

Wade R. Roberts

Postdoctoral Fellow

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RESEARCH INTERESTS

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

EMPLOYMENT

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

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

PUBLICATIONS

In prep:

Brylka K, Pinseel E, **Roberts WR**, Ruck EC, Conley DJ, Alverson AJ. Gene duplication, molecular evolution, and functional diversification of silicon transporter proteins in marine and freshwater diatoms.

Gargas CB, Parks M, Spiliotopoulos E, Ashner M, Ashworth MP, Pinseel E, **Roberts WR**, Ruck EC, Denne N, Wang A, Schaak S, Amin S, Wickett NJ, Alverson AJ. Signatures of long-term diatom—bacterial association in the genome and metagenome of the diatom *Psammoneis japonica*.

Pinseel E, Ruck EC, Nakov T, Jonsson P, Kourtchenko O, Kremp A, **Roberts WR**, Sjöqvist C, Töpel M, Godhe A, Hahn MW, Alverson AJ. Local adaptation of a marine diatom is governed by intricate genome-wide changes in diverse metabolic pathways.

Peer reviewed:

10. **Roberts WR**, Ruck EC, Downey KM, Pinseel E, Alverson AJ. 2023. Resolving marine—freshwater transitions by diatoms through a fog of gene tree discordance. *Systematic Biology*. Accepted.

9. Çiftçi O, Alverson AJ, van Bodegom P, **Roberts WR**, Mertens A, van de Vijver B, Trobajo R, Mann D, Pirovano W, van Eijk I, Gravendeel B. 2022. Phylotranscriptomics reveals the reticulate evolutionary history of a widespread diatom species complex. *Journal of Phycology*. 58(5):643-656.
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.
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.
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.
5. **Roberts WR**, Roalson EH. 2020. Co-expression clustering across flower development identifies modules for diverse floral forms in *Achimenes* (Gesneriaceae). *PeerJ* 8: e8778.
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.
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.
2. **Roberts WR**, Roalson EH. 2017. Comparative transcriptome analyses of flower development in four species of *Achimenes* (Gesneriaceae). *BMC Genomics* 18(1): 240.
1. Roalson EH, **Roberts WR**. 2016. Distinct processes drive diversification in different clades of Gesneriaceae. *Systematic Biology* 65(4): 662-684.

(* indicates equal contribution)

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 <i>Achimenes</i> (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

Invited Talks:

- 2023 Molecular Life of Diatoms 7 meeting, San Diego, California.
2022 Biology Department seminar series, University of Arkansas.
2017 Molecular Plant Sciences seminar series, Washington State University.
2016 Molecular Plant Sciences seminar series, Washington State University.

Contributed Talks:

- Roberts WR**, Alverson AJ. 2022. Genome size evolution in diatoms. North America Diatom Symposium, Brazil, IN.
- 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

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:

2018-2023 **Cory Gargas**, Ph.D., University of Arkansas
Diatom and bacterial genomics and metagenomics

2020-2021 **Kathryn Dupree**, Ph.D. student, University of Arkansas
Population genomics of *Lonicera maackii*

2017-2018 **Joseph Kleinkopf**, M.S., Washington State University
Phylogenomics of Hawaiian *Cyrtandra*

2017 **Raimundo Luciano Soares Neto**, Ph.D., Universidade Federal de Pernambuco
Molecular lab work for Cleomaceae taxonomic revision

Undergraduate students:

2019-2020 **Andrew Palmer**, University of Arkansas
Molecular lab work for *Lonicera maackii*

2019-2020 **Katjana Wiederkehr**, University of Arkansas
Phylogenomics 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

2019-current **Student project judge**, Northwest Arkansas Science and Engineering Fair

2021 **Session chair**, Botany meeting, virtual

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) – *Evolutionary Ecology* (1) – *Genes* (5) – *Mitochondrial DNA Part B: Resources* (2) – *Molecular Ecology Resources* (2) – *PeerJ* (6) – *PhytoKeys* (14) – *Plant Cell Reports* (1) – *Plant Growth Regulation* (3) – *Plants* (1) – *PLoS One* (2) – *Systematic Biology* (2) – *Taxon* (4)

Research review panels: NSF BIO advisory panel (2023)

Professional Society Membership: Botanical Society of America; 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