

RYAN D. BRISCOE RUNQUIST

Curriculum Vitae

UNIVERSITY OF MINNESOTA • DEPARTMENT OF PLANT AND MICROBIAL BIOLOGY • 1479 GORTNER AVENUE • SAINT PAUL • MN • 55108
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PROFESSIONAL STATUS

- 2020 – present Senior Research Associate, University of Minnesota, Dept. of Plant and Microbial Biology
- Current Projects:
 - o “Remote Sensing Biological Invasions: Detecting and Monitoring Leafy Spurge Populations Using High Resolution Imagery and Deep Learning”
 - o “Incorporating adaptation into forecasts of range shifts with climate change”
 - o “Detection of leafy spurge in Theodore Roosevelt National Park using WorldView satellite imagery”
 - Past Projects:
 - o “Improved detection and future management of leafy spurge and common tansy using remote sensing, mechanistic species distribution models, and landscape genomics
 - Manage budgets and reporting, source and obtain archival and tasked satellite imagery, process and analyze genomic data, publish in high impact journals.
- 2017 – 2020 Research Associate, Level 6, University of Minnesota, Dept. of Plant and Microbial Biology
- Projects: “Climate change and range expansion of invasive plants”
 - Mentor graduate students and supervise undergraduate students in design and implementation of experiments, data collection and data analysis
- 2018 – 2019 Science Outreach Coordinator, *Market Science*, University of Minnesota, College of Biological Sciences
- Project managed a major informal science communication and outreach organization
 - Directed the vision and mission of the program and its integration into the College structure
- 2012 – 2017 Postdoctoral Associate, University of Minnesota, Dept. of Plant and Microbial Biology
- Projects: “Ecological speciation and reinforcement in the divergence of *Clarkia xantiana* subspecies”; “Mating System Evolution in *Clarkia xantiana*”
 - Co-designed and supervised the installation, data collection and data analysis of large (>30,000 plant), multi-year, out-of-state ecological experiment

EDUCATION AND DEGREES

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|-----------|--|--------------------|-----------------------|
| 2004-2012 | University of California, Davis | Population Biology | Ph.D. |
| | Advisor: Maureen Stanton – The ecological effects of pollinator-mediated competition on community assembly for two vernal pool congeners, <i>Limnanthes alba</i> and <i>L. douglasii rosea</i> . | | |
| 1999-2003 | University of Virginia | Biology | B.S., summa cum laude |
| | Advisor: Laura Galloway
Genetic patterns of inheritance due to double reduction in the autotetraploid <i>Campanulastrum americanum</i> . | | |

