

Jill A. Hamilton, Ph.D.

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EDUCATION

2008-2012 **PhD**, Department of Forest Science, Faculty of Forestry, University of British Columbia, Vancouver, BC, Canada
Thesis: Genomic and phenotypic architecture of a spruce hybrid zone (*Picea sitchensis* x *P. glauca*).
Advisor: Dr. Sally N. Aitken

2002-2005 **MSc**, Department of Biology, Queen's University, Kingston, ON, Canada.
Thesis: Population genetic consequences of geographic disjunction in a prairie plant species isolated on Great Lake alvars. *Advisor:* Dr. Christopher G. Eckert

1997-2002 **BSc Honours**, Department of Biology, University of Winnipeg, Winnipeg, MB, Canada.
Thesis: The ecology of big bluestem (*Andropogon gerardii* Vitman) in Riding Mountain National Park. *Advisor:* Dr. Richard J. Staniforth

PROFESSIONAL EXPERIENCE

Assistant Professor, Department of Biological Sciences, Fargo, ND, USA, 2015 - present

Postdoctoral Fellow, Department of Evolution and Ecology, University of California, Davis, CA, USA, 2014 – 2015, *Advisor:* Dr. Johanna Schmitt

- Local adaptation across environments: teasing apart the genetic basis of complex traits in model and non-model systems

Postdoctoral Fellow, Department of Biology, University of Alberta, Edmonton, Alberta, Canada, 2012 – 2014, *Advisor:* Dr. Janice E. K. Cooke

- **TRIA – Mountain Pine Beetle System Genomics:**
 - Molecular and physiological characterization of pine responses to abiotic and biotic environment
 - Identification and characterization of genes and processes that mediate pine-fungal-mountain pine beetle interactions in novel habitats
- **SMarTForests:**
 - Tree breeding tools for growth and wood quality in white spruce

Research Assistant, Cereal Research Centre, Agriculture & Agri-Food Canada, Winnipeg, MB, Canada, 2005-2007, *Advisors:* Dr. Daryl Somers & Dr. Jeannie Gilbert

- Molecular breeding for disease resistance, molecular mapping, quantitative genetics and plant pathology in wheat

PROFESSIONAL WORKSHOPS AND COURSES ATTENDED

- 2017-18 GatewaysND - Learner-Focused STEM Instructional Cohorts, Fargo, ND (selected participant)
- 2016 National Academies Special Topics Summer Institute on Course-based Undergraduate Research Experiences, Austin, TX (selected participant)
- 2015 NGS for evolutionary biologists: from basic scripting to variant calling, Rome, Italy (selected participant)
- 2014 Evolutionary Quantitative Genetics, National Institute for Mathematical and Biological Synthesis, Knoxville, TN (selected participant)
- 2013 Instructional Strategies for Student Learning and Assessing Student Learning, Edmonton, Alberta
- 2012 Ecological Consequences of Climate Change: Integrating Research Approaches Workshop, Donana National Park, Sevilla, Spain (selected participant)
- 2011 Visiting PhD Candidate – Dr. C. Lexer, University of Fribourg, Fribourg, Switzerland
- 2010 Summer Institute in Statistical Genetics, University of Washington
Courses: Computing for Statistical Genetics, MCMC for Genetics and Plant and Animal Association Mapping
- 2004 Summer Institute in Statistical Genetics, North Carolina State University
Courses: Introduction to Regression and ANOVA, Principles of Quantitative Genetics

PEER-REVIEWED PUBLICATIONS (^ggraduate student, ^uundergraduate student)

Hamilton, J.A., Royauté, R., Wright, J. W., Hodgskiss, P., and F. T. Ledig (2017) Genetic conservation and management of the California endemic, Torrey pine (*Pinus torreyana* Parry): implications of genetic rescue in a genetically depauperate species. *Ecology and Evolution*

Janes, J. and **J. A. Hamilton** (2017) Mixing it up: the role of hybridization in forest management and conservation under climate change. *Forests* 8 (7): 237 **Special Issue on New Insights into Climate Sensitivity of Forest Growth, Health, and Disturbance: Vulnerability, Resilience, and Change

Hamilton, J.A., El Kayal, W., Hart, A.^u, Runcie, D.E., Arango-Velez, A., and J. Cooke. (2016) Teasing apart the influence of photoperiod and temperature on growth cessation and dormancy in white spruce (*Picea glauca*). *Tree Physiology* 36 (11): 1432-1448.

