

Megan Bontrager

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Research interests My research focuses on understanding the factors that shape geographic ranges, how populations adapt to their environments, and how species will respond to climate change. I approach these questions using a variety of methods, including large-scale field experiments, meta-analysis, landscape genetics, and climatic niche modelling.

Academic positions **University of California, Davis** 2018–
Postdoctoral researcher
Faculty advisors: Sharon Strauss, Jennifer Gremer, Johanna Schmitt

Education **University of British Columbia** 2012–2018
Ph.D. in Botany
Title: *Pollination, genetic structure, and adaptation to climate across the geographic range of Clarkia pulchella.*
Advisor: Amy Angert
Committee: Sally Aitken, Michael Whitlock, and Jeannette Whitton

University of California, Santa Cruz 2008–2011
B.Sc. in Plant Sciences
B.Sc. in Molecular, Cell, and Developmental Biology
Undergraduate research advisor: Ingrid Parker

Cabrillo Community College 2007–2008
Prerequisites for transfer to B.Sc.

Manuscripts in prep (available upon request)

- (12.) **M. Bontrager**, J. A. Lee-Yaw, T. Usui, A. L. Hargreaves, D. Anstett, H. A. Branch, and A. L. Angert. Local advantage is greater near climatic niche margins but not geographic range margins. Expected submission in May 2019.
- (11.) **M. Bontrager**, C. D. Muir, C. Mahony, D. E. Gamble, R. M. Germain, A. L. Hargreaves, E. J. Kleynhans, K. A. Thompson, and A. L. Angert. Climate anomalies are disrupting local adaptation. Plan to submit to Science, February 2019.
- (10.) A. L. Hargreaves, R. M. Germain, **M. Bontrager**, J. Persi, and A. L. Angert. Biotic interactions affect fitness but not local adaptation among populations. Plan to submit to The American Naturalist, January 2019.

Preprints

9. **M. Bontrager** and A. L. Angert (2018). Genetic differentiation is determined by geographic distance in *Clarkia pulchella*. bioRxiv 374454.
8. **M. Bontrager**, C. D. Muir, and A. L. Angert (2018). Geographic and climatic drivers of reproductive assurance in *Clarkia pulchella*. bioRxiv 372375.

Publications

7. **M. Bontrager** and A. L. Angert (2018). Gene flow improves fitness at a range edge under climate change. *Evolution Letters*. Early view: <https://doi.org/10.1002/evl3.91>.
6. D. E. Gamble, **M. Bontrager**, and A. L. Angert (2016). Floral trait variation and links to climate in the mixed-mating annual *Clarkia pulchella*. *Botany*, 96(7):425–435.
5. **M. Bontrager** and A. L. Angert (2016). Effects of range-wide variation in climate and isolation on floral traits and reproductive output of *Clarkia pulchella*. *American Journal of Botany*, 103(1):10–21.
4. J. A. Lee-Yaw, H. M. Kharouba, **M. Bontrager**, C. Mahony, A. M. Csörgő, A. M. Noreen, Q. Li, R. Schuster, and A. L. Angert (2016). A synthesis of transplant experiments and ecological niche models suggests that range limits are often niche limits. *Ecology Letters*, 19(6):710–722.
3. I. M. Parker, M. Saunders, **M. Bontrager**, A. P. Weitz, R. Hendricks, R. Magarey, K. Suiter, and G. S. Gilbert (2015). Phylogenetic structure and host abundance drive disease pressure in communities. *Nature*, 520(7548):542–544.
2. **M. Bontrager**, K. Webster, M. Elvin, and I. M. Parker (2014). The effects of habitat and competitive/facilitative interactions on reintroduction success of the endangered wetland herb, *Arenaria paludicola*. *Plant Ecology*, 215(4):467–478.
1. J. M. Yost, **M. Bontrager**, S. W. McCabe, D. Burton, M. G. Simpson, K. M. Kay, and M. Ritter (2013). Phylogenetic relationships and evolution in *Dudleya* (Crassulaceae). *Systematic Botany*, 38(4): 1096–1104.

Non-refereed contributions

3. K. R. Acierto, R. S. Hendricks, **M. Bontrager**, and I.M. Parker (12 December 2012). Transplant success for the endangered herb *Arenaria paludicola* at Golden Gate National Recreation Area: effects of site, propagation type, and competition. Technical report to the U.S. Fish and Wildlife Service and the California Department of Fish and Game.
2. I. M. Parker and **M. Bontrager** (29 February 2012). Propagation and establishment of new populations of marsh sandwort (*Arenaria paludicola*) in Santa Cruz County. Technical report to the U.S. Fish and Wildlife Service and the California Department of Fish and Game.
1. **M. Bontrager** and I. M. Parker (26 September 2011). Effects of serpentine soil on plant community composition in natural populations and seedling growth in a bioassay. Technical report to Midpeninsula Regional Open Space District.

