

# Allison Welch | Ph.D. Candidate

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## Education

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<b>University of California, Irvine, CA</b> Ph.D. Candidate in Earth System Science Advisor: Dr. Claudia Czimczik	Expected 2025
<b>University of California, Irvine, CA</b> M.S. in Earth System Science	2022
<b>University of Florida, Gainesville, FL</b> B.Sc. in Environmental Science, May 2020, Summa cum Laude Thesis: Evaluation of Element/Ca Ratios as a Screening Technique to Quantify the Amount of Diagenetic Calcite in Fossil Corals Minor: Geology; Wildlife Ecology & Conservation Certificate: College of Agriculture and Life Sciences Honors Scholar	2020

## Experience

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<b>GRADUATE STUDENT RESEARCHER</b> - UCI Department of Earth System Science <ul style="list-style-type: none"><li>Performed data collection and analysis by combining field measurements (vegetation surveying, aerosol sampling, sample collection), laboratory measurements (radiocarbon and elemental analysis), and remote sensing (GIS) to produce integrated results</li><li>Synthesized results and literature reviews to create written reports for peer-reviewed publication</li></ul>	[Oct 2020-Present]
<b>TEACHING ASSISTANT</b> - UCI Department of Earth System Science <ul style="list-style-type: none"><li>Taught upper- and lower-level courses in field methods, physics, and sustainability for 1000+ hours and &gt;100 students in lecture, discussion, and laboratory settings</li><li>Led 80+ students in group projects in sustainability and geophysics by providing individualized feedback and teaching writing fundamentals to improve their understanding of the scientific method</li><li>Devised lesson plans and worksheets using the CREATE (Consider, Read, Elucidate the hypotheses, Analyze and interpret the data, Think of the next Experiment) framework</li></ul>	[Oct 2021-Present]
<b>VOLUNTEER RESEARCH ASSISTANT</b> - United States Geological Survey <ul style="list-style-type: none"><li>Performed data collection (filtered eDNA water samples for DNA isolation and extraction), and analysis (PCR, qPCR) for invasive species research in conservation genetics</li></ul>	[May 2019-Mar 2020]
<b>LAND MANAGEMENT INTERN</b> - Alachua Conservation Trust <ul style="list-style-type: none"><li>Performed manual and chemical invasive flora species removal, wildlife/botanical surveys, general upkeep to improve visitation to public lands</li></ul>	[May 2018-Aug 2018]

- Continued to work after completion of internship to lead environmental education events about wildlife and prescribed burning for the public

## Courses Taken

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### Technical/Disciplinary

Global Physical Climate  
Remote Sensing  
Global Biogeochemistry  
Climate Data Analysis  
Humans in Earth System Science  
Paleoclimatology and Paleoceanography  
Ecosystem Ecology  
Land Surface Processes  
Intro to Radiocarbon

### Transferable

Data Visualization  
Communication Skills  
Inclusion & Team Science  
Teaching Topics/Pedagogy in Earth System Science  
Project Management

## Leadership & Involvement

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**Board Member**, Department of Earth System Science Graduate Leadership  
**Seminar Lead**, Department of Earth System Science Seminar Series; Half-Baked Seminar Series  
**Writer, Administrator, and Grader**, Orange County Science Olympiad (Division C)  
**Mentor**, Earth System Science Graduate Mentor Program  
**Mentor**, Earth System Science Undergraduate Research  
**Educator**, Climate, Literacy, Education, And iNquiry (CLEAN) Initiative  
**Mentor and Judge**, Irvine Unified School District Science Fair, Orange County Science and Engineering Fair  
**Reviewer**, Journal of Undergraduate Research  
**Member**, Orange County Native Plant Society

## Field Campaigns

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Blodget Forest Research Station, March 2022

Toolik Field Station, July-August 2022

Toolik Field Station, July-August 2023

## Courses Taught (Teaching Assistant)

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Introduction to Earth System Science, Summer, 2024