Stockwell, C.A., Kinnison, M.T., Hendry, A.P. and **J.A. Hamilton** (2016) Evolutionary Restoration Ecology in Foundations of Restoration Ecology, edited by Falk et al., Island Press.

Hamilton, J.A., Okado, M., Korves, T. & J. Schmitt. (2016) The role of climate adaptation in colonization success in *Arabidopsis thaliana* in Invasion Genetics: The Baker and Stebbins Legacy, edited by Barrett et al., Wiley-Blackwell

Cullingham, C.I., Thiessen, C., Derocher, A., Paquet, P., Miller, J., **Hamilton, J.A.**, and D. W. Coltman (2016) Population structure and dispersal of wolves in the Canadian Rocky Mountains. *Journal of Mammalogy* 97 (3): 839-851.

Miller, J. M., and **J.A. Hamilton**. (2016) Interspecies hybridization merits consideration in the conservation toolbox: response to Kovach et al. 2016. *Conservation Biology* 30: 431-433.

Hamilton, J.A., and J. M. Miller. (2016) Adaptive introgression: a resource for management and genetic conservation in a changing climate. *Conservation Biology*. 30: 33-41.

Hamilton, J.A., Okado, M., Korves, T. & J. Schmitt. (2015) The role of climate adaptation in colonization success in *Arabidopsis thaliana*. *Molecular Ecology* 24: 2253-2263.

** *Special Issue on Invasion Genetics: the Baker and Stebbins Legacy*

Hamilton, J.A., de la Torre, A., and S. N. Aitken. (2015) Introgression across a three-species spruce hybrid complex facilitates adaptation to diverse climates. *Tree Genetics and Genomes* 11:1-14.

Hamilton, J.A., Lexer, C. and S.N. Aitken (2013) Genomic and phenotypic architecture of a spruce hybrid zone (*Picea sitchensis* x *P. glauca*). *Molecular Ecology* 22: 827-841.

** *Special Issue on Evolutionary Ecological Genomics*

Hamilton, J.A., Lexer, C. and S.N. Aitken (2013) Differential introgression reveals candidates for selection across a spruce (*Picea sitchensis* x *P. glauca*) hybrid zone. *New Phytologist* 197: 927-938.

Hamilton, J.A., & S.N. Aitken. (2013) Genetics and morphology of a spruce (*Picea sitchensis* x *P. glauca*) hybrid zone along a precipitation gradient. *American Journal of Botany* 100 (8): 1651-1671.

Gornish, E.S., **Hamilton, J.A.**, Barberan, A., Benito, B.M., Binzer, A., DeMeester, J.E., Gruwez, R., Moreira, B., Taheri, S., Tomiolo, S., Vinagre, C., Vuarin, P., and Weaver, J. (2013) Interdisciplinary climate change collaborations are essential for early-career scientists. *EOS: Transactions of the American Geophysical Union* 94 (16): 151.

Hamilton, J.A. and C.G. Eckert (2007) Population genetic consequences of geographic disjunction: a prairie plant species isolated on Great Lakes alvars. *Molecular Ecology* 16: 1649-1660.

SUBMITTED OR IN PREP

Portlas, Z. ^u and **J.A. Hamilton** (*In Prep*) The evolution of dispersal across a discontinuous landscape

Ciotir, C., Coughlan, J., **Hamilton, J.A.**, Eckert, C.G., and J. Freeland (*In Prep*) Contrasting patterns of phylogeography in disjunct populations of three plant species in the Great Lakes region.

El Kayal, W., **Hamilton, J.A.**, Gregoris, A.S., Ju, C., Allen, C, Gros-Louis, M-C, Pelgas, B., Sylvestre, P., Isabel, N., and J. Cooke (*In Prep*) Transcript profiling reveals the molecular phenotype that distinguishes early versus late time to bud set genotypes in a white spruce full-sib family.

