

JANNICE FRIEDMAN

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PROFESSIONAL APPOINTMENTS AND EDUCATION

Assistant Professor, Department of Biology, Queen's University. 2019 –
Associate Professor, Department of Biology, Syracuse University. 2018 – 2019
Assistant Professor, Department of Biology, Syracuse University. 2012 – 2018
Post-Doctoral Fellow, Duke University. 2009-2011 (Advisor: J.H. Willis)
Funded by Natural Sciences and Engineering Research Council of Canada – PDF Fellowship
Ph.D., Ecology and Evolutionary Biology, 2009. University of Toronto (Advisor: S.C.H. Barrett)
M.Sc., Biology, 2003. University of Calgary (Advisor: L.D. Harder)
B.Sc. Honor's, Ecology, 2000. University of Toronto.

GRANTS, SCHOLARSHIPS AND AWARDS

Research Grants

CUSE (Collaboration for Unprecedented Success and Excellence) Grant Program: Adaptive evolution in biological invasions. PI: J Friedman 2018. (\$5000)
CUSE Grant Program: Molecular mechanisms of cold-mediated regulation of flowering. PI: M.J. Rubin, Co-PI: J. Friedman 2018. (\$5000)
NSF DEB Award 1546106: EAGER: Mechanisms of sexual selection in plants with different reproductive strategies. PI: J. Friedman. 2016-2018. (\$149,905)
NSF DEB Award 1354259: Understanding the evolutionary transition between annual and perennial life history strategies. PI: J. Friedman. 2014-2017. (\$475,900)
Syracuse University, Office of the Vice-President for Research: Voyage to the Aleutians. PI: J. Friedman. 2016. (\$1500)
The Genetics Society: Heredity Fieldwork Grant. PI: J. Friedman. Co-PI: A.D. Twyford. 2013-2014. (\$2500)
Canadian Society for Ecology and Evolution Student Grant, 2009 (\$500)
Alberta Challenge Grants in Biodiversity, 2002-2003 (\$10,000)
Research Services Travel Grant, 2003 (\$1000)

Fellowships and Scholarships

Post-doctoral Fellowship, Natural Sciences and Engineering Research Council of Canada, 2009-2011 (\$80000)
Frederick P. Ide Graduate Award, 2008 (\$2200)
Ontario Graduate Scholarships in Science and Technology, 2006-2008 (\$30000)
Canadian Graduate Scholar, Natural Sciences and Engineering Research Council of Canada, 2004-2006 (\$70000)
Valerie Anderson Graduate Fellowship, 2005 (\$1992)
Mary H. Beatty Award, 2004 (\$5000)

University of Toronto Fellowship, 2004 (\$2500)
Post-Graduate Scholarship A, Natural Sciences and Engineering Research Council of Canada, 2000-2002 (\$34500)
iCORE (Informatics Circle of Research Excellence) Fellowship, 2000-2002 (\$24000)
Province of Alberta Graduate Scholarship, 2002-2003 (\$6200)
Alberta Heritage Master's Scholarship, 2002 (\$2000)
Graduate Studies Tuition Bursary, 2000 (\$3000)
Biological Science's Scholarship, 2000 (\$1500)
Dr. James A. and Connie P. Dickson Scholarship, 1999-2000 (\$500)
University College Special In-Course Scholarship, 1998-1999 (\$250)
F.C.A. Jeanneret University College Alumni Scholarship, 1996-1997 (\$2400)
Ontario Secondary School Teacher's Federation Bursary, 1996-1997 (\$1000)
Miller Thomson Foundation Scholarship, 1996-1997 (\$1000)
University of Toronto Scholar, 1996-1997 (\$3000)

Awards and Honors

Governor General's Academic Gold Medal of Canada for top PhD, 2010
Nominated as University of Toronto's candidate for NSERC Doctoral Prize, 2009
Annals of Botany Prize – best Graduate Student Talk at the Canadian Society for Ecology and Evolution Meetings, 2007
D. L. Bailey Award – best Ph.D. proposal in Botany, 2006
Best Student Presentation, Botany Graduate Seminar Series, 2005

ARTICLES PUBLISHED IN REFEREED JOURNALS

*- indicates author is a postdoctoral advisee; ** - indicates author is graduate advisee;
***- indicates author is undergraduate advisee.

