

Richard Schuster | Curriculum Vitae

Department of Biology
Carleton University
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Ottawa, ON Canada K1S 5B6
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EDUCATION

PhD University of British Columbia (UBC)
July 2014 Forest and Conservation Sciences
Faculty of Forestry

Dissertation Title: Systematic conservation planning in human-dominated landscapes: maximizing efficiency in biodiversity conservation via carbon sequestration and land management

Advisors: Peter Arcese (Principal Advisor, UBC), Sarah Gergel (UBC), Tara Martin (Commonwealth Scientific and Industrial Research Organisation), Valerie LeMay (UBC).

MSc University of Graz (UG)
June 2009 Zoology

Thesis Title: The Crowsnest Highway and its effects on a multi-species community of mammals.

Advisor: Heinrich Römer (UG)

Wildlife Ecology and Game Management University of Natural Resources and Applied
courses Life Sciences (BOKU)
June 2008 Department of Integrative Biology and
Biodiversity Research

Academic exchange for MSc at UG Uppsala University
September 2005 – Mai 2006 Department of Ecology and Evolution

BSc University of Graz (UG)
June 2006 Zoology

Project Titles: The Wildebeest migration in the Serengeti.
Software application for cricket movement tracking.

Advisors: Gerald Kastberger (UG), Heinrich Römer (UG)

Diploma College of Electrical Engineering
October 1997 Power Engineering and Power Electronics
Wels, Austria

AWARDS AND GRANTS

| | |
|-------------|---|
| 2016 | Liber Ero post-doctoral Fellowship (\$150,000 CAD) |
| 2013 | UBC Mary and David Macaree Fellowship (\$3,000 CAD) |
| 2013 | Australia Endeavour Research Fellowship (\$18,500 AUD) |
| 2013 | UBC Killam Graduate Teaching Award (\$1,000 CAD) |
| 2013 | UBC W. and H. Hesse Research Award (\$2,400 CAD) |
| 2012 | UBC Hesse Fellowship in Ornithology (\$16,000 CAD) |
| 2012 | UBC W. and H. Hesse Research Award (\$3,150 CAD) |
| 2011 | UBC Hesse Fellowship in Ornithology (\$16,000 CAD) |
| 2011 | UBC Mary and David Macaree Fellowship (\$3,000 CAD) |
| 2010 | UBC Hesse Fellowship in Ornithology (\$10,000 CAD) |
| 2008 | UG Faculty of Science Scholarship (\$3,000 EUR) |
| 2007 | Federal Science and Research (FRS) Grant for Study Abroad (\$6,000 EUR) |
| 2006 – 2009 | FRS Masters Study Grand (\$35,000 EUR) |
| 2006 | Upper Austrian Govt. Special Sponsorship for Studies Abroad (\$800 EUR) |
| 2005 | FRS Grant for Study Abroad (\$6,000 EUR) |
| 2002 – 2006 | FRS Bachelor Study Grant (\$43,000 EUR) |

PEER-REVIEWED PUBLICATIONS

16. **Schuster, R.**, Law, E. A., Rodewald, A., Martin, T.G., Wilson, K. A., Watts, M., Possingham, H. P. and Arcese P. (In press) Tax-shifting and incentives for biodiversity conservation on private lands. *Conservation Letters*.

15. Arcese, R., Rodewald, A, **Schuster, R.**, Venter, O., and Bennett, J. R. (In press) Public-private partnerships to meet international biodiversity treaty targets and stem extinction. Book chapter in: *Reflections of Canada: Illuminating Our Opportunities and Challenges at 150+ Years*. Peter Wall Institute for Advanced Studies, UBC.

14. Loretto, M.-C., **Schuster, R.**, Itty, C., Marchand, P., Genero, F. and Bugnyar, T. (2017): Fission-fusion dynamics over large distances in raven non-breeders. *Scientific Reports*, **7**, 380, DOI:10.1038/s41598-017-00404-4.

