

# Miles Roberts

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## Education

- 2020 – Present  **Ph.D., Michigan State University**, Genetics and Genome Sciences  
Mentor: Dr. Emily Josephs
- 2017 – 2020  **Bachelor of Science, Washington State University**, Biology  
Minors: Chemistry, Mathematics  
Certificate: Quantitative Biology  
*Summa cum laude*
- 2015 – 2017  **Associates Degree, Clark College**, Biology

## Publications

- 1 **Roberts, M.**, & Josephs, E. (2022). Weaker selection on genes with treatment-specific expression may limit plasticity evolution in *Arabidopsis thaliana*. *submitted*.  
 doi:<https://doi.org/10.1101/2022.10.26.513896>
- 2 Palande, S., Kaste, J., **Roberts, M.**, Segura Abá, K., Claucherty, C., Dacon, J., ... et al. (2022). The topological shape of gene expression across the evolution of flowering plants. *submitted*.  
 doi:<https://doi.org/10.1101/2022.09.07.506951>
- 3 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>
- 4 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>
- 5 **Roberts, M.**, Seymour, H., & Dimitrov, A. (2020). Selectively caring for the most severe covid-19 patients delays icu bed shortages more than increasing hospital capacity. *SIAM Undergraduate Research Online*.  doi:<https://doi.org/10.1137/20S1379149>
- 6 Kehlet-Delgado, H., Montoya, A., Jensen, K., Wendlandt, C., Martinez, L., **Roberts, M.**, ... Porter, S. (2022). The evolutionary genomics of adaptation to stress in wild soil microbiota. *in prep*.
- 7 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. *submitted*.

## Peer reviews

- 2022  **Evolution**, Co-reviewed with Emily Josephs
- 2021  **New Phytologist**, Co-reviewed with Emily Josephs

## **Presentations**

### **Posters**

- 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
- 2020      ■ **Selectively Caring for the Most Severe COVID-19 Cases Will Delay a Hospital Bed Shortage in Washington**, Roberts M, Jensen A, Coker H, Dimitrov A  
2020 WSUV Undergraduate Research Showcase
- 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

### **Talks**

- 2021      ■ **Uncovering the contributions of regulatory element mutations in a latitudinal cline of trait correlations**, Virtual Evolution Conference

## **Employment History**

- 2020 – Present      ■ **Graduate Student**, Michigan State University  
> Research focus: How do plants respond to their environments and how do those responses evolve?  
> Analyzed 24,000 RNA-seq samples to understand factors constraining the evolution of gene expression responses  
> Writing snakemake workflows to analyze thousands of publicly available sequencing datasets
- 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  
> Counting bacterial colonies on agar plates  
> weighing dried plant matter  
> preparing plant matter for isotopic analysis

## Skills

Coding	■ R, Python, Github, L <sup>A</sup> T <sub>E</sub> X
Computational Biology	■ <a href="#">snakemake workflows</a> , high performance computing, calling genetic variants, RNA-seq analysis, cloud computing
Population genetics	■ <a href="#">genome-wide association (k-mer-based, SNP-based, multivariate, univariate)</a> , quantifying nucleotide diversity, SLiM simulations
Laboratory techniques	■ bacterial growth curves, PCR, DNA extraction, Gel electrophoresis, working with heavy metals

## Outreach and Service

- 2022 – 2023 ■ **Treasurer**, Council of Graduate Students  
    > Representative government of graduate students at MSU  
    > Manage \$250,000 in yearly expenses, plus \$250,000 in Funds Functioning as Endowments  
    > Chair Finance Committee, review over 60 funding requests per semester  
    > Represent graduate student voice in select hiring committees and board meetings for the MSU student radio station  
    > Reviewed short-term loan application procedures at MSU to identify gaps in getting emergency funding to graduate students
- 2021 – 2023 ■ **Treasurer**, QT-Grad  
    > Social organization of queer graduate students at MSU
- 2022 ■ **Organizing Committee**, Genetics and Genome Sciences Symposium  
    Invited speakers to discuss the use of "Big Data" in overcoming bottlenecks  
    lead two discussions in a semester-long seminar course on the use of machine learning in genomics
- 2021 – 2022 ■ **Peer mentor**, Graduate Recruitment Initiative Team  
    > Mentored three first-year graduate students
- **Finance Committee**, Council of Graduate Students  
    > Reviewed \$60,000 worth of funding applications
- **Grad School Application Feedback**, 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
- 2020 ■ **Podcast Co-host**, Talking Biotech Ep. 249, Host: Dr. Kevin Folta  
    > Interviewed Dr. Eva Farre about plant circadian rhythms
- **Interview**, Brian Charles Clark, A WSU Scientist Explores the Ecological and Evolutionary Power of Symbiosis, <https://magazine.wsu.edu/2020/10/31/get-together/>

## **Outreach and Service (continued)**

- 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
  - **Interview**, Kimball M, Vancoug Explores the Dangers of Antibiotic-Resistance, Vancouver News Magazine

## **Awards and Honors**

- 2022 – 2024
- **Plant Biotechnology for Health and Sustainability Fellowship**, NIH
- 2022 – 2023
- **Cloud Computing Fellowship**, Institute for Cyber-Enabled Research, MSU
- 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

## **Awards and Honors (continued)**

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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