

JORDAN DOWELL

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EDUCATION

PhD	University of Central Florida, Integrative Biology Dissertation: Running Title: "Volatile metabolomic dynamics of the annual clade of <i>Helianthus</i> " Advisors: Chase Mason (chair), Pedro Quintana-Ascencio (vice-chair)	2021
MS	University of Nevada, Las Vegas, Ecology & Evolutionary Biology Thesis: "Landscape scale: inter- and intraspecific variation in plant interactions along a stress gradient in the sheep mountain range of Nevada" Advisor: Dale Devitt	2019
BS	University of Nevada, Las Vegas, Ecology & Evolutionary Biology	2014

GRANTS, HONORS AND AWARDS

USDA, National Institute of Food and Agriculture: Agriculture and Food Research Initiative Postdoctoral Fellowship	<ul style="list-style-type: none"> ● \$225,000 external fellowship ● Direct and indirect effects of conserved and lineage-specific volatile organic compounds among eudicots for control of <i>Botrytis cinerea</i> 	2021-Present
Florida Mcknight Foundation Dissertation Fellowship	<ul style="list-style-type: none"> ● \$12,000 External Fellowship 	2020-2021
Private Funding, Sponsor: Massey services, Inc.	<ul style="list-style-type: none"> ● \$140,900 Private funding (Allocation to Dowell: \$9,500) ● PI, Swaminathan Rajaraman Co-PI, B. Sharanowski ● Initiative to develop novel nano-sensors for pest management. 	2020-2021
University of Washington's Statistical Genetics Summer Institute Scholarship	<ul style="list-style-type: none"> ● \$900 External Workshop Scholarship 	2020
Bill and Melinda Gates Foundation	<ul style="list-style-type: none"> ● \$1,000 External travel award ● Institute for Teaching and Mentoring: Compact for Faculty Diversity 	2019
University of Central Florida, Biology Graduate Student Association	<ul style="list-style-type: none"> ● \$300 Internal travel award 	2019
University of Central Florida, Biology Department	<ul style="list-style-type: none"> ● \$250 Internal travel award 	2019

Bill and Melinda Gates Foundation Millennium Graduate Fellow	2015-2020
<ul style="list-style-type: none"> ● \$175,000 External Fellowship 	
University of Central Florida's Doctoral Conference Support	2017
<ul style="list-style-type: none"> ● \$4,300 Internal Grant 	
University of Nevada, Las Vegas: Graduate and Professional Society	2016
<ul style="list-style-type: none"> ● \$1,000 Internal Research Grant 	
Bill and Melinda Gates Foundation	2016
<ul style="list-style-type: none"> ● \$1,000 External travel award ● Institute for Teaching and Mentoring: Compact for Faculty Diversity 	
Bill and Melinda Gates Foundation Millennium Undergraduate	2009-2014
<ul style="list-style-type: none"> ● \$150,000 External Scholarship 	
Silver State Millennium Foundation Scholarship	2009-2011
<ul style="list-style-type: none"> ● \$2,500 External Scholarship 	

PUBLICATIONS

Journal Publications (*undergraduate authors)

- **Dowell, J.A.**, *Clark, E.J., *Pliakas, T.P., Mandel J.R., Burke, J.M., Donovan, L.A., and Mason, C.M., 2019, "Genome wide association mapping of floral traits in cultivated sunflower (*Helianthus annuus*)," *Journal of Heredity*, 110:3 275-286 <https://doi.org/10.1007/s00049-020-00322-4>
- **Dowell, J. A.** and Mason, C. M., 2020, "Correlation in plant volatile metabolites: physiochemical properties as a proxy for enzymatic pathways as an alternative biosynthetically informed metric," *Chemoecology*. <https://doi.org/10.1007/s00049-020-00322-4>
- *De La Pascua, D. R., *Smith-Winterscheidt, C., **Dowell, J. A.**, Goolsby, E. W., and Mason, C. M., 2020, "Evolutionary trade-offs in the chemical defense of floral and fruit tissues across genus *Cornus*," *American Journal of Botany* 107(9): 1260– 1273. <https://doi.org/10.1002/ajb2.1540>
- Stahlhut, K.N., **Dowell, J.A.**, Temme, A.A., *Burke, J. M., Goolsby, E. W., Mason, C. M., 2021,* "Genetic control of arbuscular mycorrhizal colonization by *Rhizophagus intraradices* in *Helianthus annuus* (L.)." *Mycorrhiza* **31**, 723–734. <https://doi.org/10.1007/s00572-021-01050-5>
- Bahmani K, *Robinson A, Majumder S, *LaVardera A, **Dowell J**, Goolsby E, Mason C, "Broad diversity in monoterpene-sesquiterpene balance across wild sunflowers: implications of leaf and floral volatiles for biotic interactions." <https://doi.org/10.1002/ajb2.16093>

