Cooke SJ (2017) Lessons for introducing stakeholders to Environmental Evidence Synthesis. *Environmental Evidence* 6:26 (online: DOI 10.1186/s13750-017-0105-z).

Cooke SJ, Birnie-Gauvin K, Lennox RJ, Taylor JJ, **Rytwinski T**, Rummer JL, Franklin CE, Bennett JR, Haddaway NR (2017) How experimental biology and ecology can support evidence-based decision-making in conservation: Avoiding pitfalls and enabling application. *Conservation Physiology* 5:1 (online: DOI 10.1093/conphys/cox043).

- Rytwinski T**, Taylor JJ, Bennett JR, Smokorowski, KE, Cooke SJ (2017) What are the impacts of flow regime changes on fish productivity? A systematic map protocol. *Environmental Evidence* 6:13 (online: DOI 10.1186/s13750-017-0093-z).
- Rytwinski T**, Algera DA, Taylor JJ, Smokorowski, KE, Bennett JR, Harrison PM, Cooke SJ (2017) What are the consequences of fish entrainment and impingement associated with hydroelectric dams on fish productivity? A systematic review protocol. *Environmental Evidence* 6:8 (online: DOI 10.1186/s13750-017-0087-x).
- Taylor JJ, **Rytwinski T**, Bennett JR, Smokorowski, KE, Cooke SJ (2017) The effectiveness of spawning habitat creation or enhancement for substrate spawning temperate fish: a systematic review protocol. *Environmental Evidence* 6:5: (online: DOI 10.1186/s13750-017-0083-1).
- Rytwinski T**, Soanes K, Jaeger J A G, Fahrig L, Findlay C S, Houlihan J, van der Ree R, van der Grift E A (2016) How effective is road mitigation at reducing road-kill? A meta-analysis. *PLOS one* 11: (online: DOI: 10.1371/journal.pone.0166941).
- Downing RJ, **Rytwinski T**, Fahrig L (2015) Positive Effects of Roads on Small Mammals: A Test of the Predation Release Hypothesis. *Ecological Research* 30:651–662.
- Rytwinski T**, van der Ree R, Cunnington G, Fahrig L, Findlay S, Houlihan J, Jaeger JAG, Soanes K, van der Grift EA (2015) Experimental Study Designs to Improve the Evaluation of Road Mitigation Measures for Wildlife. *Journal of Environmental Management* 154:48-64.
- Jack J, **Rytwinski T**, Fahrig L, Francis, CM (2015) Influence of traffic mortality on forest bird abundance. *Biodiversity and Conservation* 24:1507-1529.
- Dorland A, **Rytwinski T**, Fahrig L (2014) Do Roads Reduce Painted Turtle (*Chrysemys picta*) Populations? *PLOS one* (online: DOI: 10.1371/journal.pone.0098414)
- Pfeifer, M., Lefebvre, V., Gardner, T., Baeten, L., Banks-Leite, C., Barlow, J., Betts, M., Brunet, J., Cerezo, A., Cisneros, L., Collard, S., d’Cruze, N., da Silva Motta, C., Duguay, S., Eggermont, H., Eigenbrod, F., Hadley, A., Hanson, T., Hawes, J., Heartsill Scalley, T., Klingbeil, B., Kolb, A., Kormann, U., Kumar, S., Lachat, T., Lakeman Fraser, P., Lantschner, V., Laurance, W., Lens, L., Marsh, C., Medina-Rangel, G., Melles, S., Mezger, D., Overall, W., Owen, C., Peres, C., Phalan, B., Pidgeon, A., Pilia, O., Possingham, H., Possingham, M., Raheem, D., Ribeiro, D., Robinson, R., Robinson, W., **Rytwinski, T.**, Scherber, C., Slade, E., Somarriba, E., Stouffer, P., Struebig, M., Tylianakis, J., Tschardtke, T., Tyre, A., Urbina Cardona, J., Vasconcelos, H., Wells, K., Willig, M., Wood, E., Young, R., Bradley, A., Ewers, R (2014) BIOFRAG – A new database for analysing biodiversity responses to forest fragmentation. *Ecology and Evolution* (online: <http://onlinelibrary.wiley.com/doi/10.1002/ece3.1036/full>)