13. Lee-Yaw J.A., Kharouba H.M., Mahony C., Bontrager M., Csörgő A.M., Noreen A.M.E., Li Q., **Schuster R.**, and Angert A.L. (2016) A synthesis of transplant experiments and ecological niche models suggests that range limits are often niche limits. *Ecology Letters* 19 (6) 710-722.

12. Jackson, C. L., **Schuster, R.**, and Arcese, P. (2016) Release date influences first-year site fidelity and survival in captive-bred Vancouver Island marmots. *Ecosphere* 7 (5).

11. Loretto, M.-C., Reimann, S., **Schuster, R.**, Graulich, D. M., and Bugnyar, T. (2016) Shared space - individually used: Spatial behaviour of non-breeding ravens (*Corvus corax*) close to a permanent anthropogenic food source. *Journal of Ornithology* 157 (2), 439-450.
10. Loretto, M.-C., **Schuster, R.**, and Bugnyar, T. (2016) GPS tracking of non-breeding ravens reveals the importance of anthropogenic food sources during their dispersal in the Eastern Alps. *Current Zoology* zow016.
9. Schmitt, V., Federspiel, I., Eckert, J., Keupp, S., Tschernek, L., Faraut, L., **Schuster, R.**, Michels, C., Sennhenn-Reulen, H., Bugnyar, T., Mussweiler, T., Fischer, J., (2015). Do monkeys compare themselves to others? *Anim. Cogn.* 1–12.
8. Germain, R.R., **Schuster, R.**, Delmore, K.E., and Arcese, P. (2015) Habitat preference facilitates successful early breeding in an open-cup nesting songbird. *Functional Ecology* 29 (12), 1522-1532.
7. **Schuster R.** and Arcese P. (2015). Effects of disputes and easement violations on the cost-effectiveness of land conservation. *PeerJ*, 3, e1185.
6. Delmore, K.E., Hübner, S., Kane, N.C., **Schuster, R.**, Andrew, R.L., Câmara, F., Guigó, R., and Irwin, D.E. (2015) Genomic analysis of a migratory divide reveals candidate genes for migration and implicates selective sweeps in generating islands of differentiation. *Molecular Ecology* 24, 1873–1888.
5. Arcese P., **Schuster R.**, Campbell L., Barber A., and Martin T.G. (2014) Deer density and plant palatability predict shrub cover, richness, diversity and aboriginal food value in a North American archipelago. *Diversity and Distributions* 20, 1368-1378.
4. **Schuster R.**, Martin T.G. and Arcese P. (2014) Bird community conservation and carbon offsets in western North America. *PloS One* 9, e99292.
3. **Schuster R.**, Römer H. and Germain R.R. (2013) Using multi-scale distribution and movement effects along a montane highway to identify optimal crossing locations for a large-bodied mammal community. *PeerJ* 1, e189.
2. **Schuster R.** and Arcese P. (2013) Using bird species community occurrence to prioritize forests for old growth restoration. *Ecography*, 36, 499–507.
1. Trobe D., **Schuster R.** and Römer H. (2011) Fast and reliable decisions for a dynamic song parameter in field crickets. *Journal of Comparative Physiology – A*, 197, 131-135.

PUBLICATIONS IN REVIEW

Schuster, R., Germain, R. R., Bennett, J. R., Reo, N.J., Secord, D.L. and Arcese, P. Indigenous lands support higher biodiversity than protected areas. *Science*.

Germain R.R., **Schuster R.**, Tarwater C.E., Hochachka W.M, and Arcese P. Adult survival and reproductive rate are linked to habitat preference in a territorial, year-round resident bird. *Journal of Avian Biology*.

PUBLICATIONS IN REVISION/PREPARATION

Schuster, R. and Arcese P. Biodiversity surrogates for conservation based on composite occurrence maps and expert opinion. *In revision after rejection from Ecological Indicators*.

Orihel, D. M., Colla, S. R., Coristine, L. E., Davy, C. M., Flockhart, D. T. T., McCune, J. L., and **Schuster, R.** Mapping pollution threats in habitat of at-risk species in Canada. *In preparation*.