Rubin* M.J., K. M. Schmid** and **J. Friedman**. 2018. Assortative mating by flowering time and its effect on correlated traits in variable environments. *Ecology and Evolution* 00: 1–11.

Rubin, M.J*. and **J. Friedman**. 2018. The role of cold cues at different life stages on germination and flowering phenology. *American Journal of Botany* 105: 749-759.

Twyford, A.D.*, A.M. Caola***, P. Choudhary, R. Raina, and **J. Friedman**. 2018. Loss of color pigmentation is maintained at high frequency in a monkey flower population. *American Naturalist* 191: 135-145.

Friedman, J. 2017. Variation in gene regulation underlying annual and perennial flowering in Arabideae species. *Molecular Ecology* 26: 3324-3326.

- Friedman, J.**, K.C. Hart***, M. den Bakker. 2017. Losing one's touch: Evolution of the touch-sensitive stigma in *Mimulus guttatus* species complex. *American Journal of Botany* 104: 335-341.
- Preston, J. C., M. McKeown, M. den Bakker, and **J. Friedman**. 2016. Comparative transcriptomics indicates a role for *Short Vegetative Phase (SVP)* genes in *Mimulus guttatus* vernalization responses. *G3: Genes, Genomes, Genetics*. 6: 1239-1249.
- Twyford, A.D*. and **J. Friedman**. 2015. Adaptive divergence in the monkey flower *Mimulus guttatus* is maintained by a chromosomal inversion. *Evolution*. 69: 1476-1486.
- Twyford, A.D*., M.A. Streisfeld, D.B. Lowry and **J. Friedman**. 2015. Genomic studies on the nature of species: adaptation and speciation in *Mimulus*. *Molecular Ecology*. 24: 2601-2609.
- Friedman J.** and M.J. Rubin*. 2015. All in good time: understanding annual and perennial strategies in plants. *American Journal of Botany*. 102: 497-499.
- Friedman, J.**, A.D. Twyford*, J.H. Willis, and B.K. Blackman. 2015. The extent and genetic basis of phenotypic divergence in life history traits in *Mimulus guttatus*. *Molecular Ecology*. 24: 111–122.
- Friedman, J.** 2014. Genetic determinants and epistasis for life history trait differences in *Mimulus guttatus*. *Journal of Heredity*. 105:816-827
- Yan, J., M.D. Bradley, **J. Friedman** and R.D. Welch. 2014. Phenotypic profiling of ABC transporter coding genes in *Myxococcus xanthus*. *Frontiers in Microbiology* 5: 352.
- Friedman, J.** and J.H. Willis. 2013. Major QTLs for critical photoperiod and vernalization underlie extensive variation in flowering in the *Mimulus guttatus* species complex. *New Phytologist* 199: 571-583.
- Friedman, J.** 2011. Gone with the wind: understanding evolutionary transitions between wind and animal pollination in the angiosperms. *New Phytologist* 191: 911-913
- Friedman, J.** and S.C.H. Barrett. 2011. Genetic and environmental control of temporal and size-dependent sex allocation in a wind-pollinated plant. *Evolution* 65: 2061–2074
- Friedman, J.** and S.C.H. Barrett. 2011. The evolution of ovule number and flower size in wind-pollinated plants. *American Naturalist* 177: 246-257
- Friedman, J.** and S.C.H. Barrett. 2009. Wind of change: new insights on the ecology and evolution of pollination and mating in wind-pollinated plants. *Annals of Botany* 103:1515-1527
- Friedman, J.** and S.C.H. Barrett. 2009. The consequences of monoecy and protogyny for mating in wind-pollinated *Carex*. *New Phytologist* 181: 489-497

Stehlik, I., **J. Friedman** and S.C.H. Barrett. 2008. Environmental influence on primary sex ratio in a dioecious plant. *Proceedings of the National Academy of Science* 105: 10852-10857

Friedman, J. and S.C.H. Barrett. 2008. High outcrossing in the annual colonizing species *Ambrosia artemisiifolia*. *Annals of Botany* 101: 1303-1309

