

Nicholas A. Johnson

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Education

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| 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

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| 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

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

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

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| 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. | Jan 30 2023 |
| <i>Introductory Bioinformatics Workshop</i> | |
| <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 | Oct 15 2022 |
| <i>Ecotek Lab Youth Scientists Visit</i> | |
| <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 | June 2022 – Present |
| <i>Graduate Recruitment Initiative Team</i> | |
| <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 | May 2022 – July 2022 |
| <i>CSS 126 Introduction to Weed Management – Instructor: Dr. Erin Hill</i> | |
| <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 |

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| 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

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| 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. | |
| <i>Plant and Animal Genome Conference 30</i> : Poster presentation | |
| Subtelomeric rearrangements cause glyphosate resistance in <i>Eleusine indica</i> | 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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| 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

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| 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

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| 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> – 10.1093/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

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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 |