Ford, A., Colla, S., Flockhart, T., Fraser, K., **Schuster, R.**, Coristine, L., McCune, J., Favaro, B., Palen, W., Jacob, A., Orihel, D., Davy, C., and Venter, O. Why Canada matters: nation-based conservation in a global context. *In preparation*.

Schuster, R., Tulloch A., Pobert W., Maloney R., Joseph L., Di Fonzi M., and Bennett J. Improving research strategies by analysing likelihood of success and cost of threatened species management. *In preparation*.

Schuster, R., Morell, N., Bennett, J., Watts, M., Possingham, H., and Arcese P. prioritizr: a new way to spatial conservation prioritization using an intuitive graphical user interface. *In preparation*.

Boag, A. E., **Schuster, R.**, Bennett, J. R., and Arcese P. Consensus among species richness model predictions from multiple datasets in a fragmented landscape. *In preparation*.

Federspiel, I., Schmitt, V., **Schuster, R.**, Fischer, J., Bugnyar, T., Michels, C., and Mussweiler, T. Social comparisons in carrion crows (*Corvus corone*). *In preparation*.

Loretto, M.-C., **Schuster, R.**, Federspiel, I, Heinrich, B., and Bugnyar T. Contextual imitation in juvenile common ravens (*Corvus corax*). *In preparation*.

PROFESSIONAL HISTORY

Analyst

11/2016 – current (part time: 2d/week)

Wildlife Conservation Society Canada

- Project:
 - Key Biodiversity Area's Criterion C (ecological integrity)

Liber Ero Postdoctoral Research Fellow

11/2016 – current (part time: 2d/week)

Carleton University
Department of Biology

- Project:
 - Combining full annual cycle population models and conservation optimization to address population declines of migratory birds in Canada.

Parental leave

04/2016 – 10/2016

Postdoctoral Research Fellow

06/2015 – 03/2016

The Nature Trust of British Columbia
(TNTBC) +
University of British Columbia (UBC)
Forest and Conservation Sciences

- Projects:
 - Cross-boundary Planning for Resilience and Restoration of Endangered Oak Savannah and Coastal Douglas-fir Forest Ecosystems
 - Tax shifting as an option for funding conservation initiatives
 - Species distribution model performance using multiple modelling techniques and variable types
 - Relative Ecological Assessment Tool updates for TNTBC

Postdoctoral Research Fellow

07/2014 – 06/2015 (10h/week)

(in addition to full time parental leave)

University of British Columbia (UBC)
Forest and Conservation Sciences

- *Projects:*
 - Web application development for the Marxan conservation planning software
 - Application and extension of PhD thesis methods to regional and local government levels

Service Contractor

Independent contractor

06/2015, 03/2015, 10/2014, 06/2014, 03/2014

- *Projects:*
 - Mapping support for the development of a Coastal Douglas-fir and Associated Ecosystems Conservation Partnership (CDFCP) Conservation Strategy.
 - Marxan Conservation Tool Development for the Islands Trust Area. (Islands Trust)
 - Identification of optimal candidate areas for conservation and stewardship efforts in the Coastal Douglas-fir zone. (CDFCP)
 - Carbon and biodiversity mapping for the Islands Trust area as well as cost effectiveness analysis of land protection in the Islands Trust area compared with the larger region. (Islands Trust)
 - Identification of optimal candidate areas for conservation and stewardship efforts in the Coastal Douglas-fir zone. (CDFCP)

BRITE Intern

04/2014-09/2014

The Nature Trust of British Columbia
Vancouver, British Columbia

- Biodiversity Research: Integrative Training & Education (BRITE) internship
- *Project:* Relative Ecological Assessment Tool development
 - Web application development using R that allows TNTBC to more thoroughly and efficiently evaluate potential land purchases using scientific assessments, spatial data, and information about compatible or incompatible land uses

Visiting Scientist

09/2013-01/2014

Commonwealth Scientific and Industrial
Research Organisation (CSIRO)
Ecosystems Sciences Division
Brisbane, Australia

- Visiting scientist with the Conservation Decisions Team at CSIRO, supported by an Endeavour Research Fellowship.
- Work on a collaborative project on Marxan conservation solutions with members of the Environmental Decisions Group, University of Queensland.

