

## EMMA E. GOLDBERG

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## IDENTIFYING INFORMATION

## Employment

<i>University of Minnesota</i> Assistant Professor	2014 – present
<i>University of Illinois at Chicago</i> Visiting Research Assistant Professor	2010 – 2013
Postdoctoral Research Associate sponsor/supervisor: Boris Igić	2008 – 2010
<i>University of Maryland at College Park</i> Postdoctoral Research Associate supervisor: Bill Fagan	2007 – 2009

## Education

<i>University of California, San Diego</i> Ph.D., Division of Biological Sciences advisor: Russ Lande	2002 – 2007
<i>California Institute of Technology</i> B.S. Physics, with honors	1995 – 1999

## RESEARCH GRANTS

***The Role of Mating System Divergence in Plant Speciation***

<i>NSF DEB-1754246</i> National Science Foundation; Division of Environmental Biology, Evolutionary Ecology David Moeller (PI); Yaniv Brandvain, Emma Goldberg (co-PIs)	2018 – 2022
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***Breaking Barriers to the Study of Trait-Dependent Lineage Diversification***

<i>NSF DEB-1655478</i> National Science Foundation; Division of Environmental Biology, Phylogenetic Systematics Emma Goldberg (PI); Itay Mayrose, Tracy Heath, Heath Blackmon (Collaborators)	2017 – 2020
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***Interacting Effects of Polyploidy and Breeding Systems on Rates of Evolution***

<i>BSF-2013286</i> Binational Science Foundation; Life Science, Plant Sciences, Evolutionary Biology Emma Goldberg, Itay Mayrose (PIs)	2014 – 2016
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### ***Phylogenetic Models of Macroevolution***

NSF DEB-1120279

2011 – 2014

National Science Foundation; Division of Environmental Biology, Phylogenetic Systematics  
Emma Goldberg (PI); Boris Igić (co-PI)

### ***The History and Consequences of Self-Incompatibility***

NSF DEB-0919089

2009 – 2013

National Science Foundation; Division of Environmental Biology, Population & Evolutionary Processes  
Boris Igić (PI) (I co-wrote the sections supporting my work)

### ***Graduate Research Fellowship***

NSF-GRFP

2003 – 2006

## **RESEARCH PUBLICATIONS**

### **Peer-reviewed articles**

Huang, D., E.E. Goldberg, L.M. Chou, and K. Roy. 2018. The origin and evolution of coral species richness in a marine biodiversity hotspot. *Evolution* 72:288–302.

Rabosky, D.L.\* and E.E. Goldberg\*. 2017. FiSSE: A simple nonparametric test for the effects of a binary character on lineage diversification rates. *Evolution* 71:1432–1442.

Grossenbacher, D.L., Y. Brandvain, J.R. Auld, M. Burd, P.-O. Cheptou, J.K. Conner, A.G. Grant, S.M. Hovick, J.R. Pannell, A. Pauw, T. Petanidou, A.M. Randle, R. Rubio de Casas, J. Vamosi, A. Winn, B. Igić, J.W. Busch, S. Kalisz, and E.E. Goldberg. 2017. Self-compatibility is overrepresented on islands. *New Phytologist* 215:469–478.

Goldberg, E.E., S.P. Otto, J.C. Vamosi, I. Mayrose, N. Sabath, R. Ming, T.-L. Ashman. 2017. Macroevolutionary synthesis of flowering plant sexual systems. *Evolution* 71:898–912.

Zhan, S.H., M. Drori, E.E. Goldberg, S.P. Otto, I. Mayrose. 2016. Phylogenetic evidence for cladogenetic polyploidization in land plants. *American Journal of Botany* 103:1252–1258.

Glick, L., N. Sabath, T.-L. Ashman, E.E. Goldberg, and I. Mayrose. 2016. Polyploidy and sexual system in angiosperms—is there an association? *American Journal of Botany* 103:1223–1235.

Grossenbacher, D., R. Briscoe Runquist, E.E. Goldberg, and Y. Brandvain. 2016. No association between plant mating system and geographic range overlap. *American Journal of Botany* 103:110–117.

Sabath, N., E.E. Goldberg, L. Glick, M. Einhorn, T.-L. Ashman, R. Ming, S.P. Otto, J.C. Vamosi, and I. Mayrose. 2016. Dioecy does not consistently accelerate or slow lineage diversification across multiple genera of angiosperms. *New Phytologist* 209:1290–1300.

Pannell, J.R., J.R. Auld, Y. Brandvain, M. Burd, J.W. Busch, P.-O. Cheptou, J. K. Conner, E.E. Goldberg, A.-G. Grant, D.L. Grossenbacher, S.M. Hovick, B. Igić, S. Kalisz, T. Petanidou, A.M. Randle, R. Rubio de Casas, C.A. Pauw, J.C. Vamosi, and A.A. Winn. 2015. The scope of Baker’s law. *New Phytologist*

208:656–667.

Smith, S.D. and E.E. Goldberg. 2015. Tempo and mode of flower color evolution. *American Journal of Botany* 102:1014–1025.

