

# Nicholas A. Johnson

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## Education

<b>Michigan State University</b> , Ph.D., dual major, Genetics and Genome Sciences; Ecology, Evolution, and Behavior	Aug 2021 – Current
<b>Michigan State University</b> , Computational Plant Science Graduate Certificate	Aug 2021 - May 2024
<b>University of Minnesota, Twin-Cities</b> , B.S., Plant Science (Breeding and Genetics)	Aug 2018 – May 2020
<b>Normandale Community College</b> , A.A., Liberal Arts	Aug 2012 – Dec 2017

## Research Experience

<b>Graduate Research Assistant</b> , Michigan State University – East Lansing, MI	Aug 2021 – Current
<i>Principal Investigator: Dr. Eric L. Patterson</i>	

- Investigating genomic patterns associated with adaptation in weedy plants through comparative genomics
- Revealed genomic structural variation associated with herbicide resistance evolution in the agronomic weed *Eleusine indica* using comparative genomics approaches, advancing understanding of weed adaptation
- Developed genomic and evolutionary analysis pipelines (Unix, Python, R) to automate workflows and expand accessibility for non-computational biologists
- Independently secured over \$200,000 for the lab through fellowships and industry partnership
- Frequently communicated results through seminars, conference presentations, open-source software, and publications
- Provided continuous mentorship and collaboration in computational methods with undergraduate and graduate students, post-doctoral researchers, faculty, and external collaborators

<b>Biological Science Technician (GS-7)</b> , United States Department of Agriculture (U.S.D.A.) – Logan, UT	July 2024 – Feb 2025
<i>Principal Investigator: Dr. Matthew D. Robbins</i>	

- Assembled and annotated the genome of *Penstemon fruticosus*, a model genus for floral morphology evolution
- Investigated the evolution of floral morphology among *Penstemon* species with comparative genomics
- Currently writing a manuscript on these findings

<b>Undergraduate Researcher</b> , University of Minnesota – St. Paul, MN	Dec 2018 – May 2020
<i>Principal Investigator: Dr. Alan G. Smith</i>	

- Independently researched abiotic stress and intraspecific competition of *Nicotiana tabacum* (tobacco) pollen
- Developed a Nanodrop Spectrophotometer method for quantifying pollen in a liquid solution
- Propagated, crossed, tissue cultured, regenerated, and transformed tobacco plants
- Collected and tissue cultured invasive plants and discussed management techniques with landowners
- Communicated results through an undergraduate thesis and symposia presentations

## Teaching and Mentoring Experience

<b>Graduate Teaching Assistant</b> , Michigan State University – East Lansing, MI	Jan 2024 – May 2024
<i>IBIO 341 Fundamental Genetics – Instructor: Dr. Jeanette McGuire</i>	

- Guided students through course content with two recitation sections and open office hours weekly
- Graded assignments, quizzes, and exams
- Contributed to course refinement through weekly meetings with the instructor and teaching assistants

<b>Mentor</b> , Michigan State University – East Lansing, MI	May 2023 – July 2023
<i>Research Experience for Undergraduates in Plant Genomics</i>	

- Guided a visiting student exploring subgenome evolution in a genus of agronomic weeds and crops
- Helped students develop programming, computational analysis, and presentation skills

**Lead Trainer**, International Weed Genomics Consortium Meeting, Washington, D.C.

Jan 30 2023

*Introductory Bioinformatics Workshop*

- Led a conference workshop for primarily non-computational or early career scientists
- Guided participants through a full RNA-Seq pipeline using public data
- Helped organize event and develop workshop scripts

**Trainer**, Michigan State University – East Lansing, MI

Oct 15 2022

*Ecotek Lab Youth Scientists Visit*

- Taught visiting junior scientists about genetics
- Helped junior scientists run P.C.R. and subsequent gel electrophoresis

**Mentor**, Michigan State University – East Lansing, MI

June 2022 – Present

*Graduate Recruitment Initiative Team*

- Guiding first-year Ph.D. students (assigned one student annually) through professional and general graduate student life decisions to help them acclimate
- Attending group-sponsored meetings to recruit and retain graduate students

