

# Edgar L. Carrillo

PhD Student · Department of Earth Science · University of Oregon  
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## Education

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- 2024 - Present     **University of Oregon**, Eugene, OR  
Ph.D. in Earth Science, concentration in Volcano Physics  
Thesis: *Dynamics of Volcanic Flows*  
Advisor: Leif Karlstrom
- 2021 - 2023     **Fisk University**, Nashville, TN  
M.S. in Physics  
Joint program with Vanderbilt University  
Thesis: *Dynamics of Water-Rich Volcanic Plumes*  
Advisor: Kristen Fauria, Vanderbilt University
- 2016 - 2019     **California State University**, San Bernardino, CA  
B.S. in Physics, concentration in Applied Physics  
Dean's List 2018

## Publications

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### *In Review*

**Carrillo, E.L.**, Fauria, K.E., Mittal, T., Mastin, L.G., (2024). Effects of External Water on Volcanic Column Height and Collapse.

### *In Prep*

Ruefer, A.C., Kelly, L.J., Guilherme, G.A.R., **Carrillo, E.L.**, Hickernell, S., Ward, S., Winslow, H., Ruprecht, P., (2024). One small step in the crust, one giant leap for magma: Insights into magma differentiation from basalt to rhyolite at Cordón Caulle derived from rhyolite-MELTS simulations.

## Invited Talks

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- 2024     **Science by the Slice, a STEM Seminar Series**, "Boom! The Physics of Volcanic Eruptions." Lane Community College, Eugene, OR.
- 2022     **Bridge Research Celebration Day**, "External Water Influence in Explosive Eruption Plumes." Vanderbilt University, Nashville, TN.
- 2022     **Fisk Research Symposium**, "Dynamics of Shallow Submarine Eruptions" Fisk University, Nashville, TN.

## Conference Abstracts

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- Carrillo, E.L.**, Fauria K.E., Mittal, T., Mastin, L.G. (2024, October). Effects of External Water on Volcanic Column Height and Collapse. SACNAS NDiSTEM 2024, Phoenix, AZ.
- Fauria K.E., **Carrillo, E.**, Mittal, T., Mastin, L.G., Jutzeler M. (2024, August). Plume Heights in Water-Rich Explosive Eruptions. Cascades24, Bend, OR.

**Carrillo, E.L.,** Fauria K.E., Mittal, T. (2023, December). External Water Effects on Explosive Eruption Plume Height. AGU Fall Meeting 2023, San Francisco, CA.

## Honors and Awards

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- 2024 **College of Arts and Sciences Fellowship**, University of Oregon
- 2024 **IGEN Academic Travel Grant**, National Science Foundation
- 2024 **Summer School on Mathematics of Geophysical Flows Travel Grant**, Max Planck Institute for Mathematics in the Sciences
- 2024 **Earth Sciences Department Recruitment Award**, University of Oregon
- 2023 **College of Arts & Sciences Fellowship**, Vanderbilt University
- 2023 **Geometry and Analysis of Fluid Flows Workshop Travel Grant**, Vanderbilt University
- 2022 **Graduate Student Support Grant**, American Physical Society
- 2021 **Fisk-Vanderbilt Masters-to-PhD Bridge Fellowship**, Fisk University
- 2019 **Math Alliance Predoctoral Scholar**, Purdue University

## Research Interests

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Submarine Volcanism, Oceanography, Pyroclastic Density Currents, Conduit Dynamics, Magma Bodies, Igneous Petrology, Fluid Mechanics, Mathematical Modeling

## Research Experience

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- 2024 - Present **Research Assistant**, University of Oregon, Eugene, OR  
Investigated flow localization in fissure systems.  
Used numerical models to analyze the dynamics of conduits.
- 2021 - 2024 **Research Assistant**, Vanderbilt University, Nashville, TN  
Investigated the impact of external water and mass eruption rate on plume height.  
Assisted in geochemical and thermal modeling using Rhyolite-MELTS.
- 2019 (Summer) **Research Experience for Undergraduates**, Oregon State University, Corvallis, OR  
Participated in NSF and NSA-funded summer research on the reliability assessment of the Power Grid using probability mass functions.  
Developed algorithms in R to simulate and analyze data.