Fellowships and awards

UBC Biology teaching award (500 CAD)	2018
Best research presentation, Brackendale Ecology and Evolution Retreat	2016
Li Tze Fong Memorial Fellowship (25000 CAD)	2016
Botanical Society of America Genetics Section Grad Research Award (500 USD)	2016
Botanical Society of America Graduate Student Research Award (500 USD)	2016
Washington Native Plant Society Research Grant (1200 USD)	2016
Vladimir J. Krajina Prize in Plant Ecology (2000 CAD)	2013
UBC Four Year Doctoral Fellowship (102400 CAD)	2012

Selected presentations

M. Bontrager*, C.R. Mahony, D.E. Gamble, R.M. Germain, A.L. Hargreaves, E.J. Kleynhans, C.S. Leven, K.A. Thompson, and A.L. Angert. (6 January 2018) Climate anomalies drive local maladaptation. Presentation at the American Society of Naturalists meeting, Asilomar, California.

M. Bontrager* and A.L. Angert. (24 June 2017) Effects of gene flow on the performance of *Clarkia pulchella* at the species' northern range margin. Presentation at Evolution. Portland, Oregon. Video link.

M. Bontrager* and A.L. Angert. (9 May 2017) Effects of gene flow on the performance of *Clarkia pulchella* at the species' northern range margin. Presentation at the Annual Meeting of the Canadian Society for Ecology and Evolution. Victoria, British Columbia.

M. Bontrager* and A.L. Angert. (5 November 2016) Effects of gene flow on the performance of *Clarkia pulchella* at the species' northern range margin. Presentation at Ecology and Evolution Retreat. Brackendale, British Columbia.

M. Bontrager* and A.L. Angert. (16 April 2016) Effects of gene flow on the performance of *Clarkia pulchella* at the species' northern range margin. Poster presentation at Evo-Wibo. Port Townsend, Washington.

M. Bontrager* and A.L. Angert. (22 May 2015) Effects of range-wide variation in climate and isolation on floral traits and reproductive output of *Clarkia pulchella*. Presentation at the Annual Meeting of the Canadian Society for Ecology and Evolution. Saskatoon, Saskatchewan.

M. Bontrager*, K. Webster, M. Elvin, and I.M. Parker. (12 January 2012) Factors influencing growth and survival of a critically endangered plant, *Arenaria paludicola*. Presentation at the California Native Plant Society 2012 Conservation Conference. San Diego, California.

J. Yost, **M. Bontrager***, S. McCabe, K.M. Kay, and M. Ritter. (11 July 2011) A classification of California's diploid *Dudleya* species based on molecular phylogenetic data. Poster presentation at Botany 2011 Conference. St. Louis, Missouri.

* presenting author

Professional experience

Staff research associate	2011–2012
Supervisors: Ingrid Parker and Greg Gilbert	
Trained and led crews in the field, greenhouse, and molecular biology lab. Designed greenhouse experiments and field monitoring protocols.	
Undergraduate research assistant	2010–2011
Supervisors: Ingrid Parker, Kathleen Kay, and Jenn Yost	
Developed and performed molecular protocols and greenhouse experiments. Assisted with field experiments.	

Mentoring and teaching

Advisor to undergraduate thesis students	2018–2019
Leader of R workshop for undergraduate research assistants	2018
Head teaching assistant, Biostatistics	2017–2018
Teaching assistant, Plant Ecology	2017
Teaching assistant, Phytogeography	2016
Advisor to undergraduate honours thesis student	2016–2017
Supervisor of undergraduate research volunteers	2014–2017

Service and outreach

Grad representative, Biodiversity Research Centre postdoc search committee	2018
Co-organizer of Biodiversity Centre Women in STEM Workshop	2017
Coordinator of Florum, a weekly meeting of UBC plant ecologists	2013–2016
Modules in Ecology and Evolution Development, curriculum developer	2013–2015
UBC Let's Talk Science, visiting scientist in primary school	2012–2014
UBC Let's Talk Science, science fair mentor	2012–2013
Beaty Biodiversity Museum Nature Club, volunteer	2012–2013

Professional memberships

American Society of Naturalists
Botanical Society of America
Canadian Society for Ecology and Evolution
Society for the Study of Evolution
Washington Native Plant Society