**Mentor**, Michigan State University – East Lansing, MI

May 2022 – July 2022

*Research Experience for Undergraduates in Plant Genomics*

- Guided a visiting student through comparative genomics of agronomic weeds and crops to find genomic patterns associated with domestication
- Helped students develop programming, computational analysis, and presentation skills

**Graduate Teaching Assistant**, Michigan State University – East Lansing, MI

May 2022 – July 2022

*CSS 126 Introduction to Weed Management – Instructor: Dr. Erin Hill*

- Graded and provided feedback on a semester-long project on agronomic weed identification, biology, and management throughout the course

## Fellowships, Grants, and Awards

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**Deep Learning Cis-Regulation Research Grant (Renewal)**, BASF Germany

Jan 2025 - Aug 2026

**Dissertation Completion Fellowship**, College of Natural Sciences, Michigan State University

Jan 2025 - May 2026

**Outstanding Student Award**, Genetics and Genome Sciences Program, Michigan State University

May 2025

**Outstanding Scholar Fellowship**, College of Natural Sciences, Michigan State University

May 2025 - Aug 2025

**Deep Learning Cis-Regulation Research Grant**, BASF Germany

Jan 2025 - Dec 2025

**Agricultural Genome to Phenome Initiative Travel Award**, United States Department of Agriculture and Iowa State University

July 2024

**NSF Research Trainee Travel Award**, National Science Foundation and Michigan State University

July 2024

**NSF Integrated Training Model in Computational Plant Sciences Fellowship**, National Science Foundation and Michigan State University

Aug 2022 – Aug 2023

**Plant Biotechnology for Health and Sustainability Fellowship**, National Institutes of Health and Michigan State University

May 2022 – May 2025

**Collegiate Scholars Award**, American Society of Horticultural Science

May 2020

**Undergraduate Research Opportunity Program**, University of Minnesota, Twin-Cities

Jan 2019 – May 2019

<b>Edward Hartwig Undergraduate Scholarship</b> , University of Minnesota, Twin-Cities	Aug 2018 – May 2020
<b>Dr. Laddie Elling Outstanding Achievement Scholarship</b> , University of Minnesota, Twin-Cities	Aug 2018 – May 2020

## Conference Presentations

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<b>Gene regulatory sequence annotation in plants using deep learning</b>	Oct 2025
Johnson, N. A., Filho, D., Bernhofer, M., Islamovic, E., Murphy, B., & Patterson, E. L.	
<i>BASF Bioinformatics Seminar</i> : Oral presentation	
<b>Annotating cis-regulatory elements in plants via deep learning</b>	July 2025
Johnson, N. A., Filho, D., Bernhofer, M., Islamovic, E., Murphy, B., & Patterson, E. L.	
<i>BASF North American Open Research Alliance 2025</i> : Oral presentation	
<b>A high-throughput pipeline for measuring selection pressure during comparative genomic analysis</b>	Feb 2025
Johnson, N. A., Cutti, L., Gaines, T. A., & Patterson, E. L.	
<i>Weed Science Society of America 2025</i> : Oral presentation	
<b>Chromosome-level assembly of the allohexaploid <i>Chenopodium album</i> L. genome reveals selection pressures on genes associated with adaptation</b>	June 2024
Johnson, N. A., Cutti, L., Abdollahi, F., Fengler, K., Nelson, D. R., Llaca, V., MacGregor, D. R., Maughan, P. J., Gaines, T. A., & Patterson, E. L.	
<i>Plant Biology 2024</i> : Poster presentation	
<b>Subtelomeric EPSPS duplications confer glyphosate resistance in <i>Eleusine indica</i></b>	Jan 2024
Johnson, N. A., Hall, N., Zhang, C., Yu, Q., & Patterson, E. L.	
<i>Weed Science Society of America Annual Meeting</i> : Single-slide oral presentation	
<b>Subtelomeric 5-enolpyruvylshikimate-3-phosphate synthase copy number variation confers glyphosate resistance in <i>Eleusine indica</i></b>	Dec 2023
Johnson, N. A., Hall, N., Zhang, C., Yu, Q., & Patterson, E. L.	
<i>North Central Weed Science Society Annual Meeting</i> : Poster presentation	
<b>Weeds, genomics, and evolution</b>	Jan 2023
Johnson, N. A.	
<i>Weed Science Society of America Annual Meeting</i> : Three-minute thesis oral presentation	
<b>FHY3/FAR1 transposable elements generate adaptive genetic variation in the <i>Bassia scoparia</i> genome</b>	Jan 2023
Johnson, N. A.	
<i>Plant and Animal Genome Conference 30</i> : Oral presentation	
<b>Subtelomeric 5-enolpyruvylshikimate-3-phosphate synthase copy number variation confers glyphosate resistance in <i>Eleusine indica</i></b>	Jan 2023
Johnson, N. A., Hall, N., Zhang, C., Yu, Q., & Patterson, E. L.	
<i>Plant and Animal Genome Conference 30</i> : Poster presentation	
<b>Subtelomeric rearrangements cause glyphosate resistance in <i>Eleusine indica</i></b>	Dec 2022
Johnson, N. A., Hall, N., Zhang, C., Yu, Q., & Patterson, E. L.	
<i>North Central Weed Science Society Annual Meeting</i> : Oral presentation	