Friedman, J. and S.C.H. Barrett. 2008. A phylogenetic analysis of the evolution of wind pollination in the angiosperms. *International Journal of Plant Sciences* 169: 49-58

Friedman, J. and L.D. Harder. 2005. Functional associations of floret and inflorescence traits among grass species. *American Journal of Botany* 92: 1862-1870

Friedman, J. and L.D. Harder. 2004. Inflorescence architecture and wind pollination in six grass species. *Functional Ecology* 18: 851-860

Dorken, M.E., **J. Friedman** and S.C.H. Barrett. 2002. The evolution and maintenance of monoecy and dioecy in *Sagittaria latifolia* (Alismataceae). *Evolution* 56: 31-41

Book Reviews:

Friedman, J. 2017. Review of *Approaches to Plant Evolutionary Ecology*, by G. P. Cheplick [book review]. *Quarterly Review of Biology* 92: 339-340.

In preparation:

Rubin, M.J.* , T.M. Middleton**, and **J. Friedman**. Does delaying development affect reproduction in an annual plant? To be submitted to a special issue of *New Phytologist*.

Twyford, A.D.* , L.Y.E Wong and **J. Friedman**. Patterns of genetic structure at different spatial scales. To be submitted to *Evolution Letters*.

Vallejo-Marin, M., J. Puzey, **J. Friedman** et al. Unravelling the complex history of a global plant invasion. To be submitted to *Evolution*.

J. Friedman. 2020. Evolutionary transitions between annuality and perenniality. Invited review to be submitted to *Annual Review of Ecology, Evolution and Systematics*.

INVITED TALKS

University of California at Davis. Dept of Evolution and Ecology. April 2019.

Green Life Sciences Symposium, University of Michigan. Ann Arbor, MI. September 2018.

Evolution of Plant Reproductive Systems: From Muddy Boots to Genomics. Toronto, Canada.

August 2018

International Workshop on Plant Reproductive Ecology. Kunming, China. June 2018.

Beijing Normal University. Biology. June 2018.

Queen's University. Department of Biology. March 2018.

York University. Department of Biology. February 2018.

Carleton University. Department of Biology. December 2017.

Botany Symposium: The Role of Boundaries in Plant Diversification. Fort Worth. June 2017

New York State Biotechnology Symposium, 9th Annual. SUNY ESF, May 2017
 microMORPH, Developmental Basis of Evolutionary Innovation, Harvard, March 2017
 University of Kentucky, Department of Biology. January 2017.
 Queen’s University. Department of Biology. October 2016.
 American Genetics Association Symposium: Genetics of Local Adaptation. Asilomar July 2016.
 British Columbia Nature Annual General Meeting. Comox, BC. May 2016.
 Harvard University. Arnold Arboretum. February 2015.
 Binghamton University. Department of Biology. November 2014.
 Novel Traits and Rapid Evolution Conference, Cornell University. May 2013.
 Cornell University. Department of Plant Biology. March 2013.
 University of Southern Mississippi. Department of Biology. February 2013.
 University of Vermont, Department of Plant Biology. November 2012.
 Syracuse University, Department of Biology. January 2011.
 Duke University, Department of Biology. April 2010.
 North Carolina State University, Department of Plant Sciences. November 2009.
 University of Toronto, Department of Ecology and Evolutionary Biology. May 2009.
 University of Calgary, Biology Department, November 2000.

CONFERENCE PRESENTATIONS

All presentations are talks, presented by first author, unless otherwise indicated.

*- indicates author is a postdoctoral advisee; **- indicates author is a graduate advisee.

Rubin, M.J.* and J. Friedman. Intraspecific variation in paths to fitness in plants with different life histories. Botanical foundations for perennial agriculture: Evolution and ecology of perennial herbaceous plants symposium: Botany Annual Meeting. July 2018. Rochester, MN.

Rubin, M.J.* and J. Friedman. Intraspecific variation in paths to fitness in plants with different life histories. EvoDay Annual Meeting on Local Adaptation. May 2018. Ithaca, NY.

Friedman, J. and Twyford, A.D*. 2018. Loss of color pigmentation is maintained at high frequency in a monkey flower population. American Society of Naturalists, Asilomar, CA. January 2018.