Grossenbacher, D., R. Briscoe Runquist, E.E. Goldberg, and Y. Brandvain. 2015. Geographic range size is predicted by plant mating system. *Ecology Letters* 18:706–713.

Huang, D., E.E. Goldberg, and K. Roy. 2015. Fossils, phylogenies, and the challenge of preserving evolutionary history in the face of anthropogenic extinctions. *Proceedings of the National Academy of Sciences USA* 112:4909–4914.

Rabosky, D.L.\* and E.E. Goldberg\*. 2015. Model inadequacy and mistaken inferences of trait-dependent speciation. *Systematic Biology* 64:340–355.

Servedio, M.R., Y. Brandvain, S. Dhole, C.L. Fitzpatrick, E.E. Goldberg, C.A. Stern, J. Van Cleve, D.J. Yeh. 2014. Not just a theory: The utility of mathematical models in evolutionary biology. *PLoS Biology* 12:e1002017.

The Tree of Sex Consortium; T.-L. Ashman, D. Bachtrog, H. Blackmon, E.E. Goldberg, M.W. Hahn, M. Kirkpatrick, J. Kitano, J.E. Mank, I. Mayrose, R. Ming, S.P. Otto, C.L. Peichel, M.W. Pennell, N. Perrin, L. Ross, N. Valenzuela, J.C. Vamosi. 2014. Tree of sex: A database of sexual systems. *Scientific Data* 1:140015.

Fagan, W.F, Y.E. Pearson, E.A. Larsen, H.J. Lynch, J.B. Turner, H. Staver, A.E. Noble, S. Bewick, and E.E. Goldberg. 2013. Phylogenetic prediction of the maximum per capita rate of population growth. *Proceedings of the Royal Society B* 280:20130523.

Goldberg, E.E. and B. Igić. 2012. Tempo and mode in plant breeding system evolution. *Evolution* 66: 3701–3709.

Goldberg, E.E., R. Lande, and T.D. Price. 2012. Population regulation and character displacement in a seasonal environment. *The American Naturalist* 179:693–705.

Goldberg, E.E., L.T. Lancaster, and R.H. Ree. 2011. Phylogenetic inference of reciprocal effects between geographic range evolution and diversification. *Systematic Biology* 60:451–465.

Anacker, B.L.\*, J.B. Whittall\*, E.E. Goldberg, and S.P. Harrison. 2011. Origins and consequences of serpentine endemism in the California flora. *Evolution* 65:365–376.

Robertson, K.A., E.E. Goldberg, and B. Igić. 2011. Comparative evidence for the correlated evolution of polyploidy and self-compatibility in Solanaceae. *Evolution* 65:139–155.

Goldberg, E.E., J.R. Kohn, R. Lande, K.A. Robertson, S.A. Smith, and B. Igić. 2010. Species selection maintains self-incompatibility. *Science* 330: 493–495.

Goldberg, E.E., H.J. Lynch, M.G. Neubert, and W.F. Fagan. 2010. Effects of branching spatial structure and life history on the asymptotic growth rate of a population. *Theoretical Ecology* 3: 137–152.

Goldberg, E.E.\* and B. Igić\*. 2008. On phylogenetic tests of irreversible evolution. *Evolution* 62: 2727–2741.

Goldberg, E.E. and R. Lande. 2007. Species' borders and dispersal barriers. *The American Naturalist* 170: 297–304.

Roy, K.\* and E.E. Goldberg\*. 2007. Origination, extinction and dispersal: integrative models for understand-

ing present-day diversity gradients. *The American Naturalist* 170: S71–S85.

Goldberg, E.E. and R. Lande. 2006. Ecological and reproductive character displacement on an environmental gradient. *Evolution* 60: 1344–1357.

Goldberg, E.E., K. Roy, R. Lande, and D. Jablonski. 2005. Diversity, endemism, and age distributions in macroevolutionary sources and sinks. *The American Naturalist* 165: 623–633.

\* *equal contributions*

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#### Other reviewed contributions

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Harkness, A., Y. Brandvain, and E.E. Goldberg. (in press.) Evolution of plant mating systems. In K. Pfennig, ed. *Oxford Bibliographies in Evolutionary Biology*. Oxford University Press.

Goldberg, E.E. 2013. Species selection. In J. Losos, ed. *The Princeton Guide to Evolution*. Princeton University Press.

## RESEARCH PRESENTATIONS AND ACTIVITIES

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### Invited talks

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#### *Symposia*

- Vice Presidential Symposium, “Theory in Ecology and Evolution.” American Society of Naturalists. Montpellier, France. 2018.
- “Sex in the wild” spotlight session. Society for the Study of Evolution. Portland, Oregon. 2017.
- “Darwin Day” public lecture. Oslo, Norway. 2017.
- “Plant Speciation.” Austin, Texas. 2016.
- Atwood Colloquium, “Rising Star in Evolution” plenary talk. Univ Toronto, Canada. 2015.
- “Integrating approaches to macroevolution: Combining fossils and phylogenies.” Society for the Study of Evolution. Raleigh, North Carolina. 2014.
- “Predicting macroevolution from microevolution.” European Society for Evolutionary Biology. Tübingen, Germany. 2011.
- “Unified approaches for understanding patterns of character evolution and diversification.” Society of Systematic Biologists. Norman, Oklahoma. 2011.
- “The future of historical biogeography: Conceptual and methodological challenges.” Society of Systematic Biologists. Portland, Oregon. 2010.
- “The Biology of Extinction 2.” Okazaki Biology Conference. Okazaki, Japan. 2006.

