

EDUCATION

- Ph.D. **University of California, Santa Cruz** Santa Cruz, CA
2016-2021 Geophysics and Seismology, August 2021
- B.S. **California State University, Stanislaus** Turlock, CA
2008-2013 Geology, May 2013, *summa cum laude*

RESEARCH EXPERIENCE

- NSF EAR Postdoctoral Fellow, UC Berkeley** 2021-2023
Project with Prof. Roland Bürgmann: Evaluating the spatiotemporal scales of transient aseismic slip on the San Andreas fault near San Juan Bautista, central California, and the implications for seismic hazard.
- Graduate Student Researcher, UC Santa Cruz** 2016-2021
Dissertation research encompassed two main areas: transient aseismic slip and related microseismicity (Advisor: Prof. Susan Schwartz) and the seismic detection of oceanic internal gravity waves (Advisor: Prof. Emily Brodsky). Committee: Prof. Susan Schwartz, Prof. Emily Brodsky, Prof. Thorne Lay, Prof. Kristen Davis.
- Research Assistant, CSU Stanislaus** 2012-2013
Research Assistant to Prof. Mario Giaramita. Involved two weeks of geologic mapping and sample collection in southwestern Oregon. Specific project involved mapping of a 300-meter exposed road cut in the southwestern part of the Elk Outlier and analyzing geochemistry of samples and thin sections to determine the petrogenesis of the sequence.
- Research Assistant, CSU Stanislaus** 2010
Research assistant to Prof. Julia Sankey. Project involved studying “Paronychodon Lacustris” teeth from the collection at UC Berkeley’s Museum of Paleontology to develop hypotheses for the presence of the longitudinal ridges that extend from apex to basal of a “Paronychodon” tooth. Additionally worked in the Paleontology lab on fossil preparation.

PUBLICATIONS

- Shaddox, H. R.**, Brodsky, E. E., Ramp, S. R., and Davis, K. A., 2021, Seismic detection of oceanic internal gravity waves from subaerial observations: *AGU Advances*, 2, e2021AV000475. <https://doi.org/10.1029/2021AV000475>
- Alongi, T., Schwartz, S. Y., **Shaddox, H. R.**, and Small, D. T., 2021, Probing the Southern Cascadia Plate Interface with the Dense Amphibious Cascadia Initiative Seismic Array: *Journal of Geophysical Research: Solid Earth*, 126, e2021JB022180. <https://doi.org/10.1029/2021JB022180>
- Shaddox, H.R.**, Schwartz, S.Y., and Bartlow, N. M., 2021, Afterslip and spontaneous aseismic slip on the Anza segment of the San Jacinto fault zone, southern California: *Journal of Geophysical Research: Solid Earth*, 126, e2020JB020460. <https://doi.org/10.1029/2020JB020460>
- Shaddox, H.R.** and Schwartz, S.Y., 2019, Subducted seamount diverts shallow slow slip to the forearc of the northern Hikurangi subduction zone, New Zealand: *Geology*, v. 47, p. 415-418. <https://doi.org/10.1130/G45810.1>
- Yarce, J., Sheehan, A. F., Nakai, J. S., Schwartz, S. Y., Mochizuki, K., Savage, M. K., Wallace, L. M., Henrys, S. A., Webb, S. C., Ito, Y., Abercrombie, R. E., Fry, B., **Shaddox, H. R.**, Todd, E. K., 2019, Seismicity at the northern Hikurangi Margin, New Zealand, and investigation of the potential spatial and temporal relationships with a shallow slow slip event: *Journal of Geophysical Research: Solid Earth*, v. 124, p. 4751-4766. <https://doi.org/10.1029/2018JB017211>

