Miles Roberts

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Education

July 2025- Present — **Postdoctoral scholar, UC Berkeley**
Mentor: Dr. Moises Exposito-Alonso and Dr. Yaniv Brandvain

2020 – 2025 — **Ph.D., Michigan State University**
Major: Genetics and Genome Sciences
Mentor: Dr. Emily Josephs
Graduated: May 9, 2025

2017 – 2020 — **Bachelor of Science, Washington State University**
Major: Biology
Minors: Chemistry, Mathematics
Certificate: Quantitative Biology
Summa cum laude

2015 – 2017 — **Associates Degree, Clark College**
Major: Biology

Publications

†marks co-first authors

1. †**Roberts, M.**, †Davis, O., Williamson, R., & Josephs, E. (2025). K-mer-based approaches to bridging pangenomics and population genetics. *Molecular Biology and Evolution*. doi:https://doi.org/10.1093/molbev/msaf047
2. **Roberts**, **M.**, & Josephs, E. (2025). K-mer-based diversity scales with population size proxies more than nucleotide diversity in a meta-analysis of 98 plant species. *Evolution Letters*. doi:https://doi.org/10.1093/evlett/qraf011
3. Kehlet-Delgado, H., Montoya, A., Jensen, K., Wendlandt, C., Martinez, L., **Roberts**, **M.**, … Porter, S. (2024). The evolutionary genomics of adaptation to stress in wild soil microbiota. *PNAS*. doi:https://doi.org/10.1073/pnas.2311127121
4. †Palande, S., †Kaste, J., †**Roberts, M.**, †Segura Abá, K., Claucherty, C., Dacon, J., … et al. (2023). Topological data analysis reveals a core gene expression backbone that defines form and function across flowering plants. *PLOS Biology*. doi:https://doi.org/10.1371/journal.pbio.3002397
5. **Roberts**, **M.**, & Josephs, E. (2023). Weaker selection on genes with treatment-specific expression consistent with a limit on plasticity evolution in *Arabidopsis thaliana*. *Genetics*. doi:https://doi.org/10.1093/genetics/iyad074

6. Montoya, A., Wendlandt, C., Benedict, A., **Roberts**, **M.**, Griffitts, J., Piovia-Scott, J., & Porter, S. (2022). Hosts winnow symbionts with multiple layers of absolute and conditional discrimination mechanisms. *Proceedings of the Royal Society B*. doi:https://doi.org/10.1098/rspb.2022.2153

7. Wendlandt, C., **Roberts**, **M.**, Nguyen, K., Graham, M., Lopez, Z., Helliwell, E., … Porter, S. (2022). Negotiating mutualism: A locus for exploitation by rhizobia has a broad effect size distribution and context-dependent effects on legume hosts. *Journal of Evolutionary Biology*. doi:https://doi.org/10.1111/jeb.14011

8. Wendlandt, C., Helliwell, E., **Roberts**, **M.**, Nguyen, K., Friesen, M., Wettberg, E., … Porter, S. (2020). Decreased coevolutionary potential and increased symbiont fecundity during the biological invasion of a legume-rhizobium mutualism. *Evolution*. doi:https://doi.org/10.1111/evo.14164

9. **Roberts**, **M.**, Seymour, H., & Dimitrov, A. (2020). Increasing number of hospital beds has inconsistent effects on delaying bed shortages due to covid-19. *SIAM Undergraduate Research Online*. doi:https://doi.org/10.1137/20S1379149

Peer reviews

2025 **GigaScience**, **BMC Genomics**, **Bioinformatics Advances**

2024 **PeerJ**

2023 **Peer Community In,** Co-reviewed with Emily Josephs

2022 **Evolution,** Co-reviewed with Emily Josephs

2021 **New Phytologist,** Co-reviewed with Emily Josephs

Presentations

Posters

2024 **Previously unmeasured genetic variation explains part of Lewontin's paradox in plants**
> The Allied Genetics Conference

2022 **Weaker selection on genes with treatment-specific expression may limit plasticity evolution in *Arabidopsis thaliana***
> Evolution 2022 Conference
> Plant Biotechnology for Health and Sustainability Retreat