Research Assistant

10/2009-03/2010

University of British Columbia (UBC)
Centre for Applied Conservation Research

- *Projects:*
 - Demography, genetics and behaviour of island bird populations.

- Development of GIS, R and Visual Basic tools for application in the analysis of bird and plant species count data from the Southern Gulf Islands.

Lead developer
2002

Webak Games Austria
Gmunden, Austria

- Lead developer of software applications using C and C++
- Systems manager

Design engineer
2000

Lederhilger automation engineering
Allhaming, Austria

- Designing engineer of Recycling Machines
- Systems manager

Paramedic
1999, 2001

Detachment: Kirchdorf/Krems
Austrian Red Cross, Upper Austria

- Paramedic and driver for the Red Cross Ambulance service

SECONDARY SKILLS AND EXPERIENCE

- Fluency in English and German (mother tongue)
- Substantial professional expertise in the programming languages C, C++, R, Visual Basic, Python and Perl.
- Extensive GIS experience, including development of analytical Python scripts.
- Proficiency in a variety of scientific field techniques and equipment

TEACHING EXPERIENCE

Guest lecturer for UBC courses FRST 532B (Spatial Statistics), CONS 101, FRST 495, FRST 532B (Bayesian analysis) and University of the Fraser Valley Forest Ecology (BIO 430)

2017 Instructor, Statistical analysis using R; 1 day workshop for members of the Biology department at Carleton University.

2017 Lecturer, Systematic Conservation Planning with practical examples using online tools, Carleton University.

2016 Lecturer, Prioritizing conservation actions: development and application of Marxan spatial planning tools in the Georgia Basin. Topics: 'Species Distribution

- Models' and 'Algorithms and Approaches to Systematic Conservation Planning' (FRST 507c). UBC
- 2015 Instructor, Introduction to R; Workshop for participants at the Graduate Meeting 2015. Konrad Lorenz Forschungsstelle, University of Vienna, Austria.
- 2014 Teaching Assistant (TA), Advanced Regression Analysis (FRST 530). UBC
- 2013 Main Instructor, Advanced Occupancy and Abundance Modelling; 2 day workshop for members of the Wildlife Institute of India. UBC
- 2013 Main Instructor, Statistical analysis using R; 2 day workshop for members of the Wildlife Institute of India. UBC.
- 2013 TA, Applied Multivariate Statistics (FRST 531). UBC
- 2011 TA, Introduction to Conservation Science (CONS 101). UBC
- 2011 - 2013 TA, Biological Diversity and Forest Management (FRST 495). UBC
- 2010 Instructional Skills Program for International Teaching Assistants. UBC
- 2008 TA, Aggression Behaviour. University of Graz (UG), Austria.
- 2008 TA, Methods of Analyzing Social Systems in the Animal Kingdom. UG
- 2008 TA, Social Behaviour of Animals and Humans. UG

STUDENT SUPERVISION

Graduate Student Committee member

Nina Morell, UBC. (2016-) Using species distribution models to prioritize conservation in the Northern Andes .

Cassie Hill, Carleton. (2016 -) Involvement of Indigenous Peoples in Species at Risk recovery planning in Canada.

Calla Raymond, Carleton. (2016 -) Value of information to improve the decision-making process associated with endangered species conservation.

Honours

M.-A. Leclerc, UBC. Species Management in Human Dominated Landscapes (2013)

Undergraduate Student Research Projects

J. Pon, Carleton. (2016)

W. Wang, UBC. Map comparisons for different species distribution model techniques (2015)

N. Morrell, UBC. Cross-boundary planning for ecosystem resilience and restoration (2015)

A. Barber*, UBC. Deer density and plant palatability predict shrubs (2011)

L. Cambell*, UBC. Deer density and plant palatability predict shrubs (2011)

M. Combie, UBC. Demography of song sparrows (2010)

(* resulted in co-authorship on a paper)

