

CURRICULUM VITAE

JILL C. PRESTON

Professor

Department of Plant Biology
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EDUCATION

University of Missouri –St. Louis	Ecology, Evolution and Systematics	PhD 2007
Missouri Botanical Garden	Internship in Conservation Biology	2006
University of Nottingham	Plant Genetic Manipulation	MSc 2000
Edinburgh Napier University	Biological Sciences	BSc 1994

RESEARCH INTERESTS

- Evolutionary genetics of inflorescence and flower development
- Adaptations to cold and hot seasonal climates
- Role of gene duplications and divergence in plant morphological diversification
- Evolution of grass flowering time
- Molecular evolution of gene families

POSITIONS HELD

Professor, The University of Vermont, Department of Plant Biology, 2023-present
Codirector of the Biological Data Science (BiDS) program, The University of Vermont, 2023-present
Associate Professor, The University of Vermont, Department of Plant Biology, 2018-2023
Assistant Professor, The University of Vermont, Department of Plant Biology, 2012-2018
Postdoctoral Fellow with Dr. Lena Hileman, University of Kansas, Department of Ecology and Evolutionary Biology, 2007-2012
Graduate Research Assistant with Dr. Elizabeth Kellogg – University of Missouri – St. Louis, Department of Biology, 2002-2007
Research Assistant, Biogemma, Cambridge (UK), 2000-2002
Molecular Laboratory Manager, Royal Botanic Gardens Edinburgh (UK), 1998-1999
Research Technician, Royal Botanic Gardens Edinburgh (UK), 1996-1998

FUNDING

Dissecting the genetic basis for correlations between plant growth, yield, and stress resilience. USDA-NIFA HATCH (VT-H02712). J. C. Preston (PI). \$45,000. 2023-2026.
Development of the grass subfamily Pooideae as a powerful comparative genomics model for temperate crop and biofuel development. Joint Genome Institute, US Department of Energy (508175). J. C. Preston (PI), M. Bartlett (coPI), S. Fjellheim (coPI). Cost of deep genome and transcriptome sequencing. 2022-onward.
Evolution of temperature-mediated flowering in grasses. National Science Foundation. J. C. Preston (PI). \$621,354. 2022-2025.

Exploring epigenetic mechanisms of flowering time evolution in the temperate cereal grass clade Pooideae. USDA-NIFA HATCH (VT-H02712). J. C. Preston (PI). \$45,000. 2020-2023.

Live or let die? Deciphering the developmental and genetic basis for transitions between perenniality and annuality in temperate grasses. Norway Research Council. S. Fjellheim (PI), Å. Ergon (coPI), T. R. Hvidsten (coPI), J. C. Preston (coPI), C. Osborne (coPI), B. Trevaskis (coPI) and X. Yongzhong (coPI). \$1,200,000. 2020-2025.

Perenniality, abiotic stress tolerance, and biomass allocation in *Brachypodium*, a model grass genus for bioenergy. Joint Genome Institute, US Department of Energy (503006). D. L. Des Marais (PI), R. Amasino (coPI), D. Woods (coPI), P. Catalan (coPI), B. Contreras-Moreira (coPI), P. Edger (coPI), J. C. Preston (coPI). Cost of deep genome and transcriptome sequencing. 2017-onward.

Genomic comparison of freezing and drought stress response across the temperate cereal grass clade Pooideae. USDA-HATCH (CALS). J. C. Preston (PI). \$45,000. 2015-2020.

Evolutionary genetics of vernalization responsiveness in the cold temperate grass subfamily Pooideae. National Science Foundation. J. C. Preston (PI). \$420,000. 2014-2019.

Emperors of the sun: Linking the evolution of flowering time in long days with a major niche transition in the grass subfamily Pooideae. Norway Research Council. Siri Fjellheim (PI), Torgeir Hvidsten (co-PI), Sigbjørn Lien (co-PI), Simen Sandve (co-PI), Ben Trevaskis (co-PI), and Jill Preston (co-PI). \$1,100,000, 2014-2019.

Understanding the evolutionary transitions between annual and perennial life history strategies. National Science Foundation. Jannice Friedman (PI), J. C. Preston (senior personnel), and Alex Twyford (senior personnel). \$500,000. 2014-2017.

Determining the genetic basis of flowering time variation in the North American *Mimulus guttatus* species complex. REACH award, University of Vermont, J. C. Preston (PI), \$36,183, 2013-2014.