PUBLICATIONS

- 2023 – Lake, T. A., **R. D. Briscoe Runquist**, L.E. Fligel, and D. A. Moeller. 2023. Chronosequence of invasion reveals minimal losses of population genomic diversity, niche expansion, and trait divergence in the polyploid, leafy spurge, *Evolutionary Applications* DOI: 10.1111/eva.13593
- 2022 – Lake, T. A., **R. D. Briscoe Runquist**, and D. A. Moeller. 2022. Deep learning detects invasive plant species across complex natural landscapes using WorldView-2 and PlanetScope satellite imagery, *Remote Sensing in Ecology and Conservation*, 8: 875-889.
- 2021 – **Briscoe Runquist, R. D.**, T. A. Lake, and D. A. Moeller. 2021. Improving predictions of range expansion for invasive species using joint species distribution models and surrogate co-occurring species. *Journal of Biogeography*, 48: 1693-1705.
- 2020 – Lake, T. A., **R. D. Briscoe Runquist**, and D. A. Moeller. 2020. Predicting range expansion of invasive species: Pitfalls and best practices for obtaining biologically realistic projections. *Diversity and Distributions*, 26: 1767-1779.
- 2020 – **Briscoe Runquist, R. D***, A. J. Gorton*, J. B. Yoder*, N. J. Deacon, J. J. Grossman, S. Kothari, M. P. Lyons, S. N. Sheth, P. Tiffin, and D. A. Moeller. 2020. Context dependence of local adaptation to abiotic and biotic environments: a quantitative and qualitative synthesis. *American Naturalist*, 195: 412-431.
*Equal contribution to first authorship
- 2019 – **Briscoe Runquist, R. D.**, T. Lake, P. Tiffin, and D. A. Moeller. 2019. Species distribution models throughout the invasion history of Palmer amaranth predict regions at risk of future invasion and reveal challenges with modeling rapidly shifting geographic ranges. *Scientific Reports*, 9: 2426.
- 2018 – Grossenbacher, D. L. *, **Briscoe Runquist, R. D***, and J. Smith. 2018. Self-fertilization and herbivory in a rare alpine plant in California, *Claytonia megarhiza* (Montiaceae). *Madroño*, 65: 22-27.
*Equal contribution to first authorship
- 2017 – **Briscoe Runquist, R. D.**, M. A. Geber, M. Pickett-Leonard and D. A. Moeller. 2017. Mating system evolution under strong pollen limitation: Evidence of disruptive selection through male and female fitness in *Clarkia xantiana*. *American Naturalist*, 189: 549-563.
- 2017 – Moeller, D. A.*, **R. D. Briscoe Runquist***, A. Moe, M. A. Geber, C. Goodwillie, P.-O. Cheptou, C. G. Eckert, E. Elle, M. O. Johnston, S. Kalisz, R. H. Ree, R. D. Sargent, M. Vallejo-Marin, and A. A. Winn. 2017. Global biogeography of mating system variation in seed plants, *Ecology Letters*, 20: 375-384.
*Equal contribution for first authorship
- 2016 – **Briscoe Runquist, R. D.**, D. L. Grossenbacher, S. Porter, and J. Smith. 2016. Pollinator-mediated assemblage in California wildflowers, *Journal of Evolutionary Biology*, 29: 1045-1058.
- 2016 – Pettengill, J. B., **R. D. Briscoe Runquist** and D. A. Moeller. 2016. Mating system affects the distribution of sequence diversity within and among populations of recently diverged subspecies of *Clarkia xantiana* (Onagraceae). *American Journal of Botany*, 103: 99-109
Invited Paper for Special Issue on “Evolutionary insights from the study of geographic variation”

- 2016 – Grossenbacher, D. L, **R. D. Briscoe Runquist**, E. Goldberg and Y. Brandvain. 2016. No association between plant mating system and geographic range overlap. *American Journal of Botany*, 103: 110-117.
Invited Paper for Special Issue on “Evolutionary insights from the study of geographic variation”
- 2015 – Grossenbacher, D. L, **R. D. Briscoe Runquist**, E. Goldberg and Y. Brandvain. 2015. Geographic range size is predicted by plant mating system. *Ecology Letters*, 18: 706-713.
- 2014 – **Briscoe Runquist, R. D.**, Chu, E., Iverson, J., Kopp, J. and D. A. Moeller. 2014. Rapid evolution of reproductive isolation between incipient outcrossing and selfing *Clarkia* species. *Evolution*, 68: 2885-2900.
- 2014 – **Briscoe Runquist, R. D.** and D. A. Moeller. 2014. Floral and mating system divergence in secondary sympatry: testing an alternative hypothesis to reinforcement in *Clarkia*. *Annals of Botany* 113: 223-235.
Invited Paper for Special Issue on “Pollinator-Driven Speciation”
- 2013 – **Briscoe Runquist, R. D.** and D. A. Moeller. 2013. Resource reallocation does not influence estimates of pollen limitation or reproductive assurance in *Clarkia xantiana* ssp. *parviflora*. *American Journal of Botany* 100: 1916-1921.
- 2013 – **Briscoe Runquist, R. D.** 2013. Community phenology and its consequences for plant-pollinator interactions and pollen limitation in a vernal pool plant. *International Journal of Plant Sciences* 174(6): 853-862.
- 2013 – **Briscoe Runquist, R.** and M. L. Stanton. 2013. Asymmetric and frequency-dependent pollinator-mediated interactions may influence competitive displacement in two vernal pool annuals. *Ecology Letters* 16(2): 183-190.
- 2012 – **Briscoe Runquist, R.D.** 2012. Pollinator-mediated competition between two congeners, *Limnanthes douglasii* subsp. *rosea* and *L. alba*. *American Journal of Botany* 99: 1125-1139.