NON PEER-REVIEWED PUBLICATIONS

Hamilton, J.A. (2009) Evaluation of genetic issues *in* Guidelines for Translocation of Plant Species at Risk in British Columbia, BC Ministry of the Environment, Victoria, BC.

PRESENTATIONS (*presenter, ^ggraduate student, ^uundergraduate student)

Hamilton, J.A.*, Royauté, R., Wright, J. W., Hodgskiss, P., and F. T. Ledig (2017) Genetic conservation and management of the Californian endemic, Torrey pine (*Pinus torreyana* Parry): implications of genetic rescue in a long-lived species. Presentation at the Ecological Society of America, Portland, OR.

Yoko, Z.*^g, and **J. A. Hamilton** (2017) How local is local: phenological and life history differences across the range of *Geum triflorum*. Poster presentation at the Ecological Society of America, Portland, OR.

di Santo, L.*^g, and **J. A. Hamilton** (2017) *Ex situ* collections to complement ongoing efforts for Torrey pine conservation. Presentation at the Santa Barbara Botanic Garden, Santa Barbara, CA.

Stadel, T. J.*^u, and **J. A. Hamilton** (2016) The importance of local adaptation in restoration: phenotypic variation between disjunct alvar and prairie populations of *Geum triflorum* in a common environment. Presentation at North American Congress in Conservation Biology, Madison, WI.

Hamilton, J.A.*, Wright, J. W. & F. T. Ledig (2016) Genetic conservation and management of the Californian endemic, Torrey pine (*Pinus torreyana* Parry). Presentation at North American Congress in Conservation Biology, Madison, WI.

Hamilton, J.A.*, Wright, J. W. & F. T. Ledig (2016) Genetic conservation and management of the Californian endemic, Torrey pine (*Pinus torreyana* Parry). Presentation at Gene Conservation of Tree Species: Banking on the Future, Chicago, IL.

Hamilton, J.A.*, Runcie, D., Anacker, B., Korves, T. & J. Schmitt (2015) Testing the climate pre-adaptation hypothesis: a proof of concept using *Arabidopsis thaliana*. Presentation at CSEE, Saskatoon, SK

Hart, A.*^u, **Hamilton, J.A.**, El Kayal, W., & J. Cooke (2015) Cellular level changes that occur during white spruce growth cessation dormancy acquisition. Presentation at Botany, Edmonton, AB

Hamilton, J.A. (2014) Planting the forests of the future: lessons from provenance trials. Presentation at Tahoe Forest Genetics Workshop, Tahoe, CA. **Invited Speaker**

Hamilton, J.A.*, El Kayal, W., Arango-Velez, A., & J. Cooke (2014) Environmental cues under climate change: teasing apart the influence of photoperiod and temperature during the development of dormancy in spruce (*Picea glauca*). Presentation at Ecological Society of America, Sacramento, CA, USA.

Hamilton, J.A.* & S.N. Aitken (2013) Broad- and fine-scale genetic structure of a spruce (*Picea sitchensis* x *P. glauca*) hybrid zone spanning a climatic gradient. Presentation at Forest Genetics 2013, Whistler, BC, Canada.

Cooke, J.*, El Kayal, W., **Hamilton, J.A.**, Gregoris, A., Pelgas, B., Carles, S., and N. Isabel (2013) Apical bud formation and dormancy acquisition in white spruce. Presentation at Plant Dormancy Symposium, Auckland, New Zealand.

Adriana Arango-Velez, **Hamilton, J.A.***, El Kayal W., Meents, M., Royko, D., & J. Cooke (2013) Fine-scale transcriptome reconfiguration in response to a climate-induced stress: testing the naïve host hypothesis. Poster presentation at IUFRO Tree Biotechnology, Asheville, NC, USA.

Cooke, J.*, Arango, A., Cullingham, C., Meents, M., **Hamilton, J.A.**, Copeland, C., Dang, S., Boychuk, S., El Kayal, W., Galindo, L., & Coltman, D. W. (2013) Fighting the good fight: Factors affecting pine defenses against mountain pine beetle at the leading edge of the outbreak. Presentation at Plant & Animal Genome XXI, San Diego, CA.