WYITA travel grant for Plant Biology 2013 Conference, Providence, Rhode Island, American Society of Plant Biologists. \$1000, 2013.

Visiting researcher grant for a one-month research stay at the Norwegian University of Life Sciences, Ås, Norway, \$6795, 2013.

Determining the genetic basis of sympetaly in *Petunia* and other asterids. John and Christine Craighead Foundation, J. C. Preston (PI), \$137,913, 2012-2015.

Evolution of a cold season adaptation in the temperate grass subfamily Pooideae. USDA-HATCH, J. C. Preston (PI), \$60,000. 2012-2015.

NSF travel grant to microMORPH, Harvard U. Arnold Arboretum, Boston, MA, 2012.

Determining the evolutionary consequences of gene duplications in the *SPL* family of transcription factors. National Science Foundation, L. C. Hileman (PI) and J. C. Preston (co-PI), \$240,000, 2011-2013.

Raju Mehra award for an outstanding foreign graduate student, University of Missouri – St. Louis, \$500, 2007

Travel grant for Plant Genetics 2005 Conference, Snowbird, UT, Department of Biology and International Center for Tropical Ecology, University of Missouri – St. Louis, 2005

Studentship for Cereal Genomics Workshop, Cold Spring Harbor, NY, 2005

Research Grant for “Duplication and diversification of *APETALA1/FRUITFULL*-like genes in grasses (Poaceae)”, Sigma Xi Grant-in-Aid of Research, JC Preston, PI, \$500, 2005

Travel grant for Evolution 2004 Conference, Fort Collins, CO, Graduate School and

Department of Biology, University of Missouri-St. Louis, 2004
Travel grant for Evolution 2003 Conference, Chico, CA, Graduate School and Department of
Biology, University of Missouri-St. Louis, 2003
Graduate scholarship, Plant Science Division, University of Nottingham, £1000, 1999

PUBLICATIONS

2024

Stolsmo, S. P., Lindberg, C. L., Ween, R. E., Schat, L., **Preston, J. C.**, Humphreys, A. M., and Fjellheim, S. (2024) Evolution of frost and drought responses in cool season grasses (Pooideae): was drought tolerance a precursor to frost tolerance? *Journal of Experimental Botany*. 75: 6405-6422.

Kennedy, A., Meixia, L., Vandeperre, A., Hameed, M. U., Van Dyck, M., Engelen, S., **Preston, J. C.**, and Geuten, K. (2024) VRT2 re-initiates vernalisation when interrupted by warm temperatures in a temperate grass model. *Plant Physiology*. doi: 10.1093/plphys/kiae498

2023

Khodaverdi, M., Mullinger, M. D., Shafer, H. R., and **Preston, J. C.** (2023) *Melica* as an emerging model system for comparative studies in temperate Pooideae grasses. *Annals of Botany*.

Hjertaas, A. C., **Preston, J. C.**, Kainulainen, K., Humphreys, A., and Fjellheim, S. (2023) Evidence for parallelisms in the convergent evolution of annual-perennial life history syndromes. *Frontiers in Plant Science*. 13: 1048656.

Das, A., Dedon, N., Enders, D., Fjellheim, S., and **Preston, J. C.** (2023) Testing the chilling-before drought-tolerance hypothesis in Pooideae grasses. *Molecular Ecology*. 32: 772-785.

Paliocha, M., Schubert, M., **Preston, J. C.**, and Fjellheim, S. (2023) Independent recruitment of FRUITFULL-like transcriptional factors in the convergent evolution of vernalization-responsive flowering in the grass family. *Molecular Phylogenetic and Evolution*. 179: 107678.

2022

Lewis, C. D., **Preston, J. C.**, and Tierney, M. L. CCDC22 and CCDC93, two potential retriever-interacting proteins, are required for root and root hair growth in Arabidopsis. *Frontiers in Plant Science*. 13: 1051503.

Preston, J. C., Sinha, N. R., Torii, N. U., and Kellogg, E. A. (2022) Plant structure and function: evolutionary origins and underlying mechanisms. *Plant Physiology*. 190: 1-4.

Fjellheim, S., Young, D. A., Paliocha, M., Johansen, S. S., Schubert, M., and **Preston, J. C.** (2022) Variation in photoperiodic flowering correlates with major niche transitions in Pooideae and involves evolution of CCT domain genes. *Journal of Experimental Botany*. 73: 4079-4093.

Preston, J. C. (2022) Gene duplication. Buffering growth at the shoot tip. *Nature Plants*. 8: 322-323.

