Thomas A. Lake

PhD Candidate, University of Minnesota
Department of Plant & Microbial Biology
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Education

University of Minnesota, Minneapolis, MN, USA 2018-present
PhD Candidate, Plant & Microbial Biology
Advisor: Dr. David Moeller

University of Minnesota, Minneapolis, MN, USA 2013-2017
B.S., Conservation Biology, Minor in Geographic Information Sciences

Research & Professional Experience

Graduate Research Assistant, University of Minnesota 2018-present
Minneapolis, MN, USA
PI: Dr. David Moeller
Thesis title: Predicting Biological Invasions & Population Genetics of Leafy Spurge (*Euphorbia virgata*).

Researcher I, USDA ARS Cereal Disease Lab 2018
St. Paul, MN, USA
PI: Dr. James Kolmer
Predicting leaf rust (*Puccinia triticina*) resistance in U.S. spring and winter wheat clutivars.

Undergraduate Teaching Assistant, University of Minnesota 2017-2018
Minneapolis, MN, USA
PI: Dr. Fumiaki Katagiri
Identifying genomic QTL involved in plant immune signaling with (*Arabidopsis*) and microbial pathogens.

Undergraduate Researcher, University of Minnesota 2016-2017
Minneapolis, MN, USA
PI: Dr. David Moeller
Distribution modeling and predictions of range expansion for invasive species with R and ArcGIS.

Undergraduate Researcher, University of Minnesota 2015-2016
Minneapolis, MN, USA PI: Dr. Changbin Chen
Mechanisms of DNA break repair, homologous recombination, genome organization and evolution.

Honors & Awards

Scholarships & Awards

University of Minnesota Doctoral Dissertation Research Fellowship ($25,000) 2022
University of Minnesota Bell Museum Dayton Natural History Award ($2,500) 2020
Botanical Society of America Graduate Student Research Award ($1,500) 2021

Research Grants

Earth Observation Data, European Space Agency ($12000) 2020
NVIDIA Accelerated Data Science Grant Program ($1000) 2019
Google Cloud Platform Research Grant ($1000) 2022

Publications

Journal Articles

4. **Lake, T. A.**, Briscoe Runquist, R. D., & Moeller, D. A. (2022). Deep learning detects invasive plant species across complex landscapes using Worldview-2 and Planetscope satellite imagery. Remote Sensing in Ecology and Conservation. https://doi.org/10.1002/rse2.288

3. Briscoe Runquist, R. D., **Lake, T. A.**, & Moeller, D. A. (2021). Improving predictions of range expansion for invasive species using joint species distribution models and surrogate co-occurring species. Journal of Biogeography, 48(7), 1693-1705. https://doi.org/10.1111/jbi.14105

2. **Lake, T. A.**, Runquist, R. D. B., & Moeller, D. A. (2020). Predicting range expansion of invasive species: Pitfalls and best practices for obtaining biologically realistic projections. Diversity and Distributions, 26(12), 1767-1779. https://doi.org/10.1111/ddi.13161

1. Briscoe Runquist, R. D., **Lake, T. A.**, Tiffin, P., & Moeller, D. A. (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(1), 1-12. https://doi.org/10.1038/s41598-018-38054-9

Non-refereed Articles

1. Briscoe Runquist, R. D., **Lake, T. A.**, & Moeller, D. A. (2019). MITPPC Practical Guide to Species Distribution Modeling in R. Minnesota Invasive Terrestrial Plants and Pests Center.

Invited Presentations

2. **Lake, T. A.** Image segmentation approaches in ArcGIS. Presentation. American Society of Photogrammetry and Remote Sensing Student Chapter. University of Minnesota. 11/7/2021.

1. **Lake, T. A.** Ecology and Impacts of Invasive Species. Invited Lecturer. Ecology, Evolution, and Behavior. University of Minnesota. 10/1/2019.

Presentations

5. **Lake, T. A.**, Briscoe Runquist, R. D., & Moeller, D. A. Detecting invasive plant species across complex landscapes using satellite imagery and deep learning. Presentation. Upper Midwest Invasive Species Conference, Green Bay, Wisconsin. 10/25/2022.

4. **Lake, T. A.**, Briscoe Runquist, R. D., & Moeller, D. A. Deep learning detects invasive plant species across complex landscapes using Worldview-2 and Planetscope satellite imagery. Presentation. Joint Annual Meeting of the Ecological Society of America (ESA) and Canadian Society for Ecology & Evolution (CSEE), Montreal, Canada. 8/17/2022.

3. **Lake, T. A.**, Briscoe Runquist, R. D., & Moeller, D. A. Deep learning detects invasive plant species across complex landscapes using Worldview-2 and Planetscope satellite imagery.

Presentation. American Society of Photogrammetry and Remote Sensing Virtual Conference. 3/25/2022.

2. Briscoe Runquist, R. D., **Lake, T. A.**, & Moeller, D. A. 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. Presentation. Joint Summit of the Minnesota Terrestrial Invasive Plants and Pests Center and Minnesota Department of Agriculture. 2/10/2019.

1. Briscoe Runquist, R. D., **Lake, T. A.**, & Moeller, D. A. 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. Poster presentation. Joint Meeting of the Upper Midwest Invasive Species Conference and the North American Invasive Species Management Association. 10/18/2018.

Teaching & Supervisory Experience

Teaching

University of Minnesota

Graduate Teaching Assistant, Plant, Algal and Fungal Diversity and Adaptation 2019, 2020
Graduate Teaching Assistant, Foundations of Biology (BIOL1961) 2019
Undergraduate Teaching Assistant, Plant Immunity (PBIO4994) 2018

Community Involvement

Departmental Service

Undergraduate Mentor 2018, 2019, 2020, 2021, 2022

Organizations & Memberships

Citizen Scientist, iNaturalist Contributor 2020-present
Member, Society for the Study of Evolution (SSE) 2021-present
Member, Ecological Society of America (ESA) 2021-present
Member, American Society of Photogrammetry and Remote Sensing (ASPRS) 2020-present
Chapter Coordinator, American Society of Photogrammetry and Remote Sensing - University of Minnesota Chapter 2020-2022