PRESENTATIONS

Invited Talks

- Shaddox, H. R.**, 2021, Near-repeating Earthquakes as a Proxy for Transient Aseismic Slip, Invited Talk at USGS Earthquake Science Center Seminar.
- Shaddox, H. R.**, 2020, Burst-type Repeating Earthquakes as a Proxy for Transient Aseismic Slip, Invited Talk at University of Texas Institute for Geophysics Seminar.
- Shaddox, H. R.**, 2020, Burst-type Repeating Earthquakes as a Proxy for Transient Aseismic Slip, Invited Talk at Berkeley Seismology Lab (BSL) Seminar, Berkeley, CA.
- Shaddox, H. R.**, 2020, The Fault Slip Spectrum, Invited Talk at San Jose State University Geology Club, San Jose, CA.
- Shaddox, H. R.** & Schwartz, S. Y., 2019, Hikurangi Ocean Bottom Investigation of Tremor and Slow Slip Experiment: Results & Implications, Invited Talk at the annual Marine Seismic Research Oversight Committee (MSROC) Meeting, San Francisco, CA.
- Shaddox, H. R.**, 2017, Spatiotemporal Relationship between Shallow Slow Slip and Repeating Earthquakes in the Northern Hikurangi Subduction Margin, New Zealand, Invited Talk at California State University, Stanislaus, Turlock, CA.

Conference Talks

- Shaddox, H. R.**, Schwartz, S. Y., & Bartlow, N. M., 2021, Near-repeating Earthquakes as a Proxy for Transient Aseismic Slip, Oral Presentation at the annual Seismological Society of America Meeting.
- Shaddox, H. R.**, Schwartz, S. Y., & Bartlow, N. M., 2020, Burst-type Repeating Earthquakes as a Proxy for Transient Aseismic Slip, Oral Presentation at the annual Seismological Society of America Meeting, Albuquerque, NM (*cancelled due to COVID-19*). Abstract published in Seismological Research Letters, 91 (2B): 1095–1338. doi.org/10.1785/0220200043.
- Shaddox, H. R.**, Schwartz, S. Y., & Bartlow, N. M., 2019, Newly Detected Strain Transient on the Anza Segment of the San Jacinto Fault Zone, Southern California, Oral Presentation at the annual American Geophysical Union Fall Meeting, San Francisco, CA, Abstract T53C-03.
- Shaddox, H. R.**, Brodsky, E. E., & Davis, K. A., 2019, Seismic Detection of Internal Gravity Waves at the Dongsha Atoll, South China Sea, Oral Presentation at the annual Seismological Society of America Meeting, Seattle, WA.
- Shaddox, H. R.**, Schwartz, S. Y., & Todd, E. K., 2018, Seamount Subduction Prolongs Shallow Slow Slip Event in the Forearc of the Northern Hikurangi Subduction Zone, New Zealand, Oral Presentation at the annual American Geophysical Union Fall Meeting, Washington, D.C., Abstract T53C-04.
- Shaddox, H. R.**, Brodsky, E. E., & Davis, K. A., 2018, Seismic Detection of Internal Gravity Waves at the Dongsha Atoll, South China Sea, Oral Presentation at the annual American Geophysical Union Fall Meeting, Washington, D.C., Abstract S42B-05.
- Shaddox, H. R.**, Schwartz, S. Y., Todd, E. K., Sheehan, A., Yancey, J., Nakai, J. S., 2017, Spatiotemporal Relationship between Shallow Slow Slip and Repeating Earthquakes in the Northern Hikurangi Subduction Margin, New Zealand, Oral Presentation at the annual American Geophysical Union Fall Meeting, New Orleans, LA, Abstract S54C-04.

Poster Presentations

- Shaddox, H. R.**, Schwartz, S. Y., Mochizuki, K., Yamashita, Y., Savage, M. K., Wallace, L. M., Barker, D. H. N., Warren-Smith, E., Woods, K., 2020, Comparison of Repeating Earthquake Activity during the 2014 and 2019 Gisborne Slow Slip Events and Implications for Seamount Subduction and Fluid Migration at the Northern Hikurangi Subduction Margin, New Zealand, Poster Presentation at the annual American Geophysical Union Fall Meeting, Abstract T17C-0002.
- Shaddox, H. R.**, Schwartz, S. Y., & Bartlow, N. M. 2020, Triggered and Spontaneous Slow Slip Transients on the Anza Segment of the San Jacinto Fault Zone, Southern California, Poster Presentation at 2020 SCEC Annual Meeting.