2019 – 2020 **Soil bacteria adapt to tolerate heavy metal stress in their local soil environment**
> 2020 WSUV Undergraduate Research Showcase
> 2019 Murdock College Science Research Conference
> 2019 WSU Plant Sciences Symposium
> 2019 WSU Symposium for Undergraduate Research and Creative Activities
> 2019 WSUV Undergraduate Research Showcase

Presentations (continued)

Talks

2025 **Invited Seminar**
> Rose-Hulmann Institute of Technology, Terre Haute, Indiana
> February 10th, 2025

2024 **Conference talk:** Previously unmeasured genetic variation explains part of Lewontin's paradox in plants
> Mid-west Population Genetics Conference, Bloomington, Indiana
> Evolution, Montreal, Canada
> Plant Biotechnology for Health and Sustainability Symposium

2021 **Conference talk:** Uncovering the contributions of regulatory element mutations in a latitudinal cline of trait correlations
> Virtual Evolution Conference

Teaching

Fall 2024 **Teaching Assistant:** Fundamental Genetics, Michigan State University
> IBIO 341
> led 2 recitations for 15 weeks, helping students solve homework problems

Spring 2024 **Teaching Assistant:** Scientific Writing, Michigan State University
> GEN 840
> led 1 class per week teaching fundamentals of scientific writing to 6 genetics graduate students, evaluating research proposal drafts
> co-led with Claire Vielle

Mentorship

Summer 2024 **REU Student**: John Ready
> 10 weeks of hands on training in genomics and pangenomics, culminating in a poster for an undergraduate research symposium
> co-mentored with Maya Wilson Brown

2023 **Undergraduate:** Olivia Davis
> Computer Science Student at Rose-Hulmann Institute of Technology, Indiana
> weekly or bi-weekly meetings to coordinate original research
> co-first-authored a paper together

2021-2023 **Graduate students:** Marcelio Shamammi, Nick Johnson, Luke Strickland
> Graduate Recruitment Initiative Team (GRIT), Michigan State University
> organized weekly conversation with mentees about navigating graduate school

Employment History

2020 – Present
Graduate Student, Michigan State University
> Analyzed >24,000 RNA-seq samples to understand factors constraining the evolution of gene expression responses in *Arabidopsis thaliana*
> Analyzed >205 terabases DNA-sequencing data to investigate genetic diversity-population size genetic diversity relationships in plants
> Training machine learning models on simulated datasets to predict the time to fixation of beneficial alleles

Summer 2023
Computational Biology Intern, Inari
> population genetics of target crop species
> developed reproducible cloud-based genomic workflows

2018 – 2020
Lab Technician, Porter Plant-Microbe Lab, Washington State University Vancouver
> Designed high-throughput bacterial growth curve assay with 384 well-plates
> Designed petri-dish-based assay to determine the minimum inhibitory concentration of heavy metals on bacterial growth
> Grew over 300 strains of wild bacteria in the presence and absence of nickel to understand how bacteria adapt to heavy metal stress

2018
Tutor, General Genetics and Organic Chemistry, Washington State University Vancouver Quantitative Skills Center
> Designed 60 practice questions for genetics students
> Walked through reaction mechanisms with organic chemistry students

2016 – 2017
Intern, Porter Plant-Microbe Lab, Washington State University Vancouver
> phenotype measurements of bacteria and plants

Skills

Coding
R, Python, Bash, Github, LaTeX

Computational Biology
snakemake workflows, high-performance computing, calling genetic variants, RNA-seq analysis, cloud computing with VMs; containers; Kubernetes in Azure and AWS

Population genetics
genome-wide association (k-mer-based and SNP-based), quantifying diversity, selection scans, population structure, SLiM simulations

Laboratory techniques
bacterial growth curves, PCR, DNA extraction, Gel electrophoresis, working with heavy metals

Outreach, Service, and DEI

2024 – 2025
President, Council of Graduate Students, Michigan State University
> Manage an Executive board of 7 members to address academic, financial, and social needs of graduate and professional students at MSU
> Represent the views of $\sim 10,000$ graduate and professional students with the Board of Trustees, President, Provost, and select Deans in monthly or bimonthly 1-1 meetings
> Planned and implemented support programs to improve longevity of graduate and professional student organizations