Preston, J. C., and Fjellheim, S. (2022) Flowering time runs hot and cold. Update on the evolution of temperature regulated flowering. *Plant Physiology*. 190: 5-18.

Preston, J. C., Wooliver, R., Driscoll, H., Coughlin, A., Sheth, S. N. (2022) Spatial variation in high temperature-regulated gene expression predicts evolution of plasticity with climate change in the scarlet monkeyflower. *Molecular Ecology*. 31: 1254-1268.

2021

Das, A., Prakash, A., Dedon, N., Doty, A., Siddiqui, M., and **Preston, J. C.** (2021) Variation in climatic tolerance, but not stomatal traits, partially explains Pooideae grass distributions. *Annals of Botany*. 128: 83-95.

Preston, J. C. (2021) Insights into the evo-devo of plant reproduction using next-generation sequencing approaches. *Journal of Experimental Botany*. 72: 1536-1545.

2020

Schubert, M., Humphreys, A. M., Lindberg, C. L., **Preston, J. C.**, and Fjellheim, S. (2020) To coldly go where no grass has gone before: A multidisciplinary review of cold adaptation in Poaceae. *Annual Plant Reviews*. 3: 523-562.

Preston, J. C. and Fjellheim, S. (2020) Understanding past, and predicting future, niche transitions based on grass flowering time variation. *Plant Physiology*. 183: 822-839.

Lindberg, C. L., Hanslin, H. M., Schubert, M., Marcussen, T., Trevaskis, B., **Preston, J. C.**, and Fjellheim, S. (2020) Increased above ground resource allocation is a likely precursor for independent evolutionary origins of annuality in the Pooideae grass subfamily. *New Phytologist*. 228: 318-329.

2019

Preston, J. C., Powers, B., Kostyun, J. L., Driscoll, H., Zhang, F., and Zhong, J. (2019) Implications of region-specific gene expression for development of the partially fused petunia corolla. *The Plant Journal*. 100: 158-175.

Kostyun, J. L., Robertson, J. E., and **Preston, J. C.** (2019) Evidence of a largely staminal origin for the *Jaltomata calliantha* (Solanaceae) floral corona. *EvoDevo*. 10: 9.

2018

Fjellheim, S. and **Preston, J. C.** (2018) Shedding light on the role of seasonal flowering in plant niche transitions. *American Journal of Botany*. 105: 136-138.

Zhong, J., McKeown, M., Poire, A., and **Preston, J. C.** (2018) Successive evolutionary steps drove Pooideae grasses from tropical to temperate regions. *New Phytologist*. 217: 925-938.

2017

Kostyun, J. L., **Preston, J. C.**, and Moyle, L. C. (2017) Peramorphic developmental changes contribute to floral diversity among *Jaltomata* (Solanaceae) species. *EvoDevo*. 8: 17.

Palacio-López, K., **Preston, J. C.**, and Molofsky, J. (2017) High temperature-induced plasticity and its genetic pathway in wild ecotypes of *Arabidopsis thaliana*. *International Journal of Plant Sciences*. 178: 680-688.

McKeown, M.*, Schubert, M.*, **Preston, J. C.**, and Fjellheim, S. (2017) Evolution of the miR5200-FLOWERING LOCUS T flowering time regulon in the temperate grass subfamily Pooideae. *Molecular Phylogenetics and Evolution*. 114: 111-121.

Preston, J. C. (2017). Plant evolution: an introduction to the history of life (Karl Niklas) book review. *Bioscience*. 67: 577-578.

Zhong, J., **Preston, J. C.**, Hileman, L., and Kellogg, E. A. (2017). Repeated and diverse losses of corolla bilateral symmetry in the Lamiaceae. *Annals of Botany*. 119: 1211-1223.

2016

Zhong, J., Powell, S., and **Preston, J. C.** (2016) Functional changes in NAC-domain transcription factors are implicated in the evolution of petal fusion. *Plant Biology*. 18: 893-902.