Friedman, J. The evolution and maintenance of boundaries between life history strategies. Botany Conference. Fort Worth, TX. June 2017.

Friedman, J. The evolution of reproductive strategies in annual and perennial plants. American Genetics Association President’s Symposium. Asilomar, CA. July 2016.

Rubin, M.J.*, and J. Friedman. Seed environment affects germination and flowering timing in *Mimulus guttatus*. Evolution Conference, TX. June 2016.

Schmid, K.***, and J. Friedman. Intrapopulation genetic variation for flowering and growth in response to photoperiod. Evolution Conference, TX. June 2016.

- Friedman, J. *Mimulus* – Diversity and Genetics. British Columbian Nature Conservancy Annual General Meeting. Comox Valley, B.C. May 2016.
- Rubin, M.J.*, and J. Friedman. The role of cold cues on life history transitions in the *Mimulus guttatus* species complex. Plant Biology Conference, MN. July 2015 (*poster*)
- Friedman, J. and J. Preston. Understanding the evolution and genetic basis of variation in vernalization in *Mimulus guttatus*. Society for the Study of Evolution Annual Meeting. Raleigh, NC. June 2014.
- Twyford, A.D*. and J. Friedman. Life-history evolution and the role of a chromosomal inversion for ecotype divergence in *Mimulus guttatus*. Society for the Study of Evolution Annual Meeting. Raleigh, NC. June 2014.
- Twyford, A.D*. and J. Friedman. Using genotyping by sequencing to resolve the intraspecific phylogeny of *Mimulus guttatus*. Mimulus Meeting. Durham, NC. June 2014
- Twyford, A.D.*, J. Friedman, J.H. Willis, B.K. Blackman. Phenotypic and genetic trade-offs between flowering and vegetative growth in *Mimulus guttatus*. Society for the Study of Evolution Annual Meeting. Snow Bird, Utah. June 2013.
- Friedman, J. Evolutionary transitions in plant reproductive strategies. Evo-Day Symposium, Cornell University Lab of Ornithology, May 2013
- Friedman, J. and J.H. Willis. Evolutionary genomics of life history strategies in *Mimulus guttatus*. Joint Congress on Evolutionary Biology. Ottawa, Canada. June 2012.
- Friedman, J. and J.H. Willis. Ecological genomics of complex traits in life history transitions in *Mimulus guttatus*. Duke University. October 2011.
- Friedman, J. and J.H. Willis. Local adaptation and evolution of life-history changes in *Mimulus guttatus*. Society for the Study of Evolution Annual Meeting. Portland, Oregon. June 2010.
- Friedman, J. and S.C.H. Barrett. Genetic and environmental control of sex allocation and dichogamy in ragweed. Canadian Society for Ecology and Evolution Annual Meeting. Halifax, Nova Scotia. May 2009.
- Friedman, J. The evolution and ecology of wind pollination. Ecology and Evolution Department, University of Toronto. May 2009.
- Barrett, S.C.H., I. Stehlik and J. Friedman. Sex ratio variation in dioecious plant populations. Frontiers of Sexual Plant Reproduction III. Tucson, Arizona. October 2008.
- Barrett, S.C.H., I. Stehlik and J. Friedman. Environmental influence on primary sex ratio in a dioecious plant. Analogies in the Evolution of Gender Expression and Sexual Strategies in Animals and Plants. Neuhausen/Fildern, Germany. September 2008.