- Bahmani K, *Giguere M, **Dowell J**, Mason C, “Germplasm Diversity of Sunflower Volatile Terpenoid Profiles Across Vegetative and Reproductive Organs.”
<https://doi.org/10.15159/ar.22.084>

(in-press)

- **Dowell J**, Mason C. “Candidate pathway and genome-wide association approaches reveal alternative genetic architectures of carotenoid content in cultivated sunflower (*Helianthus annuus*).”

(in-revision)

- **Dowell J**, Bowsher A, *Jamshad A, *Shah R, Burke J, Donovan L, Mason M., “Historic breeding practices contribute to germplasm divergence in leaf specialized metabolism and ecophysiology in cultivated sunflower (*Helianthus annuus*).” (*American Journal of Botany*)
- Ridenbaugh, R, **Dowell J**, Goolsby E, Sharanowski., “The effects of plant phytochemistry on parasitoid (Hymenoptera: Braconidae) niche breadth.” (*Ecology and Evolution*)

(in-prep)

- **Dowell J**, *Jowais J, Mason C. “Species-specific herbivore-induced responses across the genus *Helianthus*.”
- *Valdiviezo M, **Dowell J**, Goolsby E, Mason C. “Validation and optimization of hyperspectral reflectance analysis-based predictive models for the determination of plant functional traits in *Cornus*, *Rhododendron*, and *Salix*.”

Selected conference Oral/Poster Presentations

- **Dowell, J. A.**, “Isolate specific effects of *Botrytis cinerea* on the expression of biosynthetic enzymes in *Arabidopsis thaliana*”, Fungal Genetics Society 2022
- **Dowell, J. A.**, “Evolution & diversification of plant-plant communication: An intermediate hypothesis”, Plant Biology 2020
- **Dowell, J. A.**, Mason, C. M. “Correlation in plant volatile metabolites: physiochemical properties as a proxy for enzymatic pathways and an alternative metric of biosynthetic constraint”, Botany 2020, ABSTRACT ID-576
- *De La Pascua, D. R., *Smith-Winterscheidt, C., **Dowell, J. A.**, Goolsby, E. W., Mason, C. M.,S, “Evolutionary trade-offs in the chemical defense of floral and fruit tissues across genus *Cornus*”, Botany 2020, ABSTRACT ID-166

- *Stahlhut, K. **Dowell, J. A.**, Temme, A., Burke, J., Goolsby, E., Mason, C. M., “Genetic control of arbuscular mycorrhizal colonization in *Helianthus annuus*”, Botany 2020 ABSTRACT ID-137
- *Stahlhut, K. **Dowell, J. A.**, Mason, C. M., “Genetic control of mycorrhizal colonization in *Helianthus annuus*”, Botany 2019, ABSTRACT ID-469
- *Davis, R., **Dowell, J. A.**, and Mason, C. M., “Describing Photosynthetic Diversity in Cultivated Sunflower,” Botany 2019, ABSTRACT ID-385
- *Valdiviezo, M. I., **Dowell, J. A.**, and Mason, C. M., “Comparing Leaf Reflectance Analysis Prediction Models Based on Dried Whole Leaf Tissue against Dried Ground Tissue”, Botany 2019, ABSTRACT ID-766.
- **Dowell, J. A.**, and Mason, C. M., “An evolutionarily relevant definition of ‘Eavesdropping’ and ‘Communication,’” International Society of chemical ecology, 2019
- **Dowell, J. A.** and Mason, C. M., “Impacts of physical chemistry on biosynthetic constraints of plant volatile profiles,” International Society of chemical ecology, 2019
- **Dowell, J.A.**, *Clark, E.J., *Pliakas, T.P., Mandel J.R., Burke, J.M., Donovan, L.A., and Mason, C.M., “Genome-wide association mapping of floral traits in cultivated sunflower (*Helianthus annuus*),” Botany, 2018, ABSTRACT ID-295.