Ciotir, C.*, Coughlan, J., **Hamilton, J.A.**, Eckert, C.G. & J. Freeland (2013) Contrasting patterns of phylogeography in disjunct populations of four plant species in Ontario highlight the relevance of genetic novelty to conservation assessments. Presentation at Canadian Society of Ecology and Evolution, Kelowna, BC.

Hamilton, J.A.*, Lexer, C. & S.N. Aitken (2012) Differential introgression reveals candidates for selection across a spruce hybrid zone (*Picea sitchensis* x *P. glauca*). Presentation at 1st Joint Congress on Evolutionary Biology 2012, Ottawa, ON

Hamilton, J.A. (2012) Genomic and phenotypic architecture of a spruce hybrid zone (*Picea sitchensis* x *P. glauca*). Presentation at the University of British Columbia, Department of Forest Sciences seminar series, Vancouver, BC

Hamilton, J.A.*, Lexer, C. & S.N. Aitken (2011) Genomic architecture of reproductive isolation and species differences in a spruce hybrid zone (*Picea sitchensis* x *P. glauca*). Presentation at Canadian Society of Ecology and Evolution, Banff, AB**

**Featured special symposium “Genetics of Speciation and Evolution” (McNiven et al. 2011, *Molecular Ecology*, 20:5119-5122)

Hamilton, J.A.* & S.N. Aitken (2010) Sitka-white spruce (*Picea sitchensis* x *P. glauca*) hybrids as tools for investigating adaptation to climate. Poster presented at Evolution, Portland, Oregon, USA

Aitken, S.N.*, Lobo, N., **Hamilton, J.A.**, de la Torre, A., & J.A. Holliday. (2010) Distribution of genetic variation relevant to adaptation to local climate across different geographic and taxonomic scales in *Picea*. Presentation at EvolTree, Madrid, Spain.

Hamilton, J.A.* & C.G. Eckert (2006) Population genetic consequences of geographic disjunction: a prairie plant species isolated on Great Lakes alvars. Poster presented at the Manitoba Association of Plant Biologists, Winnipeg, MB.

Hamilton, J.A.* & C.G. Eckert (2005) Conservation implications of geographic disjunction in a widespread prairie species isolated on Great Lakes alvars. Presentation at the Ontario Ecology & Ethology Colloquium, Ottawa, ON.

Hamilton, J.A. (2004) Conservation genetics of disjunct populations: genetic diversity in the allohexaploid, *Geum triflorum*. Presentation at Queen's University, Ecology Evolution & Behaviour seminar series. Kingston, ON.

Hamilton, J.A. (2002) The ecology of *Andropogon gerardii* (big bluestem) in Riding Mountain National Park. Presented at the Prairie University Biological Symposium, Calgary, AB.

INVITED SEMINARS

Torrey Pines State Reserve, La Jolla, CA (2017)
Torrey Pines Golf Course, La Jolla, CA (2017)
Northern Arizona University, Flagstaff, AZ (2017)
US Fish & Wildlife Service – Advanced Topics in Conservation Genetics Webinar (2016)
USGS Northern Prairie Research Station, Jamestown, ND (2016)
University of Winnipeg, Winnipeg, MB, Canada (2016)
Nature Conservancy of Canada – Manitoba, Winnipeg, MB, Canada (2016)
Pacific Rim Tonewoods, Bellingham, WA (2016)
University of Minnesota, Minneapolis, MN (2016)
Santa Barbara Botanic Garden, Santa Barbara, CA (2016)
North Dakota State University – ECS Greenbag Seminar (2016)
University of Minnesota – Duluth, MN (2015)
Northern Central Research Station USDA Forest Service – Grand Rapids, MN (2015)
University of California – Davis, CA (2015)
California State University, Sacramento, CA (2014)
North Dakota State University, ND (2014)
University of California - Merced, CA (2014)
University of Lethbridge, AB, Canada (2014)
University of Alberta, AB, Canada (2014)
University of Winnipeg, MB, Canada (2012)
University of British Columbia, BC, Canada (2012)
University of Manitoba, Winnipeg, MB, Canada (2011)
University of Fribourg, Fribourg, Switzerland (2011)