- McKeown, M., Schubert, M., Marcussen, T., Fjellheim, S., and **Preston, J. C.** (2016) Evidence for an early origin of vernalization responsiveness in temperate Pooideae grasses. *Plant Physiology*. 172: 416-426.
- Preston, J. C.**, Zhong, J., McKeown, M., den Bakker, M., and Friedman, J. (2016) Comparative transcriptomics indicates a role for *SHORT VEGETATIVE PHASE (SVP)* genes in *Mimulus guttatus* vernalization response. *G3: Genes, Genomes, Genetics*. 6: 1239-1249.
- Preston, J. C.** (2016) Evo-devo: the role of regulatory and protein-coding evolution on the diversification of plant development. In: Kliman, R. M. (ed.), *The Encyclopedia of Evolutionary Biology*, vol. 2, pp. 13-18, Oxford: Academic Press.
- Woods, D*, McKeown, M*, Dong, Y., **Preston, J. C.**, and Amasino, R. M. (2016) Evolution of *VRN2/Ghd7*-like genes in vernalization-mediated repression of grass flowering. *Plant Physiology*. 170: 2124-2135. *shared first authorship
- Preston, J. C.**, Jorgensen, S. A., Orozco, R., and Hileman, L. C. (2016) Paralogous *SQUAMOSA PROMOTER BINDING PROTEIN-LIKE (SPL)* genes differentially regulate leaf initiation and reproductive phase change in petunia. *Planta*. 243: 429-440.
- 2015**
- Zhong, J., and **Preston, J. C.** (2015) Bridging the gaps: evolution and development of perianth fusion. *New Phytologist*. 208: 330-335.
- 2014**
- Preston, J. C.**, Barnett, L. L., Kost, M. A., Oborny, N. J. and Hileman, L. C. (2014) Optimization of virus-induced gene silencing to facilitate evo-devo studies in the emerging model species *Mimulus guttatus* DC. (Phrymaceae). *Annals of the Missouri Botanical Garden*. 99: 301-312.
- Preston, J. C.**, Jorgensen, S. A., and Jha, S. G. (2014) Functional characterization of duplicated *SUPPRESSOR OF OVEREXPRESSION OF CONSTANS 1*-like genes in petunia. *PLoS One*. 9: e96108.
- Jorgensen, S. A., and **Preston, J. C.** (2014) Differential *SPL* gene expression patterns reveal candidate genes underlying flowering time and architectural differences in *Mimulus* and *Arabidopsis*. *Molecular Phylogenetics and Evolution*. 73: 129-139.
- 2013**
- Preston, J. C.**, and Sandve, S. R. (2013) Adaptations to seasonality and the winter freeze. *Frontiers in Plant Evolution and Development*. 4:167.
- Preston, J. C.**, Hileman, L. C. (2013) Functional evolution in the plant *SQUAMOSA-PROMOTER BINDING PROTEIN-LIKE (SPL)* gene family. *Frontiers in Plant Science*. 4: 1-13.
- 2012**
- Preston, J. C.**, Hileman, L. C. (2012) Parallel evolution of TCP and B-class genes in Commelinaceae flower bilateral symmetry. *EvoDevo*. 3: 6.
- Preston, J. C.**, Wang, H., Kursel, L., Doebley, J., Kellogg, E. A. (2012) The role of *teosinte glume architecture (tga1)* in coordinated regulation and evolution of grass glumes and inflorescence axes. *New Phytologist*. 193: 204-215.
- 2011**
- Preston, J. C.**, Hileman, L. C., Cubas, P. (2011) Reduce, reuse and recycle: evo-devo and trait diversity. *American Journal of Botany*. 98: 1-7.
- Preston, J. C.**, Martinez, C. C., Hileman, L. C. (2011) Gradual disintegration of the floral

symmetry genetic network is implicated in the evolution of a wind-pollination syndrome. *Proceedings of the National Academy of Sciences USA*. 108: 2343-2348. Faculty of 1000 selected.

2010

- Preston, J. C.** (2010) Evolutionary genetics of core eudicot inflorescence and flower development. *International Journal of Plant Developmental Biology*. 4: 17-29.
- Preston, J. C.** and Hileman, L. C. (2010) SQUAMOSA-PROMOTER BINDING PROTEIN1 initiates flowering in *Antirrhinum majus* through the activation of meristem identity genes. *The Plant Journal*. 62: 704-712.
- Ronse, A. C., Popper, Z. A., **Preston, J. C.**, Watson, M. F. (2010) Taxonomic revision of European *Apium* L. s.l.: *Helosciadium* W.D.J.Koch restored. *Plant Systematics and Evolution*. 287: 1-17.

2009

- Preston, J. C.**, Christensen, A., Malcomber, S. T. and Kellogg, E. A. (2009) MADS-box gene expression suggests a floral origin for sterile organs of the grass spikelet. *American Journal of Botany*. 96(8): 1-11.
- Preston, J. C.** and Hileman, L. C. (2009) Developmental genetics of floral symmetry evolution. *Trends in Plant Science*. 14(3): 147-154.
- Preston, J. C.**, Kost, M. and Hileman, L. C. (2009) Conservation and diversification of the symmetry developmental program among close relatives of snapdragon with divergent floral morphologies. *New Phytologist*. 182(3): 751-762.