#### *Departmental seminars*

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| – Univ Kansas. 2018.                | – Indiana Univ. 2015.        |
| – Uppsala Univ, Sweden. 2017.       | – Univ Oxford. 2014.         |
| – Univ California, Davis. 2017.     | – Univ Edinburgh. 2014.      |
| – Eawag, Luzern, Switzerland. 2016. | – Univ North Carolina. 2014. |
| – Iowa State Univ. 2016.            | – Univ Idaho. 2014.          |
| – Smithsonian Institution. 2016.    | – Univ Minnesota. 2013.      |

- Univ California, San Diego. 2013.
- Univ British Columbia. 2009.
- Univ Chicago. 2013.
- New Mexico Institute of Mining and Technology. 2009.
- Univ Oregon. 2013.
- Stanford University. 2013.
- Univ New Mexico. 2011.
- Univ Western Australia. 2008.
- Univ Illinois at Chicago. 2011.
- Univ Virginia. 2008.

**Other seminars**

- Los Alamos National Lab, theoretical biology division. 2017.
- Santa Fe Institute. 2016.
- Hamline math department. 2016.
- Univ Minnesota math-biology. 2015.

**Invited working group participation**

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- “Species interactions on phylogenetic trees.” Eawag, Switzerland. 2016.
- “Linking self-fertilization, dispersal and distribution traits of species: Is Baker’s law an exception to the rule?” National Evolutionary Synthesis Center. 2013 – 2015.
- “Integrating approaches to macroevolution: Combining fossils and phylogenies.” National Evolutionary Synthesis Center. 2013.
- “The tree of sex: A comprehensive synthesis of sex determination systems in eukaryotes.” National Evolutionary Synthesis Center. 2012 – 2014.
- “Macroevolution of ecosystem services.” National Socio-Environmental Synthesis Center. 2012.
- “Reconciling biogeography, phylogeny and community ecology.” Silwood Park, Imperial College, London. 2008.
- “Conservation priorities: can we have our biodiversity and ecosystem services too?” National Center for Ecological Analysis and Synthesis. 2006.

**TEACHING AND ADVISING**

**Classroom**

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<i>Professor, Univ. Minnesota</i> Evolution.	2015 – present
<i>Instructor, NIMBioS</i> Phylogenetics theory at RevBayes workshop.	summer 2017
<i>Instructor, Nature of Life</i> Spatial ecology module at the UMN freshman retreat.	summer 2014
<i>Graduate Teaching Assistant, UC San Diego</i> Quantitative Ecology and Conservation. Biometry. Introductory Ecology.	2004 – 2005

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### Advising

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*Postdoctoral research advisor:* Heath Blackmon, Will Freyman, Tanjona Ramiadantsoa, Rosana Zenil-Ferguson.

*Graduate thesis advisor:* Alex Harkness (co-advised with Y. Brandvain).

*Graduate thesis committee member:* Sarah Hammarlund, Tyler Imfeld, Joleen Khey, Jen Teshera-Levey, Pu Wang.

*Undergraduate research advisor:* Mansi Bezbaruah, Josh Justison, Anna Nagel, Tim Ohlert.

### SERVICE

#### *Manuscript review*

- *The American Naturalist*
- *Biological Journal of the Linnean Society*
- *Ecography*
- *Ecological Modelling*
- *Ecology*
- *Ecology and Evolution*
- *Ecology Letters*
- *Evolution*
- *Evolution Letters*
- *Evolutionary Biology*
- *Global Ecology and Biogeography*
- *International Journal of Plant Sciences*
- *Journal of Biogeography*
- *Journal of Evolutionary Biology*
- *Journal of the Royal Society Interface*
- *Methods in Ecology and Evolution*
- *Molecular Biology and Evolution*
- *Nature*
- *Nature Communications*
- *New Phytologist*
- *Oikos*
- *Paleobiology*
- *PCI Evolutionary Biology*
- *PeerJ*
- *Philosophical Transactions of the Royal Society B*
- *PLoS Biology*
- *PLoS ONE*
- *Proceedings of the National Academy of Sciences USA*
- *Proceedings of the Royal Society of London Series B*
- *Systematic Biology*
- *Theoretical Population Biology*

#### *Grant proposal review*

Panel reviewer for NSF DEB: Phylogenetic Systematics.

Ad hoc reviewer for NSF DEB: Evolutionary Genetics; Phylogenetic Systematics; Population & Community Ecology; Dimensions of Biodiversity.

External reviewer for National Geographic Society; Marsden Society of New Zealand; Canada Research Chairs.

***Editorship***

Associate Editor for *Systematic Biology* (2015 – present).

***Professional society leadership***

Council of the Society of Systematic Biologists (2016 – 2018; one of five elected members).