SELECTED PUBLICATIONS FOR MANAGEMENT

Briscoe Runquist, R. D., T. Lake, and D. A. Moeller. 2019. Species distribution model projections for incipient invasive species of Minnesota. *Minnesota Invasive Terrestrial Plants and Pests Center*

Briscoe Runquist, R.D. 2010. Population differentiation in four population of *Atriplex joaquiniana*, a common garden experiment. Center for Natural Land Management.

PUBLICATIONS SUBMITTED OR TO BE SUBMITTED IN 2023

Briscoe Runquist, R. D. and D. A. Moeller. Isolation-by-environment and its consequences for range shifts with climate change: landscape genomics of the invasive plant common tansy, *in prep*, Target: *Molecular Ecology*

FUNDING & AWARDS

- 2023 – USDA NIFA – (\$750,000) – PI (with D. Moeller; Co-PI), Remote Sensing Biological Invasions: Detecting and Monitoring Leafy Spurge Populations Using High Resolution Imagery and Deep Learning
- 2022 – Minnesota Invasive Terrestrial Plants and Pests Center (\$598,107) - PI (with D. Moeller, Co-PI) "Incorporating adaptation into forecasts of range shifts with climate change".
- 2021 – USDA Hatch Award – (\$65,000) – Co-PI (with D. Moeller; PI), Detection of leafy spurge in Theodore Roosevelt National Park using WorldView satellite imagery
- 2019 – IonE mini-grant (\$3000) – Life Sciences Postdoc Science Communication and Career Development Workshop
- 2018 – Minnesota Invasive Terrestrial Plants and Pests Center (\$421,501) - Co-PI (with D. Moeller, PI) "Improved detection and future management of leafy spurge and common tansy using remote sensing, mechanistic species distribution models, and landscape genomics".
Grant supports additional Research Associate funding for three years.
- 2017 – UMN College of Biological Sciences Outreach and Communications Award for Postdoctoral Scientists
- 2015 – Minnesota Invasive Terrestrial Plants and Pests Center (\$164,000) - Co-authored (with D. Moeller and P. Tiffin, PIs) grant, "Climate change and range expansion of invasive species". Supports additional postdoctoral funding for two years.
- 2015 – IonE mini-grant (\$2000) – (Co-Principal Investigator, *Market Science*) – Awarded to support hands-on science outreach at the Minneapolis Midtown Farmer's Market.
- 2009 – Davis Botanical Society Research Grant (\$1000) – (with D. Grossenbacher, S. Porter, and J. Smith) -
- Community assemblage patterns in three California genera: *Limnanthes*, *Mimulus*, and *Clarkia*
- 2009 – Northern California Botanists Research Grant (\$1000) – (with D. Grossenbacher, S. Porter, and J. Smith) -- Community assemblage patterns in three California genera: *Limnanthes*, *Mimulus*, and *Clarkia*
- 2005-2008 – Center for Population Biology Research Award (\$2990) – Awarded to support dissertation research on the ecological consequences of pollinator-mediated competition.
- 2006-2007 – Hardman Award (\$450) - Awarded to support dissertation research on the ecological consequences of pollinator-mediated competition.
- 2006 – Daphne and Ted Pengeley Award (\$200) - Awarded to support dissertation research on the ecological consequences of pollinator-mediated competition.
- 2005-2006 – ARC Foundation, Inc. Fellowship (\$7500) - Awarded to support dissertation research on the ecological consequences of pollinator-mediated competition.
- 2005 – California Native Plants Society Scholarship Award (\$1400) - Awarded to support dissertation research on the ecological consequences of pollinator-mediated competition.