WORKSHOPS AND INVITED LECTURES

- **Lecture**, “Can you really have it all? Exploring growth defense tradeoffs in plant-pathogen interactions,” University of California Davis, Plant Pathology department, Postdoctoral fellow seminar series. 2022.
- **Lecture**, “Leveraging hyperspectral reflectance to assess volatile organic compound(VOC) mediated induced responses across the genus *Helianthus*,” American Chemical Society Fall 2022, Early Career Symposium: Deciphering plant-insect-microorganism signals for sustainable crop protection. 2022.
- **Lecture**, “Evolution & diversification of plant-plant communication: An intermediate hypothesis,” Plant Biology 2020, MAC Symposium 3: Evo-Devo 2020: Case Studies in Diversity. 2020
- **Lecture**, “The language of life: chemically mediated interactions in plant ecology & evolution,” Niagara University, Early career researcher diversity seminar series, 2019.
- **Workshop**, “Comparative plant metabolomics & Bayesian hierarchical clustering analysis,” University of Central Florida, Department of Biology, 2019.
- **Lecture**, “Sassy sages and gossiping goldenrods: recent advances in plant volatile communication,” Florida Native Plant Society, Florida Native Plant Month, 2019.

- **Lecture**, “Volatile metabolomics of the annual clade of *Helianthus*,” University of Central Florida, Department of Biology, 2019.
- **Workshop**, “Comparative analytical techniques in Plant Metabolomics,” University of Central Florida, Department of Biology, 2019.
- **Lecture**, “Sassy sages and gossiping goldenrods: recent advances in plant volatile communication,” Florida Native Plant Society, Tarflower Chapter, 2019.
- **Workshop**, “Introduction to Random Forest models,” University of Central Florida’s Biology Graduate Student Association data science seminar, 2018.
- **Lecture**, “Landscape Scale: inter-and intraspecific variation in plant interactions along a stress gradient in the sheep mountain range,” University of Nevada, Las Vegas, Graduate Student Seminar series, 2017.

TEACHING EXPERIENCE

Louisiana State University 2023-present
Assistant Professor, Department of Biological Sciences

- Advisor: Eric Goolsby
- Courses: Introduction to Plant Physiology.

University of Central Florida 2019-2020
Teaching Assistant, Department of Biology

- Advisor: Eric Goolsby
- Plant Genomics & Biochemistry, Ran an original lab during a pandemic of a joint graduate and undergraduate course. This course consisted of 23 total students, all of which produced individual projects integrating publicly available multi-omic data to answer questions concerning plant genomics and biochemistry.

University of Central Florida 2019-2020
Curriculum Development Assistant, Department of Biology

- Advisor: Eric Goolsby
- Plant Genomics & Biochemistry, development of instructional materials and laboratories for a new joint graduate and undergraduate course. Assorted topics include chromatography (liquid, gas, & capillary electrophoresis), mass spectrometry, untargeted & targeted metabolomics, metabolic pathway modeling, and machine learning in metabolomics & genomics.

University of Nevada, Las Vegas 2015-2017
Graduate Teaching Assistant, Department of Biology

- Principles of Modern Biology II Lab, an undergraduate laboratory course averaging 60 students per semester, covering the following topics: organismal biology, ecological/evolutionary patterns, and processes.

Bodies: The Exhibition, Las Vegas, NV 2012-2015
Educational Director

- Development of instructional materials for docents and educational outreach materials for assorted topics, including anatomy, physiology, and new developments in the field of

medicine and comparative anatomy. During my tenure museum, average foot traffic was ~300-600 people per day with a docent staff of 15 individuals.

