

Wade R. Roberts

Postdoctoral Fellow

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RESEARCH INTERESTS

Evolutionary genomics; Phylogenomics and comparative biology; Diatoms; Gesneriaceae; Evolutionary-developmental biology; Genetics of flower development

EDUCATION

- 2018 **Ph.D., Molecular Plant Sciences**, Washington State University, Pullman, WA
Dissertation: Evolutionary genomics of flower diversification in the magic flowers (*Achimenes*, Gesneriaceae).
Advisor: Eric H. Roalson.
Thesis committee: Amit Dhingra, Joanna L. Kelley, Andrew McCubbin
- 2012 **B.S., Biology**, *cum laude*, Whitworth University, Spokane, WA
- 2012 **B.A., Art (Sculpture and Ceramics)**, *cum laude*, Whitworth University, Spokane, WA

EMPLOYMENT

- 2018 **Postdoctoral Fellow**, University of Arkansas, PI: Andrew Alverson
- 2013-2018 **Graduate Teaching Assistant**, Washington State University
- 2012-2013 **Graduate Research Assistant**, Washington State University
- 2010-2012 **Greenhouse Worker**, Whitworth University

PUBLICATIONS

Published:

8. Onyshchenko A, **Roberts WR**, Ruck EC, Lewis JA, Alverson AJ. 2021. The genome of a nonphotosynthetic diatom provides insights into the metabolic shift to heterotrophy and constraints on the loss of photosynthesis. *New Phytologist* 232(4):1750-1764. DOI: <https://doi.org/10.1111/nph.17673>.
7. Gargas CB*, **Roberts WR***, Alverson AJ. 2020. Genome sequences of bacteria associated with the diatom *Cyclotella cryptica* strain CCMP332. *Microbiology Resource Announcements* 9:e01030-20. DOI: <https://doi.org/10.1128/MRA.01030-20>.
6. **Roberts WR**, Downey KM, Ruck EC, Traller JC, Alverson AJ. 2020. Improved reference genome for *Cyclotella cryptica* CCMP332, a model for cell wall morphogenesis, salinity adaptation, and lipid production in diatoms (Bacillariophyta). *G3: Genes, Genomes, Genetics* 10(9): 2965-2974. DOI: <https://doi.org/10.1534/g3.120.401408>.

5. **Roberts WR**, Roalson EH. 2020. Co-expression clustering across flower development identifies modules for diverse floral forms in *Achimenes* (Gesneriaceae). *PeerJ* 8: e8778. DOI: <https://doi.org/10.7717/peerj.8778>.
4. Kleinkopf JA, **Roberts WR**, Wagner WL, Roalson EH. 2019. Diversification of Hawaiian *Cyrtandra* (Gesneriaceae) under the influence of incomplete lineage sorting and hybridization. *Journal of Systematics and Evolution* 57(6): 561-578. DOI: <https://doi.org/10.1111/jse.12519>.
3. **Roberts WR**, Roalson EH. 2018. Phylogenomic analyses reveal extensive gene flow within the magic flowers (*Achimenes*). *American Journal of Botany* 105(4): 726-740. DOI: <https://doi.org/10.1002/ajb2.1058>.
2. **Roberts WR**, Roalson EH. 2017. Comparative transcriptome analyses of flower development in four species of *Achimenes* (Gesneriaceae). *BMC Genomics* 18(1): 240. DOI: <https://doi.org/10.1186/s12864-017-3623-8>.
1. Roalson EH, **Roberts WR**. 2016. Distinct processes drive diversification in different clades of Gesneriaceae. *Systematic Biology* 65(4): 662-684. DOI: <https://doi.org/10.1093/sysbio/syw012>.

Preprints:

Çiftçi O, Alverson AJ, van Bodegom P, Duijsings D, **Roberts WR**, Mertens A, van de Vijver B, Trobajo R, Mann D, Pirovano W, van Eijk I, Gravendeel B. Phylotranscriptomics reveals the reticulate evolutionary history of a widespread diatom species complex. *BioRxiv*. DOI: <https://doi.org/10.1101/2022.04.11.487918>.

(* indicates equal contribution)

CONTRIBUTED DATASETS

Phylogenomics of Thalassiosirales. 2022. NCBI BioProject: PRJNA825288.

Thalassiosira oceanica CCMP1005 genome version 2.0. 2021. Zenodo: <https://doi.org/10.5281/zenodo.4589594>.

Nitzschia sp. Nitz4 Genome sequencing and assembly. 2020. NCBI BioProject: PRJNA412514.

Cyclotella cryptica strain:CCMP332 Genome sequencing and assembly. 2020. NCBI BioProject: PRJNA628076.

Roberts WR, Roalson EH. 2019. Data from: Phylogenomic analyses reveal extensive gene flow within the magic flowers (*Achimenes*). Dryad, Dataset, <https://doi.org/10.5061/dryad.9202s>.