OUTREACH & SERVICE

- 2018 – 2020 Co-Chair, Early Career Scientist Steering Committee, Genetics Society of America Early Career Scientist Leadership Program
Expanded committee and launched a virtual Early Career Scientist Seminar Series
- 2018 Guest Lecturer for Climate Change for Forest Service Coordinators Training
Presented workshop training on how to interpret Species Distribution Modeling to Upper Midwest land managers.
- 2014 – 2017 Founding Board Member and Director of Marketing, Communications, and Assessment of volunteer science outreach organizations **Market Science** (marketsci.org).
I manage the day-to-day operations of Market Science including supervising two undergraduate student workers. I manage marketing and strategic development of Market Science.
Previous duties included: session leader and volunteer coordination, on-site planning and logistics, public engagement and teaching, leading sessions on my research program, social media/website coordination.
- 2017 Minnesota Youth Institute (in conjunction with the World Food Prize) Session Leader.
I developed and lead students in an activity about seeds and seedlings that included hands-on plant and transplanting activities.
- 2015 – 2016 Guest instructor for Masters Teacher Training course –
Taught elementary school teachers about basic floral biology and pollination and led inquiry-based learning activities that they could translate to their classrooms.
- 2014 Co-organized “Fun with Plant Diversity”
Designed and led active learning inquiry-based activities at the University of Minnesota, College of Biological Sciences Plant Conservatory for local high school groups.
- 2014 Mentor for “Perpich Center for Arts and Education” plant science section
Started dialogue with high school students developing their independent research projects for the semester.

TEACHING EXPERIENCE

- 2014 – 2015 Visiting professor for Citizen Science, Bard College, January 2015
I was selected to teach as an independent primary instructor for a section of the condensed Citizen Science course for all freshmen at Bard College. The goal of the course is to increase scientific literacy for all students focusing on infectious disease. The course is a three-week intensive session with four hours of classroom time a day with emphasis on active teaching and learning.
- 2005 – 2011 EVE100: Introduction to Evolution, U. California, Davis, Teaching Assistant (8 quarters)
In addition to traditional teaching assistant duties, I was responsible for running and developing teaching materials for my discussion sections.
- 2007 – 2010 EVE101: Introduction to Ecology, U. California, Davis, Teaching Assistant (3 quarters)
In addition to traditional teaching assistant duties, I was responsible for running and developing teaching materials for my discussion sections. I also guest lectured on species interactions.
- 2008 – 2011 BIS2B: Introduction to Biology, U. California, Davis, Teaching Assistant (3 quarters)
I presented introductory lectures of the laboratory material and then guided students through the laboratory. This class required the students to develop their own mini-experiments and I provided guidance during that process.

SUPERVISORY AND MENTORING EXPERIENCE

- 2017 – Co-supervise research technician for MITPPC project on invasive species.
I trained the technician to complete research tasks and we worked together to implement protocols in order to complete project goals. Tasks included data gathering, protocol writing, and model building. Trouble-shoot any day-to-day problems with delegated tasks.
- 2017 – Supervise undergraduate student for *Market Science*.
Manage student tasks in email communications with session researchers and volunteers. Manage students dealing with inventory and materials.
- 2013 – 2014 – HHMI mentor for a transfer student, overseeing a project to assess intrinsic hybrid inviability in a greenhouse common garden of *Clarkia xantiana xantiana* and *C. x. parviflora* first and second generation hybrids.
I mentored the student as she wrote a proposal, conducted research under my supervision and presented a poster at a University symposium. She collected size and growth data from pictures of leaves collected from a common garden of *Clarkia* hybrids using Image J, analyzed the data in R with my assistance and presented the results in a poster.
- 2012 – 2013 – HHMI mentor for a transfer student, overseeing a project on reproductive isolation through pollen/pistil interaction in *Clarkia xantiana*
I mentored the student as she wrote a proposal, conducted research under my supervision and presented a poster at a University symposium. During her time in the laboratory, she learned how to prepare solutions, follow a histological protocol, work with a light microscope and work cleanly in the lab.
- 2012 – 2017 – Mentoring and training of 10 undergraduate assistants in the Moeller lab
I have helped provide direction and supervision in the lab, greenhouse and field. I directed students as they assisted me in sorting and organizing ~90,000 seeds for our large field experiment. I helped direct a student in a laboratory project on paternity analysis and selection through male fitness that became his thesis project. I mentored a student in his preliminary analysis and collection of data in the greenhouse and field for his current thesis project.
- 2008 – 2010 – Mentor for UC Davis BUSP undergraduate researchers, a program developed to promote undergraduate research, particularly in underrepresented minority groups.
I mentored two Latina students as they helped me grow plants and work in the field for my graduate research.
- 2006 – 2011 – Mentor for 6 additional undergraduate researchers (research for credit) at UC Davis. –
Students assisted me in during greenhouse and field projects during my graduate research.