**Rytwinski T**, Fahrig L (2013) Why are some animal populations unaffected or positively affected by roads? *Oecologia* (online: DOI 10.1007/s00442-013-2684-x)

**Rytwinski T**, Fahrig L (2012) Do species life history traits explain population responses to roads? A meta-analysis. *Biological Conservation* 147:87–98

**Rytwinski T**, Fahrig L (2011) Reproductive rates and body size predict road impacts on mammal abundance. *Ecological Applications* 21:589–600

Fahrig L, **Rytwinski T** (2009) Effects of roads on animal abundance: an empirical review and synthesis. *Ecology and Society* 14:21, (online: <http://www.ecologyandsociety.org/vol14/iss1/art21/>)

**Rytwinski T**, Fahrig L (2007) Effect of road density on abundance of white-footed mice. *Landscape Ecology* 22:1501–1512

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## BOOK CHAPTERS

Taylor JJ, **Rytwinski T**, Bennett JR, Cooke SJ (2018) Lessons for introducing stakeholders to Environmental Evidence Synthesis. In: Haddaway N, Crowe S (eds). *Stakeholder engagement in systematic reviews and maps*. Mistra EviEm, Stockholm, Sweden, (online: <http://www.biomedcentral.com/collections/SESRM?SkipCache=true>).

**Rytwinski T**, Fahrig L (2015) The impacts of roads and traffic on terrestrial animal populations. In: van der Ree R, Smith, D, Grilo C (eds). *Handbook of Road Ecology*. John Wiley & Sons, Oxford.

van der Ree R, Jaeger JAG, **Rytwinski T**, van der Grift E (2015). Good science and experimentation are needed in road ecology. In: van der Ree R, Smith, D, Grilo C (eds). *Handbook of Road Ecology*. John Wiley & Sons, Oxford.

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## Other Publications

**Rytwinski T**, Taylor JJ, Donaldson LA, Bennett JR, Hinch SG, Cooke SJ (2018) Do fish passage facilities and culverts promote fish movement at barriers? A systematic review protocol. *Open Science Framework* (online: DOI 10.17605/OSF.IO/XVZBF)

**Rytwinski T** (2014) Literature review and survey design recommendations for a road effects study on Cerulean Warblers in Ontario. Final Report. Canadian Wildlife Service, Ontario Region.

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## PRESENTATIONS/CONFERENCES/SEMINARS/WORKSHOPS

- Department of Fisheries and Ocean Canada Science national peer review meeting to develop science advice the effectiveness of spawning habitat creation. Presentation Title: How effective are spawning-habitat creation or enhancement measures for substrate spawning fish: a synthesis. Jan 2019.
- Collaboration of Environmental Evidence 2<sup>nd</sup> Annual International Conference, Paris, France. Presentation Title: The effectiveness of non-native fish removal techniques in freshwater ecosystems: a systematic review. Apr 2018.
- International meta-analysis workshop for environmental science, Paris, France. Workshop title: Introduction to meta-analysis in environmental sciences workshop. Apr 2018.
- Parks Canada headquarters, Gatineau Quebec. Presentation Title: The effectiveness of non-native fish removal techniques in freshwater ecosystems: a systematic review. Jan 2018.
- Canadian Science Policy Conference, Ottawa, Ontario. Nov 2017. General attendance.
- Centre for evidence-based conservation and environmental management workshop, Elgin, Ontario. Workshop Title: Introduction to Systematic Reviews. Oct 2017. (Workshop Co-organizer).
- International conference on ecology & transportation (ICOET), Salt Lake City, Utah. Presentation Title: How effective is road mitigation at reducing road-kill? A meta-analysis. May 2017.
- International Road Ecology Workshop, Ottawa (Carleton University), Ontario. Workshop Title: The effectiveness of road mitigation at reducing barrier impacts. Apr 2017. (Workshop Organizer)
- International Road Ecology Workshop, Ottawa (Carleton University), Ontario. Workshop Title: The effectiveness of road mitigation at reducing road-kill. Mar 2016. (Workshop Organizer)
- International Road Ecology Workshop, Harrington and Montreal (Concordia University), Quebec. Workshop Title: The use and effectiveness of mitigation measures intended to decrease road related impacts on wildlife. May 2015. (Workshop Organizer)
- National Wildlife Research Centre Seminar Series, Environment Canada, National Wildlife Research Centre, Carleton University. Seminar Title : Improving the Evaluation of Road Mitigation Measures for Wildlife. Jan 2015.
- International Road Ecology Workshop, Harrington, Quebec. Workshop Title: Experimental design and road mitigation. Jun 2013.