Earth System Physics, Spring, 2024

Food and Water Systems, Winter, 2024

Environmental Sustainability, Winter & Spring, 2022

Field Methods, Fall, 2021

## Fellowship

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National Science Foundation Non-Academic Research Internships for Graduate Students (INTERN)

~\$50,000

Ridge 2 Reef Graduate Fellowship (NSF DGE 1735040) \$34,000

Florida Academic Scholars (\$6381/year x 4)

Doris Lowe and Earl and Verna Lowe Scholarship (\$1500/year x 3)

University of Florida Summer Merit Study Abroad, New Zealand (\$1000)

## Awards

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Society of Phi Kappa Phi

University of Florida (UF) Honors Program

UF College of Agriculture and Life Sciences (CALs) Honors Award

Anderson Scholar

UF Presidents Honor Roll [2016 - 2020]

CALs Dean's List [2016 - 2020]

International Baccalaureate Diploma Recipient

## Publications

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Wang, H., **Welch, A.**, Nagalingam, S., Leong, C., Kittitanuvong, P., Barsanti, K. C., ... & Guenther, A. B. (2024). Arctic heatwaves could significantly influence the isoprene emissions from shrubs. *Geophysical Research Letters*, 51(2), e2023GL107599.

Allison M. Welch, Shawn A. Pedron, Robert Gus Jespersen, Xiaomei Xu, Brittney Martinez, Yezzen Khazindar, Nicole M. Fiore, Michael L. Goulden & Claudia I. Czimczik (2023) Implications of alder shrub growth for alpine tundra soil properties in Interior Alaska, Arctic, Antarctic, and Alpine Research, 55:1, DOI: 10.1080/15230430.2023.2285334

Yanez, C. C., Hopkins, F. M., Xu, X., Tavares, J. F., Welch, A., & Czimczik, C. I. (2022). Reductions in California's urban fossil fuel CO<sub>2</sub> emissions during the COVID-19 pandemic. *AGU Advances*, 3(6), e2022AV000732.

Pedron, S., A. Welch, R.G. Jespersen, Xiaomei Xu, B. Martinez, Y. Khazindar, N. Fiore, M.L. Goulden, and C.I. Czimczik. 2022. ABoVE: Alder Shrub Cover and Soil Properties, Alaska, 2019. ORNL DAAC, Oak Ridge, Tennessee, USA. <https://doi.org/10.3334/ORNLDAAC/2120> [dataset]

## Professional Presentation

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### Talks

Welch, A., Matthews, T., Wang, H., Leong, C., Nielsen, N., Xu, X., Barsanti, K., Sheesley, R., Guenther, A., Czimczik, C. (2023, December). *Characterization of summertime carbonaceous aerosol and biogenic precursors on the North Slope of Alaska*. Oral presentation at the annual American Geophysical Union Meeting, San Francisco, CA, USA.

### Posters

Leong, C., Wang, H., Welch, A., Nagalingam, S., Czimczik, C., Guenther, A. (2023, December). *Isoprene emissions of sedge species under varying Arctic climate conditions*. Poster presented at the annual American Geophysical Union Meeting, San Francisco, CA, USA.

Odwuor, A., Welch, A., Li, S., York, R., Banerjee, T., Randerson, J., Czimczik, C. (2023, December). *Large fuel classes as key drivers of PM<sub>2.5</sub> emissions from a prescribed fire in California*. Poster presented at the annual American Geophysical Union Meeting, San Francisco, CA, USA.

Sheesley, R., Matthews, T., Moffett, C., Welch, A., Wang, H., Tasnia, A., Guenther, A., Czimczik, C., Barsanti, K. (2023, December). *Biogenic emissions and aerosol response on the North Slope (BEAR-oNS) preliminary 2022 and 2023 results for the North Slope of Alaska: Aerosol composition and realtime VOC*. Poster presented at the annual American Geophysical Union Meeting, San Francisco, CA, USA.

