

# Nicholas A. Johnson

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## Education

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<b>Michigan State University</b> , Ph.D., <i>dual major</i> , 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

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<b>Graduate Research Assistant</b> , Michigan State University – East Lansing, MI <i>Principal Investigator: Dr. Eric L. Patterson</i>	Aug 2021 – Current
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- 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
- Secured BASF funding to develop a self-conceptualized deep learning approach to annotate cis-regulatory elements in model and non-model plants
- 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, postdoctoral 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
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*Principal Investigator: Dr. Matthew D. Robbins*

- 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
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*Principal Investigator: Dr. Alan G. Smith*

- 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

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<b>Graduate Teaching Assistant</b> , Michigan State University – East Lansing, MI <i>IBIO 341 Fundamental Genetics – Instructor: Dr. Jeanette McGuire</i>	Jan 2024 – May 2024
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- 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 <i>Research Experience for Undergraduates in Plant Genomics</i>	May 2023 – July 2023
<ul style="list-style-type: none"> <li>• Guided a visiting student exploring subgenome evolution in a genus of agronomic weeds and crops</li> <li>• Helped students develop programming, computational analysis, and presentation skills</li> </ul>	
<b>Lead Trainer</b> , International Weed Genomics Consortium Meeting, Washington, D.C. <i>Introductory Bioinformatics Workshop</i>	Jan 30 2023
<ul style="list-style-type: none"> <li>• Led a conference workshop for primarily non-computational or early career scientists</li> <li>• Guided participants through a full RNA-Seq pipeline using public data</li> <li>• Helped organize event and develop workshop scripts</li> </ul>	
<b>Trainer</b> , Michigan State University – East Lansing, MI <i>Ecotek Lab Youth Scientists Visit</i>	Oct 15 2022
<ul style="list-style-type: none"> <li>• Taught visiting junior scientists about genetics</li> <li>• Helped junior scientists run P.C.R. and subsequent gel electrophoresis</li> </ul>	
<b>Mentor</b> , Michigan State University – East Lansing, MI <i>Graduate Recruitment Initiative Team</i>	June 2022 – Present
<ul style="list-style-type: none"> <li>• Guiding first-year Ph.D. students (assigned one student annually) through professional and general graduate student life decisions to help them acclimate</li> <li>• Attending group-sponsored meetings to recruit and retain graduate students</li> </ul>	
<b>Mentor</b> , Michigan State University – East Lansing, MI <i>Research Experience for Undergraduates in Plant Genomics</i>	May 2022 – July 2022
<ul style="list-style-type: none"> <li>• Guided a visiting student through comparative genomics of agronomic weeds and crops to find genomic patterns associated with domestication</li> <li>• Helped students develop programming, computational analysis, and presentation skills</li> </ul>	
<b>Graduate Teaching Assistant</b> , Michigan State University – East Lansing, MI <i>CSS 126 Introduction to Weed Management – Instructor: Dr. Erin Hill</i>	May 2022 – July 2022
<ul style="list-style-type: none"> <li>• Graded and provided feedback on a semester-long project on agronomic weed identification, biology, and management throughout the course</li> </ul>	

## Fellowships, Grants, and Awards

<b>Outstanding Student Award</b> , Genetics and Genome Sciences Program – Michigan State University	May 2025
<b>Outstanding Scholar Fellowship</b> , College of Natural Sciences – Michigan State University	May 2025 - Aug 2025
<b>Deep Learning Cis-Regulation Research Grant</b> , BASF – Germany	Jan 2025 - Dec 2025
<b>Agricultural Genome to Phenome Initiative Travel Award</b> , United States Department of Agriculture and Iowa State University	July 2024
<b>NSF Research Trainee Travel Award</b> , National Science Foundation and Michigan State University	July 2024
<b>NSF Integrated Training Model in Computational Plant Sciences Fellowship</b> , National Science Foundation and Michigan State University	Aug 2022 – Aug 2023
<b>Plant Biotechnology for Health and Sustainability Fellowship</b> , National Institutes of Health and Michigan State University	May 2022 – May 2025
<b>Collegiate Scholars Award</b> , American Society of Horticultural Science	May 2020
<b>Undergraduate Research Opportunity Program</b> , University of Minnesota, Twin-Cities	Jan 2019 – May 2019
<b>Edward Hartwig Undergraduate Scholarship</b> , University of Minnesota, Twin-Cities	Aug 2018 – May 2020

Dr. Laddie Elling Outstanding Achievement Scholarship, University of Minnesota, Twin-Cities

Aug 2018 – May 2020

## Conference Presentations

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

## Additional Volunteer Positions

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- Peer Reviewer**, Scientific Data – One article Aug 2025 – Present
- Peer Reviewer**, Chromosome Research – One article Feb 2025 – Present
- Peer Reviewer**, Plant Communications – Two articles July 2024 – Present
- Genetics and Genome Sciences Program Representative**, Michigan State University May 2024 – May 2025

## Publications

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**Assembly and annotation of the tetraploid *Salsola tragus* (Russian thistle) genome** Jan 2025

Lemas, J., *et al.*

*Genome Biology and Evolution* – 10.1093/gbe/evaf014

**Genomic structural variation and herbicide resistance** Dec 2024

Johnson, N. A., Lemas, J., Montgomery, J., Gaines, T., & Patterson, E. L.

*Canadian Journal of Plant Science* – 10.1139/cjps-2024-0199

**Expression-based machine learning models for predicting plant tissue identity** Jan 2024

Palande, S., *et al.*

*Applications in Plant Sciences* – 10.1002/aps3.11621

**Subtelomeric 5-enolpyruvylshikimate-3-phosphate synthase copy number variation confers glyphosate resistance in *Eleusine indica*** Aug 2023

Zhang, C.\* & Johnson, N. A.\*, Hall, N., Tian, X., Yu, Q., & Patterson, E. L.

\*Co-first authors

*Nature Communications* – 10.1038/s41467-023-40407-6

## Additional Employment History

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**Technical Sales Representative**, TubeWriter – Fremont, CA Dec 2020 – Aug 2021

**In-House Sales Representative**, Gardenworld, Inc. – Cottage Grove, MN Aug 2020 – Dec 2020

**Server**, Simon & Seafort's – Anchorage, AK May 2018 – Aug 2018

**Server**, Al Vento – Minneapolis, MN Apr 2016 – May 2018

**Wait Assistant/Food Runner**, Al Vento – Minneapolis, MN Apr 2015 – Apr 2016

**Valet**, Meritage – St. Paul, MN Feb 2014 – Apr 2015

**Valet/Bellman**, Hotel Zetta – San Francisco, CA May 2013 – Feb 2014

**Valet**, The W, Foshay Tower – Minneapolis, MN Jan 2012 – May 2013

**Package Handler**, United Parcel Service – M.S.P. International Airport, MN Nov 2011 – Feb 2013