- Biology Departmental seminar, Carleton University, Ottawa, Ontario. Seminar Title: The effects of species behavioural responses to roads and life history traits on their population level responses to roads. Jul 2012.
- The International Association for Landscape Ecology (US-IALE) symposium, Portland, Oregon. Poster Title: Reproductive rate and body size predict road impacts on mammal abundance. Apr 2011.
- Ottawa-Carleton Institute of Biology (OCIB) symposium, Carleton University, Ottawa, Ontario. Poster Title: Do species life history traits explain population level responses to roads? May 2011.
- Enrichment mini-course, Carleton University, Ottawa, Ontario. Presentation Title: All about mammals. Mini-course to introduce junior high school students to animal ecology. This was a week long course (May 2010 and 2011).
- Canadian Society for Ecology and Evolution (CSEE) meeting, Halifax, Nova Scotia. Poster Title: Larger mammals are more negatively affected by roads. May 2009.
- Biology Departmental seminar, Carleton University, Ottawa, Ontario. Seminar Title: The effects of road density on white-footed mice (*Peromyscus leucopus*) relative abundance in rural and urban landscapes in eastern Ontario. Apr 2006.
- Ottawa-Carleton Institute of Biology (OCIB) symposium, University of Ottawa, Ottawa, Ontario. Poster Title: The effects of road density on white-footed mice (*Peromyscus leucopus*) relative abundance in rural and urban landscapes in eastern Ontario. Apr 2006.
- Undergraduate Research Conference, Cape Breton University, Nova Scotia. Presentation Title: Plant use by native and non-native lady beetles (Coccinellidae) in Cape Breton Island, Nova Scotia. Mar 2004.
- The Atlantic University Biology Conference, Cape Breton Island, Nova Scotia. Presentation Title: Plant use by native and non-native lady beetles (Coccinellidae) in Cape Breton Island, Nova Scotia. Mar 2004.

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## TEACHING EXPERIENCE

### **Contract Instructor (Carleton University)**

- Introduction to Environmental Science (ENSC1500) Fall 2016, 2017, 2018
  - Instructed a 1<sup>st</sup> year seminar course that introduced students (55, 45, and 50) to the field of environmental science and to provide them with strategies for analyzing and solving environmental problems.

### **Teaching Assistant/Lab Demonstrator (Carleton University)**



- Introduction to Ecology (BIOL 2600) Fall 2011
  - In charge of giving pre-lab talks, organizing students for outdoor labs, helping students with their analyses and lab reports, and marking lab reports
- Animal form and function (BIOL 2001) Winter 2005, 2006, 2008, 2009, 2010, 2011, 2012
  - Assisted students in the lab, marked assignments, quizzes, and lab exams
  - In 2010, myself and one other teaching assistant were in charge of re-writing all lab exams, in addition to the regular duties listed above
- Introductory biology (BIOL 1003) Fall 2004, 2005, 2007, 2008, 2009, 2010
  - Assisted students in the lab, marked assignments, and lab exams
  - In 2010, I acted as head teaching assistant for the lab, in charge of providing pre-lab talks and developing marking schemes for the other teaching assistants to follow when marking assignments

#### **Co-supervisor (Carleton University)**

- Meagan Harper – MSc candidate. Jan 2019-present. Meagan will be conducting a systematic review on a sub-topic identified from a systematic map entitled: What are the impacts of flow regime changes on fish productivity. Currently, I'm helping Meagan with data extraction and research project development. Other co-supervisors were Dr. Steven Cooke and Joseph Bennett.
- David O'Connor – Undergraduate honours student. Sept 2008 – Apr 2009. Thesis title: A meta-analysis of the influence of life history characteristics on road effects for mammalian, reptilian, amphibian, and avian populations. Dr. Lenore Fahrig was the other supervisor. I conceived the research project, assisted him with his analyses, and provided feedback/comments for his thesis.