Outreach, Service, and DEI (continued)

2022 – 2024 **Treasurer**, Council of Graduate Students, Michigan State University
> Manage $250,000 in yearly expenses and portfolio of >$300,000 in investments
> Chair a 5-seat Finance Committee, review about 60 funding requests per semester
> Reviewed short-term loan application procedures at MSU, culminating in the creation of online application portal

2023 – 2024 **Chair**, Student Radio Board, Michigan State University
> Chair meetings of Student Radio Board
> Ensure appropriate usage of Radio Board funds according to the Radio Board's Charter

President, Genetics and Genome Sciences Grad Student Organization
> Organize monthly meetings of grad students in Genetics and Genome Sciences Program
> Represent GGS student voice on select committees

2021 – 2023 **Treasurer**, QT-Grad
> Social organization of queer graduate students at MSU

2022 **Organizing Committee**, Genetics and Genome Sciences Symposium
> Hosted two speakers to discuss "Big Data" and current bottlenecks in genomics and phenomics

2021 – 2022 **Finance Committee Member**, Council of Graduate Students
> Reviewed $60,000 worth of funding applications for travel awards and social events

Grad School Application Feedback Program, Graduate Recruitment Initiative Team
> Reviewed grad school applications from two prospective students
> Met with both students one-on-one to discuss applying to graduate school

2021 **SLAM semi-finalist**, Museum of Science in Boston
> Science Communication competition in front of hundreds of non-scientists
> link to recorded livestream. My presentation begins at about 19:00

2020 **Podcast Co-host**, Talking Biotech Ep. 249, Host: Dr. Kevin Folta
> Interviewed Dr. Eva Farre about plant circadian rhythms
> https://www.colabra.app/podcasts/talking-biotech/249-circadian-clocks/

Interview, Brian Charles Clark, A WSU Scientist Explores the Ecological and Evolutionary Power of Symbiosis, https://magazine.wsu.edu/2020/10/31/get-together/

2019 **1 hour seminar**, Playing with Bacteria: An Undergrad Science Story, Encounter Research Series, WSU
> presented my journey through undergraduate research to other undergraduates at WSU

Interview, Lindman S, Student's paper on antibiotic resistance receives 2019 Library Research Award, WSU Insider
> https://news.wsu.edu/news/2019/05/14/students-paper-antibiotic-resistance-receives-2019-library-research-award/

Awards and Honors

2025 — **Outstanding Student Award**, Genetics and Genome Sciences Program, Michigan State University
> Recognizing research graduate school research achievements

2024 — **Leadership Award**, Genetics and Genome Sciences Program, Michigan State University
> Recognizing leadership work within PhD program and University at large

2022 – 2024 — **Plant Biotechnology for Health and Sustainability Fellowship**, NIH

2022 – 2023 — **Cloud Computing Fellowship**, Institute for Cyber-Enabled Research, MSU
> Two-semester program to learn cloud computing

2022 — **Graduate Student Organization Event Funding Award**
> host game night for QT-Grad Students

2021 – 2022 — **Integrated Training Model in Plant and Computational Sciences Fellowship**, NSF

2021 — **NSF GRFP Honorable Mention**

2020 — **College of Natural Sciences Recruiting Fellowship**, MSU

Outstanding Researcher in Biology Award, Washington State University Vancouver

1st Place in Poster Competition, Undergraduate Research Showcase, Washington State University Vancouver

1st Place in Student Competition Using Differential Equation Modeling, SIMIODE

2017 – 2019 — **President's Honor Roll**, Washington State University Vancouver

2019 — **Student Research Excellence Award**, Washington State University Vancouver

Honorable Mention, WSU-Pullman Plant Sciences Symposium Poster Competition

Travel Award, WSUV, to attend evolutionary biology conference

2018 — **Auvil Scholars Fellowship**, Washington State University Vancouver

Academic Achievement Award, Washington State University Vancouver

Travel Award, WSUV, to attend two conferences

2017 — **Washington State Honors Award**
> GPA and SAT scores in top 10 % of WA high school graduates

2015 – 2017 — **Vice President's Honor Roll**, Clark College

References

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Rose-Hulman Institute
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Dr. Wenbin Mei
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