## Additional Volunteer Positions

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<b>Peer Reviewer</b> , Scientific Data – One article	Aug 2025 – Present
<b>Peer Reviewer</b> , Chromosome Research – One article	Feb 2025 – Present
<b>Peer Reviewer</b> , Plant Communications – Two articles	July 2024 – Present
<b>Genetics and Genome Sciences Program Representative</b> , Michigan State University	May 2024 – May 2025
<b>Peer Reviewer</b> , Plant Physiology – One article	Sept 2023 – Present

## Software

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<b>iwgc-circos</b>	Aug 2025
<b>Johnson, N. A.</b> <i>BASH pipeline to quickly and easily produce Circos plots for commonly visualized genomic features</i> <a href="https://github.com/Scrumpis/iwgc-circos">https://github.com/Scrumpis/iwgc-circos</a>	

## Publications

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<b>Assembly and annotation of the tetraploid <i>Salsola tragus</i> (Russian thistle) genome</b>	Jan 2025
<b>Lemas, J., et al.</b> <i>Genome Biology and Evolution</i> – 10.1093/gbe/evaf014	
<b>Genomic structural variation and herbicide resistance</b>	Dec 2024
<b>Johnson, N. A., Lemas, J., Montgomery, J., Gaines, T., &amp; Patterson, E. L.</b> <i>Canadian Journal of Plant Science</i> – 10.1139/cjps-2024-0199	
<b>Expression-based machine learning models for predicting plant tissue identity</b>	Jan 2024
<b>Palande, S., et al.</b> <i>Applications in Plant Sciences</i> – 10.1002/aps3.11621	
<b>Subtelomeric 5-enolpyruvylshikimate-3-phosphate synthase copy number variation confers glyphosate resistance in <i>Eleusine indica</i></b>	Aug 2023
<b>Zhang, C.* &amp; Johnson, N. A.*</b> , Hall, N., Tian, X., Yu, Q., & Patterson, E. L. *Co-first authors <i>Nature Communications</i> – 10.1038/s41467-023-40407-6	

## Additional Employment History

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<b>Technical Sales Representative</b> , TubeWriter – Fremont, CA	Dec 2020 – Aug 2021
<b>In-House Sales Representative</b> , Gardenworld, Inc. – Cottage Grove, MN	Aug 2020 – Dec 2020
<b>Server</b> , Simon & Seafort's – Anchorage, AK	May 2018 – Aug 2018
<b>Server</b> , Al Vento – Minneapolis, MN	Apr 2016 – May 2018
<b>Wait Assistant/Food Runner</b> , Al Vento – Minneapolis, MN	Apr 2015 – Apr 2016
<b>Valet</b> , Meritage – St. Paul, MN	Feb 2014 – Apr 2015
<b>Valet/Bellman</b> , Hotel Zetta – San Francisco, CA	May 2013 – Feb 2014
<b>Valet</b> , The W, Foshay Tower – Minneapolis, MN	Jan 2012 – May 2013
<b>Package Handler</b> , United Parcel Service – M.S.P. International Airport, MN	Nov 2011 – Feb 2013