GRANTS

2017 PI: Morton Arboretum: Ground-truthing ex situ conservation collections: population genetic structure in the rare, California endemic Torrey pine (*Pinus torreyana*) (\$15,900)
2017 PI: USDA-NACA: Intraspecific variation and possible effects on the utility of non-crop Asteraceae (\$13,000)
2017 PI: NDSU Bioinformatics Seed Grant: The impact of polyploidy and hybridization in evolutionary diversification (\$14,886)
2017 PI: USDA-Forest Service: Incorporating a climate-based adaptation approach for post-fire reforestation - cold tolerance (\$5,000)
2016 PI: NSF-DEB RAPID: Evolution of reproductive barriers in long-lived conifers (\$14,752)

- 2016 PI: USDA-Forest Service: Ex-situ conservation for the rare Californian endemic Torrey Pine (*Pinus torreyana* Parry) (\$21,800)
- 2016 PI: NDSU Seed Grant: Mechanisms of local adaptation in divergent environments: the impact of polyploidy and hybridization in evolutionary diversification (\$5,000)
- 2016 Pacific Rim Tonewoods – Genomic ancestry of spruce in the Nass River region (\$8,000)
- 2015 NDSU Department of Biological Sciences Faculty Travel Grant (\$500)
- 2015 NDSU College of Science and Math Faculty Travel Grant (\$625)

AWARDS (*All awards in Canadian funds, unless otherwise noted)

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- 2016 Annual Alumnus Speaker Award – The University of Winnipeg
- 2016 Jim Pojar Award from the Bulkley Valley Research Centre (Nominated)
- 2011 Canadian Society for Ecology and Evolution Travel Award (\$500)
- 2011 UBC Four Year Doctoral Fellowship (\$16,000)
- 2010 Scholarship to Summer Institute in Statistical Genetics (\$1200*)
- 2010 2010 Faculty of Forestry Research Poster Event (\$100)
- 2010 UBC Four Year Doctoral Fellowship (\$16,000 – declined)
- 2008-2011 UBC Forestry Strategic Recruitment Fellowship (\$16,000)
- 2008-2010 NSERC Canada Graduate Scholarship (\$105,000)
- 2005 Queen’s Graduate Student Bursary (\$3,000)
- 2005 Queen’s Conference Travel Award (\$400)
- 2004 Scholarship to Summer Institute in Statistical Genetics (\$800*)
- 2002-2004 Queen’s Graduate Award (\$12,000)
- 2003 Queen’s Graduate Student Bursary (\$2,800)
- 1997 Florence D. Methereal Scholarship (\$1,000)
- 1997 Public Works Employees Scholarship (\$350)
- 1997 University of Winnipeg Entrance Scholarship (\$800)

TEACHING EXPERIENCE

Lecturer

- General Ecology (North Dakota State University) 2017
- Environment and Adaptation (North Dakota State University) 2016
- Plant Physiology (North Dakota State University) 2016-2017
- Genetic Analysis of Populations (University of Alberta – co-taught) 2014

Teaching Assistant

- Forest Plant Biology I & II (University of British Columbia) 2008-2010
- Population and Evolutionary Ecology (Queen’s University) 2003-2005
- Plant Reproduction Biology Field Course (Queen’s University) 2004
- Introductory Biology of Organisms (Queen’s University) 2003-2005
- Conservation Biology (Queen’s University) 2002-2003
- Mendelian and Molecular Genetics (Queen’s University) 2002-2003

Laboratory Demonstrator

- Principles of Ecology (University of Winnipeg) 2000-2002
- Biology of Vascular Plants (University of Winnipeg) 2001-2002

Invited Guest Lecturer

- Conservation Biology (North Dakota State University) 2015
- Population Biology Core (University of California – Davis) 2015
- Plant Ecology (University of Alberta) 2013
- Genetic Analysis of Populations (University of Alberta) 2013
- Conservation Biology (Queen’s University) 2004