## Professional Experience

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- 2020 - 2021 **Software QA (contract)**, Waymo, Mountain View, CA  
Expanded scripts, reports, and dashboards to enhance feature-level performance.  
Simulated autonomous vehicle behavior for assistance systems and vehicle dynamics analysis.  
Mentored new employees and beta-tested major toolsets, suggesting enhancements.
- 2016 **Intern/Financial Analyst**, California Institute of Technology, Pasadena, CA  
Organized and classified data for financial analysis.  
Developed automated reporting systems to streamline key metric processing.  
Created financial models to assist in decision-making.

## Field Experience

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- 2024     **Instructor**, Tennessee, USA (2 days)  
*Richland Creek*: Taught students how to assess a stream site (water quality and flood risk).  
*Fort Negley*: Observed sedimentary rocks, interpreted geological processes, and searched for outcrop fossils.
- 2023     **Participant**, Oregon, USA (6 days)  
*Cascadian Subduction Zone*: Participated in a short course on sedimentary deposits and their relation to past earthquakes.  
*Cascades*: Observed lava deposits at Newberry Volcano to understand lava flow dynamics and transport.
- 2022     **Participant and Student**, Italy (Various Locations) (15 days)  
Assisted in sampling fiamme from the Ora Caldera.  
Observed surface geology of the Ivrea Zone for insights into Earth's crust and upper mantle.  
Attended a short course at Stromboli, focusing on effusive processes through lava deposit observations.
- 2022     **Student**, Long Valley Caldera, CA, USA (5 days)  
Studied deposits to understand surface processes, including lava flow, pyroclastic flow, and shallow intrusions.

## Teaching and Outreach

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### National Association of Geoscience Teachers

- 2024             **Mentor**, Geosciences Education & Mentorship Support  
Advised undergraduate students at the University of Tennessee's (Knoxville, TN) Earth Science Department on academic matters.

### Vanderbilt University, Nashville, TN

- 2024 (Spring)     **Instructor for Physical Geology Lab**, Department of Earth and Environmental Science  
Delivered hands-on laboratory sessions for an introductory physical geology course.  
Supervised and assisted students in geological experiments and fieldwork.  
Fostered an inclusive environment, encouraging student participation and passion for geology.
- 2023 & 2024  
(Summer)         **Instructor for Computational Physics Bootcamp**, Department of Physics and Astronomy  
Designed and delivered an introduction to computational physics, imparting practical skills to graduate students.
- 2023 (Fall)         **Tutor for Advanced Physical Chemistry**, Department of Physics and Astronomy  
Provided tutoring for a graduate-level Physical Chemistry course. Enhanced student performance through effective teaching methodologies.
- 2023 - Present     **Reviewer for Young Scientist Journal**, Center for Science Outreach  
Provided constructive feedback to authors and collaborated with editors to promote science literacy.

## **Fisk University, Nashville, TN**

- 2022 - 2024      **Peer Mentor**, Department of Life and Physical Science  
Guided first-year graduate students in the Fisk-Vanderbilt Bridge program on academic matters.  
Organized group sessions to promote peer interaction and collaboration.
- 2024 (Spring)    **Guest Speaker for Professional Development Seminar**  
Delivered a lecture on Time and Task Management to graduate students. Conducted interactive Q&A sessions.
- 2024 (Spring)    **Guest Speaker for Biochemistry and Molecular Biology Course**  
Presented stress management techniques to undergraduate students.

## **California Institute of Technology, Pasadena, CA**

- 2016              **Volunteer**, Center for Learning and Outreach  
Designed and presented science projects for K-12 students. Developed science projects for teachers.

## **Training and Professional Development**

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- 2024      **Graduate Employee Day of Teaching**, University of Oregon; Eugene, Oregon, USA
- 2024      **Summer School on Mathematics of Geophysical Flows**, Max Planck Institute for Mathematics in the Sciences; Leipzig, Germany
- 2024      **Classrooms, Careers, & Communities: Maximizing Your TA Experience**, GSA Southeastern Section Meeting; Asheville, NC, USA
- 2021      **Professional Development Seminar: Academic Mentorship**, Fisk University, Nashville, TN, USA

## **Professional Memberships and Affiliations**

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American Physical Society (APS), American Geophysical Union (AGU), Geological Society of America (GSA), Society for the Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS)