

Nicholas A. Johnson

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Education

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

Research Experience

Graduate Research Assistant , 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, post-doctoral researchers, faculty, and external collaborators

Biological Science Technician (GS-7) , 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

Undergraduate Researcher , 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

Graduate Teaching Assistant , 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

Mentor , 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"> • 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. <i>Introductory Bioinformatics Workshop</i>	Jan 30 2023
<ul style="list-style-type: none"> • 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 <i>Ecotek Lab Youth Scientists Visit</i>	Oct 15 2022
<ul style="list-style-type: none"> • Taught visiting junior scientists about genetics • Helped junior scientists run P.C.R. and subsequent gel electrophoresis 	
Mentor , Michigan State University – East Lansing, MI <i>Graduate Recruitment Initiative Team</i>	June 2022 – Present
<ul style="list-style-type: none"> • 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 <i>Research Experience for Undergraduates in Plant Genomics</i>	May 2022 – July 2022
<ul style="list-style-type: none"> • 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 <i>CSS 126 Introduction to Weed Management – Instructor: Dr. Erin Hill</i>	May 2022 – July 2022
<ul style="list-style-type: none"> • Graded and provided feedback on a semester-long project on agronomic weed identification, biology, and management throughout the course 	

Fellowships, Grants, and Awards

Deep Learning Cis-Regulation Research Grant (Renewal) , BASF Germany	Jan 2025 - June 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

Edward Hartwig Undergraduate Scholarship , 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

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

Additional Volunteer Positions

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
Peer Reviewer , Plant Physiology – One article	Sept 2023 – Present

Software

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

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

Additional Employment History

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