

Nicholas A. Johnson

East Lansing, Michigan, U.S.A. | john7932@msu.edu | ORCID: 0000-0001-7272-6474

linkedin.com/in/nick-johnson-b771b01a9 | github.com/Scrumpis

Education

Michigan State University , Ph.D., dual major, 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	Aug 2021 – Current
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Principal Investigator: Dr. Eric L. Patterson

- Independently developed comparative genomics hypotheses and computational approaches to investigate evolutionary adaptation in weedy plant species
- Revealed genomic structural variation associated with herbicide resistance evolution in *Eleusine indica*, advancing understanding of weed adaptation
- Authored and maintained containerized, open-source omics research software to enable large-scale, reproducible analyses on HPC systems through integration of Bash, Python, and R-based analytical frameworks, with an emphasis on usability for non-computational biologists
- Frequently communicated results through presentations, open-source software, and publications
- Provided continuous mentorship or collaboration in computational biology for undergraduate and graduate students, faculty, and external researchers across diverse disciplines

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	Jan 2024 – May 2024
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IBIO 341 Fundamental Genetics – Instructor: Dr. Jeanette McGuire

- 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	May 2023 – July 2023
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Research Experience for Undergraduates in Plant Genomics

- 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

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

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	Dec 2025
Johnson, N. A. , Filho, D., Bernhofer, M., Islamovic, E., Murphy, B., & Patterson, E. L.	
<i>North Central Weed Science Society Annual Meeting</i> : Oral presentation	
Subgenome- and region-specific patterns of molecular evolution in the allohexaploid weed <i>Chenopodium album</i> L.	Dec 2025
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>North Central Weed Science Society Annual Meeting</i> : Poster presentation	
Gene regulatory sequence annotation in plants using deep learning	Oct 2025
Johnson, N. A. , Filho, D., Bernhofer, M., Islamovic, E., Murphy, B., & Patterson, E. L.	
<i>BASF Bioinformatics Seminar</i> : Oral presentation	
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.	
<i>BASF North American Open Research Alliance 2025</i> : 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.	
<i>Weed Science Society of America 2025</i> : Oral presentation	
Chromosome-level assembly of the allohexaploid <i>Chenopodium album</i> 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.	
<i>Plant Biology 2024</i> : Poster presentation	
Subtelomeric EPSPS duplications confer glyphosate resistance in <i>Eleusine indica</i>	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	
Subtelomeric 5-enolpyruvylshikimate-3-phosphate synthase copy number variation confers glyphosate resistance in <i>Eleusine indica</i>	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	
Weeds, genomics, and evolution	Jan 2023
Johnson, N. A.	
<i>Weed Science Society of America Annual Meeting</i> : Three-minute thesis oral presentation	
FHY3/FAR1 transposable elements generate adaptive genetic variation in the <i>Bassia scoparia</i> genome	Jan 2023
Johnson, N. A.	
<i>Plant and Animal Genome Conference 30</i> : Oral presentation	
Subtelomeric 5-enolpyruvylshikimate-3-phosphate synthase copy number variation confers glyphosate resistance in <i>Eleusine indica</i>	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

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

dndsR	Aug 2025
Johnson, N. A.	
<i>R library for scalable calculation and analysis of evolutionary selection pressures</i>	
https://github.com/Scrumpis/dndsR	
iwgc-circos	Aug 2025
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	

Publications

Assembly and annotation of the tetraploid <i>Salsola tragus</i> (Russian thistle) genome	Jan 2025
Lemas, J., et al.	
<i>Genome Biology and Evolution</i> – 10.1193/gbe/evaf014	
Genomic structural variation and herbicide resistance	Dec 2024
Johnson, N. A., Lemas, J., Montgomery, J., Gaines, T., & Patterson, E. L.	
<i>Canadian Journal of Plant Science</i> – 10.1139/cjps-2024-0199	
Expression-based machine learning models for predicting plant tissue identity	Jan 2024
Palande, S., et al.	
<i>Applications in Plant Sciences</i> – 10.1002/aps3.11621	
Subtelomeric 5-enolpyruvylshikimate-3-phosphate synthase copy number variation confers glyphosate resistance in <i>Eleusine indica</i>	Aug 2023
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	

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