#### **Mentor (Carleton University)**

- Dirk Algera – PhD candidate. Sept 2016-present. Dirk is conducting a full systematic review on the determining the consequences of fish entrainment and impingement associated with hydroelectric dams on fish productivity. Dr. Steven Cooke was his supervisor, and I helped Dirk with developing the review protocol, scoping, searching, screening, data extraction, and analyses.
- Richard Downing – MSc student. Sept 2011 – 2013. Thesis title: Positive Effects of Roads on Small Mammals: A Test of the Predation Release Hypothesis. Richard conducted research on predation in areas that varied in road density to address a hypothesis generated from my M.Sc. work. Dr. Lenore Fahrig was his supervisor, and I helped Richard develop his sampling design in the field and with the analysis and provided feedback/comments for his thesis.

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### **SCHOLARSHIPS/AWARDS/GRANTS**

- Senate Medal (Outstanding Academic Achievement), Carleton University 2012
- Research Assistantship, Carleton University (\$3,797) 2011-12

- Carleton University Travel Grant for travel to the International Association for Landscape Ecology (US-IALE) Annual Symposium in Portland, Oregon (\$500) 2011
- NSERC Postgraduate Scholarship (PGS) (\$63,000) 2008-11
- Graduate Scholarship, Carleton University (\$16,155) 2007-12
- Academic Excellence Scholarship, Carleton University (\$24,000) 2007-11
- Research Assistantship, Carleton University (\$3,797) 2007-08
- NSERC Canadian Postgraduate Scholarship (CGS) Master's (\$17,500) 2005-06
- Domestic Tuition Scholarship, Carleton University (\$3,000 per year) 2004-06
- Research Assistantship, Carleton University (\$5,927) 2004-05
- Cape Breton University Silver Medal (achieving highest academic standing in my program) 2004
- Fabian Joseph Scholarship, Cape Breton University (\$500) 2002-04
- Academic All-Canadian (student-athlete who has achieved >80% avg. while playing a varsity sport), Cape Breton University 2000-04
- Dean's List, Cape Breton University (>80% average) 2000-04
- Cape Breton University Entrance Scholarship (\$1,500) 2000

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## SCIENTIFIC COMMUNITY INVOLVEMENT

### JOURNAL EXPERIENCE

- **Editor-in-Chief, (interim)** for the journal *Canadian Field-Naturalist*. Nov 2013-Apr 2014
- **Assistant Editor**, for the journal *Canadian Field-Naturalist*. 2011-2015
  - I was in charge of various administrative tasks associated with new manuscript submissions; galley reviews; reviewer searches; writing the News and Comments section of the journal; and communicating with the authors.
- **Associate Editor** (unofficial), for the journal *Canadian Field-Naturalist*. 2012-2015

- I managed and assessed 12 manuscript submissions primarily involving mammal research.

## **REVIEWING EXPERIENCE**

- Animal Biodiversity and Conservation
- Ecology and Society
- PLOS ONE
- Ecosystems
- Biodiversity and Conservation
- Canadian Field-Naturalist
- Biological Conservation
- Environmental Evidence

## **COMMUNICATION OF SCIENCE TO THE WIDER COMMUNITY**

- Participated on “The Academic Minute” with an audio essay. Essay title: What’s the best way to conduct environmental management? 2017
- Invited Presenter at “Discovery Café”. Discovery Café is a series of public lectures given by experts in their fields to the community of Blackburn Hamlet, Ontario. Presentation Title: The effects of roads on wildlife. 2012
- Media training session with the Department of University Communications, Carleton University. 2011
- Television interview on animal vehicle collisions for CTV news. 2010
- Interview for article on ecological impact of roads for "The Charlatan" newspaper. 2010
- Participated in the Chelsea (QC) BioBlitz as a member of the mammalogist team. During the Bioblitz, teams of professional ornithologists, botanists, herpetologists, entomologists, mammalogists, mycologists and lichenologists comb through the numerous habitats in five of Chelsea’s largest parcels of land, in search of species in their particular taxa of specialty. In addition to gathering scientific information, a primary objective of the Bioblitz is to bring awareness to local residents about the rich diversity of life in their backyards. 2009 & 2010

## **COMMITTEE WORK AND SERVICE**

- Carleton University Animal Care Committee graduate student representative. 2009-2012
- Cape Breton University Biology Faculty Selection Committee student representative for a biology faculty position. 2003
- Cape Breton University Biology Faculty Selection Committee student representative for an integrated science instructor. 2003