PROFESSIONAL SERVICE

- Peer reviewer for the following journals: Animal Conservation, Journal of Avian biology, Diversity, Ecography, Ecological Indicators, Ecology, Landscape Ecology, PLoS One, Journal of Biogeography, PeerJ, Avian Conservation and Ecology, Natural Sciences Education.
- Scientific reviewer for the Cooperative Monitoring, Evaluation and Research (CMER) Committee of the University of Washington (2014)
- Award and grant committee member:
 - International Forestry Students' Association (IFSA) Food and Agriculture Organization of the United Nations (FAO) internship (2013)
 - IFSA travel grants for the International Forestry Student' Symposium (2013)
 - Graduate Teaching Award UBC (2014)

STUDENT SERVICE

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| 2013 | Received the UBC Killam Graduate Teaching Assistant Award |
| 2012 | Recognized as a UBC "Student Leader" by the President's Office. |
| 2011 – 2012 | IFSA – Head of Web Commission (elected). Secretariat location: Freiburg, Germany. |
| 2011 – 2012 | IFSA – Regional Representative North America (elected). |
| 2010 – 2012 | IFSA local chapter UBC: re-established IFSA membership. Chapter president 2011 -2012 (elected). UBC. |
| 2010 – 2012 | UBC Forestry Graduate Student Association. International Representative (elected). |

CONFERENCE PRESENTATIONS AND INVITED SEMINARS

Loretto, M-C., **Schuster, R.**, Bugnyar, T. (2017): Movement strategies of non-breeding ravens. Annual Conference of the British Ornithologists' Union, Coventy, UK, oral.

Schuster, R., Bennett, J., Rodewald, A., Wilson, S., Marra, P., and Wells, J. (2016) Full annual cycle population models and conservation optimization for migratory birds. Oral presentation at 'Frank discussion', Cornell lab of Ornithology.

Schuster, R., Morell, N., Kleynhans, E., and Arcese, P. (2016) Cross-boundary Planning for Resilience and Restoration of Endangered Ecosystems. Oral presentation at Wildlife and Landscape Science Division, Environment and Climate Change Canada.

Schuster, R., Morell, N., Kleynhans, E., and Arcese, P. (2016) Cross-boundary Planning for Resilience and Restoration of Endangered Ecosystems. Oral presentation at Biology Seminar Series, Carleton University.

Arcese, P., **Schuster, R.**, Kleynhans, E.J., Rodewald, A.D., Wilson, S.D. (2016) Climate and Land Use Drivers of Species Distribution in Conservation Prioritization. Oral presentation North American Ornithological Conference.

Loretto, M-C., **Schuster, R.**, Bugnyar, T. (2016): Fission-fusion dynamics over large distances in wild non-breeding ravens. Oral presentation at the 8th European Conference on Behavioural Biology, Vienna, Austria.

Schuster, R., Bennett, J., Rodewald, A., Wilson, S., Marra, P., and Wells, J. (2016) Full annual cycle population models and conservation optimization for migratory birds. Oral presentation to the Conservation Science - Bird Population Studies group at Cornell lab of Ornithology.

Schuster, R., Morell, N., Kleynhans, E., and Arcese, P. (2016) eBird species distribution models and cross-boundary conservation planning. Oral presentation at 'Frank discussion', Cornell lab of Ornithology.

Schuster, R., Morell, N., and Arcese, P. (2015) Marxan tool demonstration: How does the model work and how can you make use of it? Oral presentation at the 13th Conservation Connection Forum.

Gow E., **Schuster, R.**, Laforge M. and Arcese P. (2015) Olive-sided flycatcher occurrence in relation to habitat in British Columbia. Poster presentation American Ornithologists' Union meeting.

Schuster, R. (2015) Distribution models, variables and data. Oral presentation at the Cross-boundary Planning for Resilience and Restoration of Endangered Oak Savannah and Coastal Douglas-fir Forest Ecosystems workshop.