2008

- Preston, J. C.** and Kellogg, E. A. (2008) Discrete developmental roles for temperate cereal grass *VERNALIZATION1/FRUITFULL*-like genes in flowering competency and the transition to flowering. *Plant Physiology*. 146: 1-12.

2007

- Preston, J. C.** and Kellogg, E. A. (2007) Conservation and divergence of *APETALA1/FRUITFULL*-like gene function in grasses: evidence from gene expression analyses. *The Plant Journal*. 52(1): 69-81.

2006

- Malcomber, S. T., **Preston, J. C.**, Reinheimer, R., Kossuth, J. and Kellogg, E. A. (2006). Developmental gene evolution and the origin of grass inflorescence diversity. *Advances in Botanical Research*. 44: 426-481.
- Preston, J. C.** and Kellogg, E. A. (2006) Reconstructing the evolutionary history of paralagous *APETALA1/FRUITFULL*-like genes in grasses (Poaceae). *Genetics*. 174: 421-437.

2004

- Sales, F., Hedge, I. C., Eddie, W., **Preston, J.** and Moeller, M. (2004) *Jasione* L. taxonomy and phylogeny. *Turkish Journal of Botany*. 28(1-2): 253-259.

2003

- Bateman, R. M., Hollingsworth, P. M., **Preston, J.**, Yi-Bo, L., Pridgeon, A. M. and Chase, M. W. (2003) Molecular phylogenetics and evolution of Orchidinae and selected Habenariinae (Orchidaceae). *Botanical Journal of the Linnean Society*. 142(1): 1-40.

2002

- Sinclair, W. T., Mill, R. R., Gardner, M. F., Woltz, P., Jaffre, T., **Preston, J.**, Hollingsworth, M. L., Ponge, A. and Moller, M. (2002) Evolutionary relationships of the New Caledonian heterotrophic conifer, *Parasitaxus usta* (Podocarpaceae), inferred from

chloroplast *trnL*-F intron/spacer and nuclear rRNA ITS2 sequences. *Plant Systematics and Evolution*. 233(1-2): 79-104.

2001

- Atkins, H., **Preston, J.** and Cronk, Q. C. B. (2001) A molecular test of Huxley's line: *Cyrtandra* (Gesneriaceae) in Borneo and the Philippines. *Biological Journal of the Linnean Society*. 72(1): 143-159.
- Pennington, R. T., Lavin, M., Ireland, H., Klitgaard, B., **Preston, J.**, and Hu, J. M. (2001) Phylogenetic relationships of basal papilionoid legumes based upon sequences of the chloroplast *trnL* intron. *Systematic Botany*. 26(3): 537-556.
- Radford, E. A., Watson, M. F., and **Preston, J.** (2001) Phylogenetic relationships of species of *Aciphylla* (Apiaceae, subfamily Apioideae) and related genera using molecular morphological, and combined data sets. *New Zealand Journal of Botany*. 39(2): 183-208.

2000

- Harris, D. J., Poulsen, A. D., Frimodt-Møller, C., **Preston, J.**, and Cronk, Q. C. B. (2000) Rapid radiation in *Aframomum* (Zingiberaceae): Evidence from nuclear ribosomal DNA internal transcribed spacer (ITS) sequences. *Edinburgh Journal of Botany*. 57(3): 377-395.
- Ireland, H., Pennington, R. T., **Preston, J.** (2000) Molecular systematics of the Swartzieae. In: P. Herendeen & A. Bruneau (editors). *Advances in Legume Systematics. Part 9*. pp.217-232. Royal Botanic Gardens, Kew.
- Long, D. G., Møller, M. and **Preston, J.** (2000) Phylogenetic relationships of *Asterella* (Aytoniaceae, Marchantiopsida) inferred from chloroplast DNA sequences. *Bryologist*. 103(4): 625-644.

TEACHING

BCOR 2300 Genetics, Fall 2020-Present

BCOR 011 Exploring Biology, Fall 2014-2019

PBIO 3800 The Evolution of Development, Spring 2014, 2016, 2018, 2024

PBIO 295 The Evolution of Plant Sex, Spring 2017, 2022

PBIO 295 Flower Development and Evolution, Spring 2019