

Emily B. Josephs

Dept. of Plant Biology
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Appointments

- 2019 – Assistant Professor, Plant Biology, Michigan State University.
Core Member of the Ecology, Evolution, and Behavior Program
- 2016 – 18 NSF Postdoctoral Fellow (Plant Genome Research Program), University of California, Davis.
Mentors: Graham Coop & Jeffrey Ross-Ibarra.

Education

- 2010 – 16 Ph.D. Ecology & Evolutionary Biology. University of Toronto.
Advisors: John Stinchcombe & Stephen Wright.
- 2004 – 08 A. B. Human Biology: Ecosystems, Evolution & Environment. Brown University.
Honors thesis advisor: Johanna Schmitt.

Publications

Peer-reviewed Publications

Mentees and Josephs lab members are underlined.

22. M.D. Roberts & **E.B. Josephs**. Weaker selection on genes with treatment-specific expression consistent with a limit on plasticity evolution in *Arabidopsis thaliana*. In press at *Genetics*
<https://doi.org/10.1093/genetics/iyad074>
21. M.K. Wilson Brown & **E.B. Josephs**. Seasonal models reveal niche changes during invasion in *Capsella bursa-pastoris*. *American Journal of Botany*. 110 (3), <https://doi.org/10.1002/ajb2.16140>.
20. J.R. Lasky, **E.B. Josephs**, & G.P. Morris (2023) Genotype–environment associations to reveal the molecular basis of environmental adaptation. *The Plant Cell* 35(1), 125-138 <https://doi.org/10.1093/plcell/koac267>
19. S.E. Johnston, N. Chen, & **E.B. Josephs**. Taking Quantitative Genomics into the Wild (2022) *Proceedings of the Royal Society B* 289:1989 <https://doi.org/10.1098/rspb.2022.1930>
18. S.M. Wadgyamar, M.L. DeMarche, **E.B. Josephs**, S.N. Sheth, & J.T. Anderson (2022) Local adaptation: Causal agents of selection and adaptive trait divergence. *Annual Review of Ecology, Evolution, and Systematics* 53:87-111 <https://doi.org/10.1146/annurev-ecolsys-012722-035231>
17. N.S. Catlin & **E.B. Josephs** (2022) The important contribution of transposable elements to phenotypic variation and evolution. *Current Opinion in Plant Biology* 65 (102140) <https://doi.org/10.1016/j.pbi.2021.102140>
16. R. Horvath, **E.B. Josephs**, E. Pesquet, J. R. Stinchcombe, S. I. Wright, D. Scofield, T. Slotte (2021) Selection on accessible chromatin regions in *Capsella grandiflora*. *Molecular Biology and Evolution* doi: 10.1093/molbev/msab270
15. **E.B. Josephs**, M. L. Van Etten, A. Harkess, A. Platts, R. Baucom. (2021) Adaptive and maladaptive expression plasticity underlying herbicide resistance in an agricultural weed. *Evolution Letters* 5 (4) doi: 10.1002/evl3.241
14. L. Wang, **E.B. Josephs**, K.M. Lee, L.M. Roberts, R. Réllan-Álvarez, J. Ross-Ibarra, & M.B. Hufford. (2021) Molecular parallelism underlies convergent highland adaptation of maize landraces. *Molecular Biology & Evolution* 38 (9) doi: 10.1093/molbev/msab119
13. J. Blanc, K.A.G. Kremling, E. Buckler, & **E.B. Josephs**. (2021) Local adaptation contributes to gene expression divergence in maize. *G3 Genes Genomes Genetics*. 11 (2) doi: 10.1093/g3journal/jkab004