MENTORSHIP EXPERIENCE

Undergraduate Honors Student Committee Service

- Ana Robinson, “Role of polyploidy in leaf functional trait and secondary metabolite evolution across *Helianthus*,” 2019-2020
- Isaac Valdiviezo, “Comparing Leaf Reflectance Analysis Prediction Models Based on Dried Whole Leaf Tissue against Dried Ground Tissue”, 2019-2020
- Mari Irving, “Developmental Effects of Terpenes on *Vanessa cardui* at Varying Temperatures”, 2019-2020
- Katie Stahlhut, “Genetic control of mycorrhizal colonization in *Helianthus annuus*”, 2019-2020
- Danielle De La Pascua, “Reproductive defense trade-offs in the fruits and flowers of the genus *Cornus*”, 2018-2019
- Rayner Seavey, “The Hyperaccumulation of Zinc in Sunflowers and its Effect on Disease Resistance”, 2018-2019
- Rebekah Davis, “Capillary Electrophoresis buffer optimization for plant tissue analysis”, 2018-2019
- Jessica Jowais, “Comparison of secondary metabolite response to *Vanessa cardui* across the genus *Helianthus*”, 2017-2018

Selection of undergraduate research mentees and their projects

- **University of California, Davis**
 - Carina Caccobaci
 - Machine learning approaches to measuring lesion size across species in images with complex backgrounds
 - Jarell Mangsat
 - Expanded the *Botrytis*-eudicot pathosystem to include nine new species and collected preliminary disease phenotype data
 - Angela Gao
 - Effects of *in vitro* diet complexity on *Botrytis* virulence over successive generations
 - Lori Pradhan
 - Leveraging genome-scale metabolic models to explore the evolution of metabolic complexity and specialized metabolite investment across the genus *Botrytis*

- Minh Tran
 - Development of live cell assays for longitudinal phenotyping of *Botrytis* in liquid culture
- Samantha Lenao
 - Leveraging deep-learning approaches to assess variation in selective sweep history across the genus *Helianthus*
- Xiaoqing Zheng
 - Simulation of protein-protein interaction of potential cultivated sunflower self-incompatibility proteins
- Julia Cook
 - Leveraging genome-scale metabolic models to explore the investment in specialized metabolites by *Botrytis cinerea* during infection of *Arabidopsis thaliana*
- Melanie Madrigal
 - Genome-wide association of the effects of plant infochemicals on the growth rate of *Botrytis cinerea*.
- **University of Central Florida**
 - Gillian Gomer
 - Genome-wide association of Sulfur metabolism in *Helianthus annuus*
 - Abigail Tripka
 - Impacts of terpenoid on growth and establishment of host-generalist plant fungal pathogens
 - Austin Hart
 - Genome-wide association of vegetative growth rate in *Helianthus annuus*
 - Logan Walck
 - Developed machine learning hyperspectral reflectance models to detect and differentiate D- & L- malate in complex solutions for indirect phenotyping of Crassulacean acid metabolism(CAM) photosynthesis
 - Juliana Wall
 - Smells like family to me! Population structure correlates of corolla terpenoid variation
 - Kaley Haff
 - Save the Bracts for Last: Comparison of flowering time & terpenoid variation in cultivated *Helianthus*
 - Linsey Plyler
 - Assessed terpenoid diversity of *Rhododendron* leaves using GC-MS
 - Bree-Alexandra Donley

- Look & Smell Pretty? Correlates of petal carotenoid content & terpenoid variation in cultivated *Helianthus*
 - Dasiell Desravines
 - Contributed to the method development of GC-MS protocols to assess volatile organic compound variation across plant tissue types
 - Group projects
 - Development of computer vision tools to assess allometric growth in cultivated *Helianthus annuus*.
 - Sergio Solano, Kyra Paris, Nicholas Cooke,
 - Development of non-invasive methods to phenotype CAM photosynthesis in real-time
 - Danielle Waugh, Kristine Vu, Madison Worsfold, Gabriela Wasif
- **University of Nevada, Las Vegas**
 - Group project
 - Assessment of plant spatial patterns in the Desert National Wildlife Refuge
 - Jordan Afaga, Young Kang, Shannon Zayas, Luisa Najera, Jacob James Nogra, Richard Van

NON-DEGREE SEEKING RESEARCH EXPERIENCE

- Postdoctoral Associate**, University of California, Davis 2021-2022
 Advisor: Daniel Kliebenstein; Leveraging multi-omic network approaches to explore the evolution of specialized metabolism and biotic-interactions between *Botrytis cinerea* (a plant fungal pathogen) and 16 eudicots species.
- Research Associate**, University of Nevada, Reno-Cooperative Extension 2017
 Advisor: Tammara Wynne
 Development of outreach-focused experiments concerning domesticated *Solanum lycopersicum* production in the Mojave Desert.
- Research Associate**, University of Nevada, Las Vegas 2017
 Advisors: Lorenzo Apodaca and Dale Devitt
 Development and implementation of image analysis-based methods of xylem flow dynamics in urban horticulture trees. Implementation of multidimensional kriging of climate data concerning the ambient effects of photovoltaic power plants on native shrublands.
- Restoration Ecology Intern**, Great Basin Institute, Nevada, Las Vegas 2015
 Advisor: Russell Lee Nasrallah
 Improvement of highly visible and ecologically important state and national park resources by controlling exotic plants, maintaining hiking trails, and providing an educational resource for park visitors. (Great Basin National Park, Lake Mead National Recreation Area, Spring Mountain Ranch State Park, Desert National Wildlife Refuge, and Pahranaagat National Wildlife Refuge).
- Undergraduate Research Assistant**, University of Nevada, Las Vegas 2012-2013
 Advisors: Tereza Jezkova and Javier Rodriguez

Elucidation of phylogeographic and population structure in Mona and Virgin Island Boas, *Chilabothrus monensis* (*Epicrates monensis*).

PROFESSIONAL SERVICE

- Associate Editor** 2022-present
- *Applications in Plant Sciences*
- One Garden fellow invited lecture series** 2022-present
- Two live seminars:
 - “Do plants have something to say?”
 - Food Futures: Could new plants solve a food crisis?
 - Link: <https://onegarden.com/fellow/dr-jordan-dowell>
 - 10,000+ viewers per talk across the Americas, Africa, Asia, and Europe
- Botanical Society of America’s Publications Committee member** 2021-2023
- Includes *APPS*, *Plant Science Bulletin*, and *American Journal of Botany*
- Reviewing Editor for *Applications in Plant Sciences* (APPS)** 2020-2022
- UCF College of Science Visiting Scholars program** 2020-Reoccurring
- \$32,000 per year Internal funding allocation
 - Co-author Ian Will
 - Initiative to supply funding to bring in historically underrepresented scholars to give research seminars and supply a mentorship opportunity for historically underrepresented undergraduate and graduate students.
- American Society of Plant Biology panel member; “Interested in Graduate School” 2020**
- Answered questions concerning graduate school funding and career options for an audience of ~100 undergraduate participants.
- Consultant for SEE Turtles organization BIPOC scholarship fund** 2020-2023
- Supplied guidance on barriers for BIPOC engaging in field programs and developed a funding schema to house and pay students.
- Reviewer**
- *Oikos*, *Journal of Chemical Ecology*, *Chemoecology*, *Plant Cell*, *American Journal of Botany*, *Applications in Plant Sciences*
- Biology Graduate Student Association**
- President, University of Central Florida, 2019-2021
 - Secretary, University of Central Florida, 2018-2019
- UCF’s Biology Integrated Orlando Training and Enrichment Camp** 2018
- Plant Science coordinator,
 - Developed and taught a weeklong curriculum of plant science focused experiments on engaging over 30 high school students from the surrounding Orlando metropolitan area in current research techniques, such as genomics and metabolomics.
- Botanical Society of America Graduate School Career Panel (UCF Chapter) 2019-2021**

- Answered questions concerning graduate school funding and career options for an audience of 50 undergraduate participants.

Plants Beyond Limits Conference

- Graduate Student Coordinator, University of Central Florida, 2017
 - Initiated, organized, and funded the first student-led conference of Plants Beyond Limits at UCF with ~500 attendees, 20 speakers, and 15 submitted posters from graduate students and postdocs

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