- Barrett, S.C.H., and J. Friedman. Ecology and evolution of wind pollination. The Ecology and Evolution of Plant-Pollinator Interactions. Milwaukee, Wisconsin USA. August 2008.
- Friedman, J. and S.C.H. Barrett. A phylogenetic analysis of the evolution of wind pollination. Canadian Society for Ecology and Evolution Annual Meeting. Toronto, Ontario. May 2007.
- Friedman, J. and S.C.H. Barrett. The consequences of monoecy for pollination and mating in wind-pollinated *Carex* (Cyperaceae). Society for the Study of Evolution Annual Meeting. Stony Brook, New York. June 2006.
- Friedman, J. The evolution and ecology of wind pollination. PhD Proposal Seminar. Department of Botany, University of Toronto. January 2006.
- Friedman, J. and S.C.H. Barrett. Is wind pollination an inefficient process? Ontario Ecology and Ethology Colloquium. Ottawa, Ontario. May 2005.
- Friedman, J. On the ecology and evolution of wind pollination. Botany Graduate Students Seminar Series. Toronto, Ontario. April 2005.
- Friedman, J. Inflorescence architecture in grasses and the consequences for pollination. Ontario Ecology and Evolution Colloquium. Toronto, Ontario. May 2004.
- Friedman, J. and L.D. Harder. Wind pollination in grasses: the role of inflorescence architecture. Society for the Study of Evolution Annual Meeting. Chico, California. June 2003.
- Friedman, J. Wind pollination in grasses (Poaceae): Are they simply blowin' in the wind? Prairie Universities Biological Symposium. Calgary, Alberta. February 2002.
- Friedman, J. The evolution and maintenance of monoecy and dioecy in a plant species. Ecology Graduate Seminar Series. Calgary, Alberta. November 2000.
- Dorken, M.E., J. Friedman, and S.C.H. Barrett. The evolution and maintenance of monoecy and dioecy in a plant species. Society for the Study of Evolution Annual Meeting. Bloomington, Indiana. June 2000.

WORKSHOPS AND SYMPOSIA (PARTICIPANT)

- Plant Reproductive Ecology Workshop, 7th Annual. Kunming, China. June 2018
- Using Digitized Herbarium Data in Research Workshop. Fort Worth, Texas. June 2017
- EvoDay Symposium on Phylogenomics, Cornell Lab of Ornithology, May 2017
- MicroMORPH Workshop, Arnold Arboretum, Harvard University, March 2017
- Communication Workshop with Dr. Chris Allen, Syracuse University, March 2017
- Linux for Biologists, Biotechnology Research Center, Cornell University February 2015
- Blackboard Faculty Training, Syracuse University, October 2015
- EvoDay Symposium on Sexual Selection, Cornell Lab of Ornithology, May 2014

Writing Science Workshop with Dr. Joshua Schimel, Syracuse University, September 2014
EvoDay Symposium on Novel Traits & Rapid Evolution, Cornell Lab of Ornithology, May 2013
Root Imaging Workshop, Duke University, September 2011
Next-Gen Sequencing Course, NESCent Academy, Durham, August 2011.

TEACHING

Instructor:

Evolutionary Genetics. Syracuse University 2013-18. Advanced undergraduate/graduate.
Ecology and Evolution. Syracuse University 2015-18. Undergraduate.
Plant Biology. Syracuse University 2016. Graduate
Biological Literature. Syracuse University 2015. Graduate.
Evolutionary Mechanisms. Syracuse University 2013-2014. Advanced undergraduate/graduate.
Sexual Selection and Mating Strategies. Syracuse University 2014. Advanced undergraduate/graduate.
Comparing Sperm and Pollen Evolution. Syracuse University 2014. Graduate.

Teaching Assistant:

Environmental Biology, U. of Toronto. 2008. Redesign field and laboratory manual.
Environmental Biology, U. of Toronto, 2004-2008. Leading field trips, laboratories and marking.
Field Botany, U. of Toronto, 2007. Field course involving plant identification, vegetation analysis and independent projects.
Organisms in their Environment, U. of Toronto, 2004-2006. Tutorials, preparation and marking.
Evolutionary Biology, U. of Calgary, 2003. Tutorials, preparation and marking.
General Biology, U. of Calgary, 2000-2001. Lab preparation, instruction and marking.

Research Assistant:

Research Assistant (Dr S.C.H. Barrett), University of Toronto, 2000.
Field Research Assistant (Dr K.J. Esler), University of Stellenbosch, South Africa, 1999.
Research Assistant (Dr S.M. Smith), University of Toronto, 1998-1999.
Research Assistant (Dr R.I.C. Hansell) University of Toronto. 1997-1998.