CONTRIBUTED PAPERS AND POSTERS

- 2022– Contributed Oral Presentation, Upper Midwest Invasive Species Conference, *Landscape genetics of common tansy reveals important spatial differentiation*
- 2020 – Contributed Oral Presentation, Upper Midwest Invasive Species Conference, *Improving predictions of range expansion for invasive species using joint species distribution models and surrogate co-occurring species.*
- 2019 – Invited Presentation, UMN MicrobeTech, a Professional Development Symposium for ECS, *Market Science – how to get involved in informal education and outreach*
- 2019 – Invited Poster, Minnesota Invasive Terrestrial Plants and Pests Center Palmer Amaranth Symposium, *Species distribution models throughout the invasion history of Palmer amaranth predict regions at risk of future invasion and reveal challenges with modeling rapidly shifting geographic ranges*

- 2018 – Contributed Oral Presentation, Upper Midwest Invasive Species Conference – North American Invasive Species Management Association Joint Conference, *Species distribution models throughout the invasion history of Palmer amaranth predict regions at risk of future invasion and reveal challenges with modeling rapidly shifting geographic ranges*
- 2018 – Invited Presentation, Ecological Society of America 2018, *Mating system evolution under strong pollen limitation: evidence of disruptive selection through male and female fitness in Clarkia xantiana*
- 2018 – Presentation to MN Dept. of Agriculture Noxious Weed Advisory Committee, *Climate change and range expansion of invasive plants – with special emphasis on Palmer Amaranth*
- 2017 – Contributed poster and presentation table, Citizen Science Association 2017, *Market Science*
- 2016 – Invited Presentation, UMN MPGI Annual Retreat, 2016, *Reinforcement between incipient outcrossing and selfing Clarkia species.*
- 2015 – Contributed Paper, Ecological Society of America 2015, *Reinforcement between incipient outcrossing and selfing Clarkia species.*
- 2015 – Invited Seminar, Department of Biology, Stanford University – *The ecological and evolutionary context of species divergence and community assembly*
- 2015 – Citizen Science Faculty Seminar, Bard College – *Speciation: The evolution of reproductive isolation*
- 2014 – Contributed Presentation, Evolution 2014, *Rapid evolution of reproductive isolation between incipient outcrossing and selfing Clarkia species*
- 2013 – Contributed Paper, Ecological Society of America 2013, *Floral and mating system divergence: a geographic and phylogeographic analysis of Clarkia xantiana subsp. parviflora.*
- 2012 – Invited Seminar, Department of Plant Biology, University of Minnesota - *Pollinator-mediated interactions between two vernal pool congeners, Limnanthes douglasii subsp. rosea and L. alba*
- 2011 – Dissertation Exit Seminar, Center for Population Biology, University of California, Davis – *Ecological consequences of pollinator-mediated interactions between two vernal-pool congeners.*
- 2011 – Contributed Paper, Northern California Botanists 2011 Symposium – *Pollinator-mediated interactions between two vernal pool congeners, Limnanthes douglasii subsp. rosea and L. alba*
- 2010 – Contributed Paper, Evolution 2010 – *Ecological and evolutionary consequences of pollinator-mediated competition between two vernal pool annuals.*
- 2009 – Contributed Poster, Evolution 2009 – *Ecological and evolutionary consequences of pollinator-mediated competition between two vernal pool annuals.*
- 2009 – Contributed Poster, California Native Plant Society 2009 Conservation Conference- *Pollinator-mediated plant interactions between the vernal pool species Limnanthes douglasii subsp. rosea and Limnanthes alba subsp. alba.* Won best student poster, invited to contribute technical paper to proceedings

2007 - Contributed paper at UC Davis NSF CLIMB Population Ecology in Vernal Pool Systems:
Implications for Management and Restoration Symposium

OTHER SERVICE

Manuscript review

- Selected Publications: American Naturalist, Global Change Biology, Computers and Electronics in Agriculture, Agricultural and Forest Entomology, New Phytologist, Ecology, Functional Ecology, Plant Ecology, Annals of Botany, Journal of Ecology, Oecologia, American Journal of Botany, Heredity, Molecular Ecology, Evolution, Journal of Evolutionary Biology, Oikos, Scientific Reports

Director of Laboratory Safety

- Current laboratory safety officer in charge of maintaining safety records, training new lab personnel, and conducting lab safety refresher trainings.