Wang, H., Nagalingam, S., Welch, A., Leong, C., Czimczik, C., Guenther, A. (2023, December). *The pronounced temperature sensitivity of sedge isoprene emission leads to a surge of isoprene release*

during heatwaves. Poster presented at the annual American Geophysical Union Meeting, San Francisco, CA, USA.

Matthews, T., Sheesley, R., Moffett., C., Guenther, A., **Welch, A.**, Czimczik, C., Wang, H., Barsanti, K., Tasnia, A. (2023, March). *Overview of the BEAR-oNS project and preliminary 2022 results for aerosol analysis from Utqiagvik and Toolik, AK.* Poster presented at the annual South-Central Regional Meeting of the Society of Environmental Toxicology and Chemistry, Denton, TX, USA.

**Welch, A.**, Wang, H., Xu, X., Sheesley, R., Guenther, A., Czimczik, C. (2023, January). *Contribution of ambient biogenic emissions and boreal forest fire smoke to aerosol formation on the North Slope of Alaska.* Poster presented at the biennial Toolik All-Scientist meeting, Santa Barbara, CA, USA.

Wang, H., **Welch, A.**, Nagalingam, S., Brijesh S., Czimczik, C., Guether, A. (2023, January). *Strong isoprene temperature response differs for woody and herbaceous tundra plants impacting the effect of warming on high-latitude isoprene emission.* Poster presented at the biennial Toolik All-Scientist meeting, Santa Barbara, CA, USA.

Matthews, T., Sheesley, R., Moffett., C., Guenther, A., **Welch, A.**, Czimczik, C., Wang, H., Barsanti, K., Tasnia, A. (March, 2023). *Overview of the BEAR-oNS project and preliminary 2022 results for aerosol analysis from Utqiagvik and Toolik, AK.* Poster presented at the annual American Meteorological Society Meeting, Houston, TX, USA.

**Welch, A.**, Pedron, S., Jespersen, R., Khazindar, Y., Fiore, N., Goulden, M., Martinez, B., Xu, X., Czimczik, C. (2021, December). *Implications of alder shrub expansion on soil properties in Arctic alpine tundra.* Poster presented at the annual fall meeting of the American Geophysical Union, New Orleans, LA, USA.

**Welch, A.**, Pedron, S., Jespersen, R., Khazindar, Y., Fiore, N., Goulden, M., Martinez, B., Xu, X., Czimczik, C. (2021, November). *Arctic Greening: Implications of expanding shrubs on soil properties in Arctic alpine tundra.* Poster presented at Ridge 2 Reef and UCI Solutions that Scale Joint Poster Session, Irvine, CA, USA.

**Welch, A.**, Dutton, A., & Vyverberg, K. (2019, March). *Evaluation of element/ca ratios as a screening technique to quantify the amount of diagenetic calcite in fossil corals.* Poster presented at the southeastern meeting of the Geological Society of America, Charleston, SC, USA.

## Education/Outreach Communication

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Joel, L. (2024, April) *UC Irvine researchers shine light on rapid changes in Arctic and boreal ecosystems*. <https://news.uci.edu/2024/04/16/uc-irvine-researchers-shine-light-on-rapid-changes-in-arctic-and-boreal-ecosystems/>

Welch, A. (2024, February). *Permafrost in an Impermanent World*. University of California Grad Slam Pitch Competition Semi-Finalist.

Welch, A., Wang, H. (2022, October). *Welcome to Mosquitotown: Fieldwork at Toolik Field Station, AK*. Presentation on summer field work campaign at Toolik Field Station in Arctic Alaska, for the ESS Department's informal seminar series, Half-Baked, run by graduate students for graduate students.

Welch, A., Pahl, B. (2021, November). *Explain Your Research to a Third Grader: The Carbon Cycle*. Science communication outreach content hosted by the University of California, Irvine, School of Physical Sciences, Irvine, CA, USA.

### Skills

R, Python, ArcGIS/QGIS

### References

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