SUPERVISORY EXPERIENCE

Graduate Students

Lionel Di Santo (PhD) 2016 – present
Zebadiah Yoko (MS) 2017 - present

Undergraduate Students

Tyler Stadel 2015 - 2016
Aidan Resh 2015 – 2016
Andy Fuchs 2016 - 2017
Marissa Spear 2016 - 2017
Zoe Portlas 2015 - 2017
Alexis Pearson 2015 – 2017
Stephen Johnson 2016 – present
Zach Tarble 2016 – present
Liberty Nguyen 2017 - present
Mercedes Hoffner 2017 - present
Kalli-Jo Olson 2017 - present
Storm Nies 2017 - present
Samuel Hyland 2017 - present

Committee Member

Lauren Frazee (PhD - Rutgers, Ecology & Evolution)
Maria Gabriela Tobar Pinon (MS - NDSU, Plant Sciences)
Meredith Swanson (MS - NDSU, Plant Sciences)
Carlos Federico Velasquez Villegas (MS - NDSU, Plant Sciences)

MEDIA COVERAGE

- 2017 - The Spectrum: The trees they need a savin' (<http://ndsuspectrum.com/trees-need-savin/>)
- 2017 – NDSU research helping save rare, iconic trees (<https://www.ndsu.edu/news/view/detail/30166/>)
- 2017 Minnesota Phenology Network - Citizen Science Opportunity (<http://mailchi.mp/c9ee5282c08d/c8b9i9aq3m>)
- 2016 Prairie Public Radio – NPR – Wood for High End Guitars (<http://www.prairiepublic.org/radio/mainstreet?post=68474>)
- 2016 KVRR Morning News Live (<http://www.kvrr.com/news/local-news/Using-Genetics-To-Make-The-Perfect-Guitar/42402662>)
- 2016 - NDSU scientist uses genetics to identify wood for high-end guitars (https://www.ndsu.edu/news/banner_stories/jillhamilton/)
- 2014 - Interview on “The Modern Forest” blog (www.blogs.ubc.ca/aitkenlab)
- 2011 - Profiled in Canadian Women in Science and Engineering – Prairies (www.cwse-prairies.ca)

PROFESSIONAL SERVICE

- 2017 – present Associate Editor – Plant Ecology and Diversity
- 2017 – present NDSU Environment and Conservation Steering Committee
- 2017 – present Dakota Women in Conservation
- 2017 – present Co-Organizer: Behaviour Ecology & Evolution Research Seminars
- 2017 – present Ecological Society of America: Restoration Ecology
- 2016 - 2017 NDSU Biological Sciences Seminar Series (Organizer)
- 2016 - NSF Panelist
- 2015 - present NDSU Conservation Biology Curriculum Committee
- 2015 - present NDSU Biological Sciences Faculty Affairs Committee
- 2012-2014 - Biology Postdoctoral Representative – Departmental Council, University of Alberta
- Judge R.E. Peter Biology Conference 2013, PDF Research Day 2012, CSEE 2012 and 2015
- 2012 Undergraduate Diversity Mentoring - Society of Evolutionary Biology
- Manuscript Review: Tree Genetics and Genomes (4), Molecular Ecology (6), New Phytologist (4), Global Change Biology (1), Functional Ecology (1), Journal of Evolutionary Biology (1), Journal of Applied Ecology (1), Heredity (2), Plant Biology (3), Ecology and Evolution (2), Restoration Ecology (1), Journal of Biogeography (1), Plant Genome (1), American Journal of Botany (3), Plant Species Biology (1), Silvae Genetica (1), PLoS ONE (1), Acta Biologica Cracoviensia Series Botanica (1), Scientific Reviews (1), G3: Genes, Genomes, Genetics (1), Biology Letters (1)
- Ad hoc reviewer: NSF Plant Genome Research Program, NSF Division of Environmental Biology, NSF IOS - Integrative Ecological Physiology, North American Congress in Conservation Biology Abstracts, AgreenSkills+ Fellowships (France)
- 2014 Top Reviewer for Molecular Ecology
- Memberships: Society for Conservation Biology, Canadian Society of Ecology and Evolution, Society for the Study of Evolution, Ecological Society of America, American Society of Naturalists, Manitoba Association of Plant Biologists