12. **E.B. Josephs**, Y.W. Lee, C. Wood, D.J. Schoen, S.I. Wright, J.R. Stinchcombe. (2020) The evolutionary forces shaping cis and trans regulation of gene expression within a population of outcrossing plants. *Molecular Biology & Evolution*. 37 (8) 2386-2393 <https://doi.org/10.1093/molbev/msaa102>
11. J. Uzunović, **E.B. Josephs**, J.R. Stinchcombe, S.I. Wright. (2019) Transposable elements are important contributors to standing variation in gene expression in *Capsella grandiflora*. *Molecular Biology & Evolution*. 36 (8) 1734-1745 doi: 10.1093/molbev/msz098
10. **E.B. Josephs**, J.J. Berg, J. Ross-Ibarra, & G. Coop. (2019) Detecting adaptive differentiation in structured populations with genomic data and common gardens. *Genetics*. doi:10.1534/genetics.118.301786
9. **E.B. Josephs** (2018) Determining the evolutionary forces shaping GxE. *New Phytologist*. doi: 10.1111/nph.15103
8. **E.B. Josephs**, S.I. Wright, J.R. Stinchcombe & D. J. Schoen. (2017) The relationship between selection, network connectivity, and regulatory variation within a population of *Capsella grandiflora*. *Genome Biology and Evolution* 9 (4): 1099-1109. [Recommended by the Faculty of 1000]
7. **E.B. Josephs**, J.R. Stinchcombe, & S.I. Wright. (2017) What can genome-wide association studies tell us about the evolutionary forces maintaining genetic variation for quantitative traits? *New Phytologist* 214 (1) 22-33. [In top 20 downloaded articles for *New Phytologist* in 2017-2018]
6. **E.B. Josephs**, Y.W. Lee, J.R. Stinchcombe, & S.I. Wright. (2015) Association mapping reveals the role of purifying selection in the maintenance of genomic variation for gene expression. *Proceedings of the National Academy of Sciences* 112 (50) 15390-15395
5. A. Sicard, C. Kappel, **E.B. Josephs**, Y.W. Lee, C. Marona, J.R. Stinchcombe, S.I. Wright, & M. Lenhard. (2015) Divergent sorting of a balanced ancestral polymorphism underlies the establishment of gene-flow barriers in *Capsella*. *Nature Communications*. 6:7960
4. G.M. Douglas, G. Gos, K.A. Steige, A. Salcedo, K. Holm, **E.B. Josephs**, R. Arunkumar, J.A. Ågren, K.M. Hazzouri, W. Wang, A.E. Platts, R.J. Williamson, B. Neuffer, M. Lascoux, T. Slotte, & S.I. Wright. (2015) Hybrid origins and the earliest stages of diploidization in the highly successful recent polyploid *Capsella bursa-pastoris*. *Proceedings of the National Academy of Sciences* 112 (9) 2806-2811.
3. R.J. Williamson*, **E.B. Josephs***, A.E. Platts, K.M. Hazzouri, A. Haudry, M. Blanchette, & S.I. Wright. (2014) Evidence for widespread positive and negative selection in coding and conserved noncoding regions of *Capsella grandiflora*. *Plos Genetics* 10(9): e1004622 (*First two authors contributed equally)
2. R. Arunkumar, **E.B. Josephs**, R.J. Williamson, & S.I. Wright. (2013) Pollen-specific, but not sperm-specific, genes show stronger purifying selection and higher rates of positive selection than sporophytic genes in *Capsella grandiflora*. *Molecular Biology and Evolution* 30 (11): 2475-2486
1. M. Debieu, C. Tang, B. Stich, T. Sikosek, S. Effgen, **E.B. Josephs**, J. Schmitt, M. Nordborg, M. Koornneef, & J. de Meaux. (2013) Co-Variation between seed dormancy, growth rate and flowering time changes with latitude in *Arabidopsis thaliana*. *Plos ONE* 8(5): e61075

Non-peer-reviewed Publications

2. **E.B. Josephs** (2021) Gene expression links genotype and phenotype during rapid adaptation. *Molecular Ecology* 30 (1) 30-32. <https://doi.org/10.1111/mec.15729>
1. **E.B. Josephs** & S.I. Wright. (2016) On the trail of linked selection. *Plos Genetics* 12(8): e1006240

Funding

Co-PI: ORCC: Integrating evolutionary and migratory potential of <i>Chamaecrista fasciculata</i> into forecasts of range-wide population dynamics under climate change. NSF. PI: Jill Anderson (University of Georgia). \$303,166 to Josephs lab.	2022 – 26
PI: R35 Determining the evolutionary forces shaping genotype-by-environment interactions. NIH \$1,915,726 to Josephs lab	2021 – 26
Co-PI: RESEARCH-PGR Uncovering the role of transposons in maize variation. NSF. PI: Nathan Springer (University of Minnesota). \$4,109,405 total, \$518,873 to Josephs lab. Career Life Balance Award Supplement (\$22,831)	2019 – 23
NSF Postdoctoral Research Fellowship in Biology, Plant Genome Research Program	2016 – 18
NSF Graduate Research Fellowship	2010 – 13

Awards

American Society of Plant Biologists Early Career Award	2022
James F. Crow Early Career Researcher Award Finalist, Genetics Society of America	2018
New Phytologist Tansley Medal Shortlist	2017
Young Investigator Travel Award, Society for Molecular Biology and Evolution	2015
Ramsay-Wright Award, University of Toronto Dept. of Ecology & Evolutionary Biology	2014
Canadian Plant Genomics Workshop Student Talk Award	2013
Conference Grant, University of Toronto, School of Graduate Studies	2011

Presentations

Invited Seminars

* denotes virtual talks

Dept of Biology, University of Toronto Scarborough	Mar 2023
Biodiversity Research Seminar Series, University of British Columbia	Feb 2023
Donald Danforth Plant Science Center	Nov 2022
Department of Plant Biology (student invited), University of Georgia	Sept 2022
Centre of Life Origins and Evolution, University College London*	June 2021
Department of Ecology, Evolution, and Organismal Biology, Iowa State University*	Mar 2021
Frontiers in Ecology and Evolution Seminar, Uppsala University*	Dec 2020
Ecology and Evolutionary Biology Department, University of Toronto*	Nov 2020
EVOLTREE Network seminar series on polygenic adaptation*	Nov 2020
Biology Department, New York University*	Nov 2020
Biology Department, University of Rochester	Mar 2020
Integrative Genome Biology Symposium, University of California, Riverside	Jan 2020
Biology Department, Indiana University	Oct 2019
Plant Biology Department (student invited), Pennsylvania State University	Oct 2019
Science at the Edge Seminar Series, Michigan State University	Mar 2019
EvoLunch, IST Austria, Vienna, Austria	Feb 2019
International Maize and Wheat Improvement Center (CIMMYT), Texcoco, Mexico	Aug 2018
LangeBio, Irapuato, Mexico	Aug 2018
Biology Department, University of San Francisco	Feb 2018
The University and Jepson Herbaria, University of California, Berkeley	Sept 2017
Plant Biology Department, Michigan State University	Jan 2017
Center for Population Biology, University of California, Davis	Oct 2016

Invited Conference Presentations

The Allied Genetics Conference, Virtual	2020
Plant Science Symposium, University of California, Davis	2018
The American Genetic Association President's Symposium, Toronto, Canada	2018
International Plant and Animal Genome Conference, San Diego, USA	2018
International Botanical Congress, Shenzhen, China	2017

Contributed Conference Presentations

American Society of Naturalists, Asilomar, USA	2023
Society for the Study of Evolution, Providence, USA	2019
SMBE Satellite Meeting "Towards an integrated concept of adaptation", Vienna, Austria.	2019
Population, Quantitative, and Evolutionary Genetics Conference, Madison, USA.	2018
Society for the Study of Evolution, Portland, USA.	2017
Society for the Study of Evolution. Austin, USA.	2016
Society for Molecular Biology and Evolution. Vienna, Austria.	2015
Society for the Study of Evolution, Raleigh, USA.	2014
Canadian Society for Ecology and Evolution, Montreal, Canada.	2014
Canadian Plant Genomics Workshop, Halifax, Canada.	2013
Society for Molecular Biology and Evolution, Chicago, USA. Poster	2013
First Joint Congress in Evolution, Ottawa, Canada.	2012
European Society for Evolutionary Biology, Tuebingen, Germany. Poster	2011
Canadian Society for Ecology and Evolution. Banff, Canada.	2011
Society for the Study of Evolution, Portland, USA. Poster	2010

Teaching Experience

Courses at Michigan State University

Co-Instructor for Statistical Methods in Ecology and Evolution I: IBIO 830 (Fall 2022)
 Co-Instructor for Fundamental Genetics: IBIO 341. (Fall 2019)

Guest Lectures at the University of Toronto

Human Genome Evolution: Gene expression evolution (2012, 2013, 2014, 2015)
 Human Genome Evolution: Adaptation and human height (2015)
 Philosophy and Methods in EEB: Multiple testing correction (2014, 2015)

Teaching Assistant at the University of Toronto

Human Genome Evolution (2010 – 2015)
 Evolutionary Ecology (2014)
 Environmental Biology (2014)

Programming Instruction

Co-taught an Introductory Programming and Population Genetics module as part of mentorship program with students from Pioneer High School in Woodland, CA. Three weeks. (2016)
 Co-taught an Introduction to Python workshop for graduate students and postdocs in the University of Toronto Ecology and Evolutionary Biology Dept. Met weekly for eight weeks. (2014)
 Volunteer mentor for Ladies Learning Code. Two one-day workshops (2013 – 2014)

Mentoring

MSU

Postdoctoral researchers

Gabrielle Standstedt, NSF Fellow (based at Utah State) July 2023 –

Christina Miller Apr 2023 –

Nathan Catlin Jan 2021 –

Daniela Palmer, EEB Presidential Fellow July 2021 – 2022

Rebecca Panko July 2020 – Aug 2022

Graduate Students

Miles Roberts, PhD student Sept 2020 –

Asia Hightower, PhD student Sept 2020 –

Sophia Buysse, PhD student July 2020 –

Maya Wilson Brown, PhD student Jul 2021 -

McKena Lipham, Rotation student Jan – Mar 2020

Luke Gregory, Rotation student Oct – Dec 2019

Research Technicians

Mia Stevens Aug 2022 –

Maya Wilson Brown Aug 2019 - Jul 2021

Undergraduates

Audrey French (Plant Genome REU 2022), Hannah Nguyen (Plant Genome REU 2021), Aryaman Seghal (2022-23), Mila Vuselic (2022-23), Trevor Markwood (2022-23), Evan Adamski (2023-), Claire Henley (2023-), Claudia Colligan (2023-), Kennedy Barnes (2023-), Tianyi Xia (2023-)

UC Davis Undergraduates

Jennifer Blanc (2017-18)

University of Toronto Undergraduates

Jasmina Uzunovic (2014), Yannay Khaikin (2014) Mia Husic (2013), Celina Baines (2011),

Adriana Salcedo (2011-12)

Service

National & International Service

American Society of Plant Biologists Early Career Award Committee (2023 -)

Genetics Society of America Conferences Committee (2021 -)

Co-organizer of Quantitative Genetics in the Wild session at the Society for the Study of Molecular Biology meeting in 2020 (Cancelled).

Co-organizer of the Domestication Genetics workshop at the Plant Animal Genome Conference (2020)

Evo Ally at the Evolution 2019 Meeting (took active bystander training and was available to support targets of inappropriate behavior)

University & Department Service

Diversity, Equity, and Inclusion committee, Dept. of Plant Biology, MSU (2023 -)

Speaker at "Women Making Science Event" event from Graduate Women in Science at MSU (2022)

Presidential Postdoctoral Fellow committee, Ecology, Evolution, and Behavior Program, MSU (2021 -, Chair 2022 -)

Graduate committee, Dept of Plant Biology, MSU, (2020 -)

Seminar committee, Ecology, Evolution, and Behavior Program, MSU (2020 - 2021)

Seminar committee, Dept of Plant Biology, MSU (2019 - 2020)

Organizing committee for Women in Life Sciences at UC Davis (2016 – 2018)

Hiring Committee for Assistant Professor, University of Toronto EEB Department (2014)

Selection Committee for Department Chair, University of Toronto EEB Department (2013)

Co-president, University of Toronto EEB Graduate Students Association (2012 – 2013), also Student Seminar Chair

(2014 – 2015), Ombudsman (2013 – 2014), and Fundraising Committee Chair (2011 – 2012)

Reviewing

Associate Editor at *Molecular Biology & Evolution* (2022 –)

Guest Associate Editor of special issue on Wild Quantitative Genetics for *Proc R Soc B* (2020 – 23)

Guest associate editor for *G3* (2018)

Reviewer for *Plos Genetics*, *Genetics*, *PNAS*, *New Phytologist*, *Evolution*, *Evolution Letters*, *Elife*, *Molecular Biology and Evolution*, *Genome Biology and Evolution*, *Genome Biology*, *The Plant Journal*, *Theoretical Population Biology*, *Molecular Ecology*, *Molecular Ecology Resources*, *Heredity*, *G3*, *PeerJ*, *Plos ONE*, *Science Advances*, *Trends in Genetics*, *Annals of Botany*, *Plos Computational Biology*, *Plant Direct*

NSF grant panel reviewer (2020)

Ad hoc reviewer for the National Science Foundation, BARD - The US-Israel Agricultural Research & Development Fund, and the German Research Foundation

Leaves and Modified Duties

Child Leave 12 weeks parental leave, modified duties in fall semester 2021