ADVISING AND GRADUATE COMMITTEES

Post-doctoral Advisees

2016-2018 Karine Leydet
2014- 2018 Matthew Rubin
2012-2014 Alexander Twyford

Graduate Students

2016- present Abrar Aljiboury (PhD)
2015-2016 Reno Eckebrecht (MS)
2015 Christina Giovinazzo (PhD rotation student)
2014-2016 Kelly Schmid (MS)

Graduate Student Committee Member

PhD committee: Linnea Ritchie, Rose Osborne, Ryan Dunk, Kelly Schmid, Kelsey Martinez, Shengpei Wang, Kristin Haynes, Emma Whittington, Elizabeth Droge-Young, Brian Gress

MSc committee: Haley Plasman, Jessica McCordick

PhD examination committee: Luka Negoita, Leanna Matthews, Andrew Siefert

MSc examination committee: Laura Porturas

PhD candidacy examination committee: Irmak Erdem, Elise Hinman, Leanna Matthews

Undergraduate researchers

2018- 2019 Alexander Le
 2018- 2019 Alexandra Loverde
 2017- 2018 Melanie Tacher
 2017- 2018 Katherine Morris
 2016- 2019 Taylor Middleton
 2017 Jennifer Nguyen
 2015-2017 Genevieve Pilch
 2014-2017 Anna Bjarvin
 2015-2017 Lynjen Lu
 2014-2015 Nick Conchieri
 2014-2015 Jeff Darkwa
 2014 Shahin Bazeli
 2013-2015 Marcus Rivera
 2013-2014 Katie Hart
 2013-2014 Aaron Caola
 2012-2013 Adam Isbiroglu

PROFESSIONAL ASSOCIATIONS AND SERVICE***Departmental/University Service***

Co-chair, Graduate Education Committee, Syracuse U. 2017-2018

First Year Forum leader, College of Arts and Science, Syracuse U, 2017

Chairs Advisory Committee, Department of Biology, Syracuse U, 2015-2018

Review Committee for Departmental Chair, Syracuse U, 2016-2017

Vision and Long-Term Planning Committee, Dept. of Biology, Syracuse U, 2015-2017

Greenhouse Committee, Department of Biology, Syracuse U, 2014-2018

Undergraduate Curriculum Committee, Department of Biology, Syracuse U. 2013-2014

SU WiSE (Women in Science & Engineering) and SU Advance (Increasing the Participation and Advancement of Women in Academic Science & Engineering Careers) participant, 2012-2018

Curriculum Review and Renewal Committee, Faculty of Arts and Science, U of Toronto –

Graduate student representative, 2006-2007

Ombudsperson, Ecology and Evolution Graduate Students Association, U of Toronto 2006-2007

Botany Dept Seminar Committee – Graduate student representative, U of Toronto 2005-2006

Ombudsperson, Botany Graduate Students Association, U of Toronto 2005-2006

President, Botany Graduate Students Association, U of Toronto 2004-2005

Search Committee, Functional Plant Ecology Assistant Professor, graduate student representative, U of Toronto 2004-2005

Faculty of Science Women's Network, U of Toronto 2002-2003
Biological Sciences Representative, Graduate Students Association, U of Calgary, 2001-2002
Search Committee, Ecology Assistant Professor, graduate student rep. U of Calgary 2002-2003

Service Outside University

PLANTS (Preparing Leaders And Nurturing Tomorrow's Scientists) Mentor for Botanical Society of America, 2017
Science Outreach at Westcott Community Center After-School Program, Syracuse City School District, 2016-2018

Associate Editor

American Journal of Botany, 2016-present

External Reviewer

Journals: American Journal of Botany, American Naturalist, Australian Journal of Botany, Axios Review, Botany, Central European Journal of Biology, Ecology, Evolution, Functional Ecology, Genetics, International Journal of Plant Sciences, Journal of Ecology, Journal of Theoretical Biology, Molecular Ecology, Molecular Phylogenetics and Evolution, New Phytologist, Oecologia, Plant Biology, Plant Species Biology, PLoS Genetics, PLoS One, Sexual Plant Reproduction.

Grants: NSF GRFP Panel 2014

(*ad-hoc* reviewer): National Science Foundation Dimensions of Biodiversity Program, Molecular and Cell Biology Program, Plant Genome Research Program, Research Initiation Award Program; Swiss National Science Foundation; M.J. Murdock Charitable Trust; Graduate Women in Science Fellowship.

Society Membership

American Genetics Association, American Society of Naturalists, Botanical Society of America, Canadian Society of Ecology and Evolution, Society for the Study of Evolution