Schuster, R. (2015) Community Maps using expert elicitation. Oral presentation at the Cross-boundary Planning for Resilience and Restoration of Endangered Oak Savannah and Coastal Douglas-fir Forest Ecosystems workshop.

Schuster, R. (2014) How does the Marxan Tool work? Oral presentation at the Coastal Douglas-fir and Associated Ecosystems Conservation Partnership Marxan Tool Demonstration and Workshop.

Arcese, P., **Schuster, R.** and Martin T. (2012) Birds as Indicators of ‘Ecological Integrity’ and Human Influence: using occupancy maps to prioritize conservation effort. Oral presentation North American Ornithological Conference.

Schuster R., Arcese P., Martin T., Bennett J. and Gonzales E. (2011) Restoring old growth forests of the Pacific coast. Oral presentation to the BC Protected Areas Research Forum.

Schuster R. and Arcese P. (2011) Using bird species occurrence to prioritize Old-forest restoration. Oral presentation at the 129th American Ornithologists’ Union meeting.

Schuster R., Arcese P., Martin T., Bennett J. and Gonzales E. (2011) Systematic conservation area design in the Coastal Douglas-fir zone. Oral presentation to the Coastal Douglas-fir (CDF) Stewardship Workshop.

Schuster, R., Arcese, P., Bennett, J., Blight, L.K., Essek, M. and Germain, R. (2011) Applied ecology and evolution in the Arcese Lab. Poster presentation at the Faculty of Forestry Research Evening, Forest Sciences Centre, University of British Columbia, Vancouver (FFRE)

Blight, L.K., Arcese, P., Bennett, J., Jackson, C. and **Schuster, R.** (2010) Applied ecology and evolution in the Arcese Lab. Poster Presentation at the FFRE.

NON-PEER REVIEWED PUBLICATIONS AND REPORTS

Ford, A. T., Cristine, L., Davies, K., Flockhart, T., Jacob, A., Palen, W., Pittman, J., **Schuster, R.**, Orihel, D., and Otto, S. (2016) Improving environmental assessment in Canada. Liber Ero Fellowship program letter to Minister Catherine McKenna in input for the Canadian Environmental Assessment Act reform.

Cristine, L, Pittman, J., and **Schuster, R.** (2016) Early-career researchers in Canada’s science-policy landscape: barriers and opportunities. Canadian Science Policy Centre (<http://www.sciencepolicy.ca/news/early-career-researchers-canadas-science-policy-landscape-barriers-and-opportunities>)

Schuster, R. and Warman L. (2016) The Nature Trust of British Columbia: Relative Ecological Assessment Tool (37pp).

Schuster, R., Crombie, M., Morrell, N., and Arcese, P. (2016) A Prioritization Tool for the Conservation of Coastal Douglas-fir Forest and Savannah Habitats of the Georgia Basin and Puget Sound Lowlands (56pp).

Emmings, K., Golumbia, T., Miller, K., and **Schuster, R.** (2015) Coastal Douglas-fir and Associated Ecosystems Conservation Partnership (CDFCP) Conservation Strategy: Study Area and Local Government Scenarios. Technical report for the CDFCP 15pp.

Morell, N., **Schuster, R.**, and Arcese, P (2015) Marxan Tutorial for the Coastal Douglas-Fir Conservation Partnership. Software documentation (25pp).

Schuster, R. (2015) Protected Area Network development for the Islands Trust Area. Technical report for The Islands Trust (37pp).

Schuster, R., and Arcese, P. (2015) Efficient routes to land conservation given risk of covenant failure (No. e1269). PeerJ PrePrints.

Schuster, R. (2014) Relative Ecological Assessment tool. Software documentation for The Nature Trust of British Columbia (34pp).

Schuster, R. (2014) Coastal Douglas-fir and Associated Ecosystems Conservation Partnership (CDFCP) Summary Table. Technical report for the CDFCP (13pp).

Schuster, R. (2014) Carbon and Biodiversity Mapping and Assessment for the Islands Trust Area. Technical report for The Islands Trust (14pp).

Schuster, R. (2005) Software application for cricket movement tracking. University of Graz, Austria. 45pp