Kleinkopf JA, **Roberts WR**, Wagner WL, Roalson EH. 2019. Data from: Diversification of Hawaiian *Cyrtandra* (Gesneriaceae) under the influence of incomplete lineage sorting and hybridization. Dryad, Dataset, <https://doi.org/10.5061/dryad.s7h937n>.

Diversification of Hawaiian *Cyrtandra* (Gesneriaceae). 2019. NCBI BioProject: PRJNA531912.

- Transcriptome sequencing of flower development in *Achimenes*. 2018. NCBI BioProject: PRJNA435759.
- Phylogenomic analysis of gene flow between species of *Achimenes* (Gesneriaceae). 2017. NCBI BioProject: PRJNA401042.
- Comparative transcriptome analyses of flower development in four species of *Achimenes* (Gesneriaceae). 2016. NCBI BioProject: PRJNA340450.
- Roalson EH, **Roberts WR**. 2016. Data from: Distinct processes drive diversification in different clades of Gesneriaceae, Dryad, Dataset, <https://doi.org/10.5061/dryad.1br13>.

RESEARCH GRANTS AND AWARDS

- 2020 **Co-PI: Community Science Program, Joint Genome Institutes**
[ID 506537100]: 100 Diatom Genomes Project. PI: Thomas Mock.
- 2016 **Co-PI: Doctoral Dissertation Improvement Grant, National Science Foundation**
[DEB 1601003]: Evolution of gene expression in floral diversification of Neotropical Gesneriaceae. PI: Eric Roalson. \$19,323.
- 2016 **PI: Elvin McDonald Research Endowment Fund, The Gesneriad Society.**
Characterizing a red-to-blue flower color transition in *Achimenes* (Gesneriaceae). \$1,750.
- 2012 **PI: Global Plant Sciences Initiative Fellowship, Washington State University.** \$10,000.
- 2016 **Best Poster Presentation**, Inland Northwest Genomics Symposium.
- 2015 **Travel Award**, Botany meeting, Edmonton, AB, American Society of Plant Taxonomists. \$300.
- 2011 **Synthetic Biology Research Experience (REU) Fellow**, National Science Foundation, North Carolina State University. PI: Jenny Xiang.

PRESENTATIONS

Departmental Seminars:

- Roberts WR**. 2017. Evolutionary genomics in the magic flowers (*Achimenes*, Gesneriaceae). Washington State University.
- Roberts WR**. 2016. Floral diversification in Gesneriaceae: macroevolutionary and genomics approaches. Washington State University.

Contributed Talks:

- Roberts WR**, Alverson AJ. 2021. Phylogenomic analysis of the centric diatom order Thalassiosirales based on genome and transcriptome data. Botany meeting, Virtual.
- Roberts WR**, Alverson AJ. 2020. Evidence for a recent whole-genome duplication in a diatom genome. Botany meeting, Virtual.
- Roberts WR**, Alverson AJ. 2019. Whole genome shotgun phylogenomics in the Thalassiosirales. North American Diatom Symposium, Eatonton, GA.
- Roberts WR**, Roalson EH. 2018. Gene co-expression network connectivity is an important determinant of selective constraint during flower diversification in the magic flowers (*Achimenes*, Gesneriaceae). Botany meeting, Rochester, MN.
- Kleinkopf JA, **Roberts WR**, Wagner WL, Roalson EH. 2018. Detecting hybridization in Hawaiian *Cyrtandra* (Gesneriaceae) using genome-wide data. Botany meeting, Rochester, MN.

- Roberts WR**, Roalson EH. 2017. Genomic evidence for gene flow between species of magic flowers (*Achimenes*, Gesneriaceae). Evolution meeting, Portland, OR.
- Roberts WR**, Roalson EH. 2017. Dissecting floral diversification in the magic flowers (*Achimenes*, Gesneriaceae). Biological Sciences Graduate Student Symposium, Washington State University.
- Roberts WR**, Roalson EH. 2015. Understanding flower diversification in *Achimenes* (Gesneriaceae) using a comparative transcriptomics approach. Botany meeting, Edmonton, AB.

Posters:

- Ruck EC, **Roberts WR**, Nakov TN, Alverson AJ. 2019. Parallel sequencing of diatom plastid genomes using a bait-capture approach.
- North American Diatom Symposium, Eatonton, GA.
- Roberts WR**, Roalson EH. 2018. Phylogenomic analyses reveal extensive gene flow within the magic flowers (*Achimenes*, Gesneriaceae).
- Botany meeting, Rochester, MN.
 - Academic Showcase, Washington State University.
- Roberts WR**, Roalson EH. 2017. Exploring phylogenetic relationships in *Achimenes* (Gesneriaceae) using transcriptome sequencing.
- School of Biological Sciences Graduate Student Symposium, Moscow, ID.
 - Plant Sciences Retreat, Washington State University, Pullman, WA.
- Roberts WR**, Roalson EH. 2016. Using comparative transcriptomics to understand flower diversification: an example from *Achimenes* (Gesneriaceae).
- Inland Northwest Genomics Research Symposium, Moscow, ID.
 - Academic Showcase, Washington State University.
 - Plant Sciences Retreat, Washington State University.
- Roberts WR**, Roalson EH. 2015. Understanding flower diversification in *Achimenes* (Gesneriaceae) using a comparative transcriptomics approach.
- Pan-Am Evo-Devo inaugural meeting, Berkeley, CA.
- Roberts WR**, Roalson EH. 2015. Geographic processes drive diversification in different clades of Gesneriaceae.
- School of Biological Sciences Graduate Student Symposium, Moscow, ID.
 - Plant Sciences Retreat, Washington State University, Pullman, WA.
- Roberts WR**, Yi Y, Xiang L, Xiang J. 2011. Cloning and evolutionary analysis of *SEPALLATA3* genes in dogwoods—deciphering the genetic links to bract petaloidy.
- North Carolina State University Undergraduate Summer Research Symposium, Raleigh, NC.

TEACHING EXPERIENCE

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| 2018, | Guest Lecturer , Washington State University Systematic Botany (undergraduate, Biol 332) |
| 2013-2018 | Graduate Teaching Assistant , Washington State University Systematic Botany, Biol 332 (3 semesters) Introductory Botany, Biol 120 (3 semesters) Introductory Biology: Organismal Biology, Biol 106 (5 semesters) |
| 2012 | Supplemental Instructor , Whitworth University General Biology I, Biol 140 (1 semester) |
| 2010-2012 | Undergraduate Teaching Assistant , Whitworth University Plant Biology, Biol 153 (2 semesters) |

STUDENT MENTORSHIP

Graduate students:

- 2020 **Kathryn Dupree**, Ph.D. student, University of Arkansas
Population genomics of *Lonicera maackii*
- 2017-2018 **Joseph Kleinkopf**, M.S. student, Washington State University
Phylogenomics of Hawaiian *Cyrtandra*
- 2017 **Raimundo Luciano Soares Neto**, visiting scholar, Universidade Federal de Pernambuco
DNA extractions and lab work for Cleomaceae

Undergraduate students:

- 2019-2020 **Andrew Palmer**, University of Arkansas
DNA extractions of *Lonicera maackii*
- 2019-2020 **Katjana Wiederkehr**, University of Arkansas
C4 photosynthesis in diatoms
- 2017 **Mara Huang**, Washington State University
Phoenix Conservancy Intern, Floristics at the Hudson Biological Reserve
- 2017 **Tia Prudholm**, Washington State University
Phoenix Conservancy Intern, Floristics at the Hudson Biological Reserve

SERVICE AND OUTREACH

- 2020-current **myDiatoms**, citizen science outreach project, University of Arkansas
- 2022 **Student project judge**, Northwest Arkansas Science and Engineering Fair
- 2021 **Session chair**, Botany meeting, virtual
- 2020 **Student project judge**, Northwest Arkansas Science and Engineering Fair
- 2019 **Student project judge**, Northwest Arkansas Science and Engineering Fair
- 2019 **Volunteer**, Secchi Day at Beaver Lake, Rogers, AR
- 2018 **Volunteer botanist**, Palouse Conservation District, Steptoe Butte State Park, WA
- 2016-2018 **Faculty representative**, Molecular Plant Sciences Graduate Student Organization
- 2017 **Co-lead organizer**, Plant Science Day, Washington State University
- 2014-2016 **Co-chair**, Palouse Discovery Science Center Committee
- 2016 **Exhibit leader**, Plant Science Day, Washington State University
- 2015 **Native plant guide**, Palouse Outdoor Science Day, Washington State University
- 2014 – 2015 **Greenhouse tour guide**, Biology Open House, Washington State University

Scientific Peer review: *Biodiversitas Journal of Biological Diversity* (1) – *Biological Procedures Online* (2) – *BMC Genomics* (1) – *Communications Biology* (2) – *Ecology and Evolution* (2) – *Evolutionary Bioinformatics* (1) – *Genes* (5) – *Molecular Ecology Resources* (2) – *PeerJ* (5) – *PhytoKeys* (12) – *Plant Cell Reports* (1) – *Plant Growth Regulation* (3) – *Plants* (1) – *PLoS One* (2) – *Systematic Biology* (2) – *Taxon* (4)

Professional Society Membership: Botanical Society of America; Society for the Study of Evolution; The Gesneriad Society

FIELDWORK AND FLORISTICS

Northwest Arkansas (2018-current); **Eastern Washington** (2011-2018); **Hudson Biological Reserve**, Smoot Hill, WA (2016-2018); **Palouse Prairie**, Whitman County, WA (2016-2018).

HONORIFIC NAMES

2007 ‘Wade Riley’, M. Roberts, Tall Bearded Iris, The American Iris Society