- Shaddox, H. R.**, Schwartz, S. Y., & Bartlow, N. M. 2019, Newly Detected Strain Transient on the Anza Segment of the San Jacinto Fault Zone, Southern California, Poster Presentation at 2019 SCEC Annual Meeting.
- Shaddox, H. R.** & Schwartz, S. Y., 2019, Subducted Seamount Diverts Shallow Slow Slip to the Forearc of the Northern Hikurangi Subduction Zone, New Zealand, Poster Presentation at 2019 ExxonMobil Geophysical Short Course, Midland, TX.
- Alongi, T., Schwartz, S. Y., **Shaddox, H. R.**, Small, D., Xia, I. Huang, F. Bahl, K., 2018, Using Cascadia Initiative Data to Investigate Seismicity and Possible Shallow Slow Slip Along the Southernmost Section of the Cascadia Subduction Zone, Poster Presentation at the annual American Physical Union Fall Meeting, Washington, D. C., Abstract T13H-0329.
- Savage, M. K., Zal, H. J., Jacobs, K., Mroczek, S., Yarce, J., Todd, E., **Shaddox, H. R.**, Nakai, J. S., Graham, K. M., Iwasaki, Y., Sheehan, A. F., Mochizuki, K., Schwartz, S. Y., Webb, S. C., 2018, Seismic Anisotropy and Vp/Vs Changes Measured on Ocean Bottom Seismometers Suggest Fluid Pressure Changes Occur With Slow Slip off the Hikurangi Margin, New Zealand, Poster Presentation at the annual American Physical Union Fall Meeting, Washington, D. C., Abstract T511-0292.
- Shaddox, H. R.** & Schwartz, S. Y., 2017, Spatiotemporal Relationship between Shallow Slow Slip and Repeating Earthquakes in the Northern Hikurangi Subduction Margin, New Zealand, Poster Presentation at the 2nd Cargese Workshop on Earthquakes, Corsica, France.
- Shaddox, H. R.** & Schwartz, S. Y., 2017, Spatiotemporal Relationship between Shallow Slow Slip and Repeating Earthquakes in the Northern Hikurangi Subduction Margin, New Zealand, Poster Presentation at the Computational Infrastructure for Geodynamics-Lawrence Livermore National Laboratory Computational Seismology Workshop, Livermore, CA.
- Shaddox, H. R.**, Barrera, A., Giaramita, M. J., 2013, A Newly Discovered Sheeted Dike Complex on the Western Margin of the Iron Mountain Peridotite, Within Eastern Elk Outlier of the Western Klamath Terrane, Southwestern Oregon, Poster Presented at the annual Geological Society of America Cordilleran Section meeting, Fresno, CA.

FIELDWORK EXPERIENCE

- Creepmeter installation** October 2020
Installation of one creepmeter along the San Andreas fault near San Juan Bautista, California
- Land seismometer & oceanographic instrument deployment** May-June 2019
4-week land seismometer & oceanographic instrument deployment to detect oceanic internal gravity waves using seismometers at Dongsha Atoll, South China Sea
- Ocean-bottom seismometer deployment** July 2018
2-week research cruise deploying ocean-bottom seismometers in the Gulf of Alaska as part of the Alaska Amphibious Community Seismic Experiment (AACSE)
- Geotechnical Fieldwork** 2013-2016
On-site geologist for geotechnical drilling. Responsible for soil sampling, logging soil, maintaining a clean and safe drill site, and drilling decisions. Fault trenching as part of geological hazard investigations; cleaned trench walls, logged soil, bedrock and fault features. Slope stability analyses; logged soil and bedrock conditions and attitudes in pits within mapped landslide zones.
- Environmental Fieldwork** 2013-2016
Project manager/on-site geologist for 20+ environmental drilling/sampling, groundwater monitoring well installation, and well destruction projects. Responsible for sampling, decontamination, maintaining a clean and safe environment, personal protective equipment and drilling decisions. Significant experience with Soil, soil vapor, groundwater, and wastewater sampling Performed Environmental site assessment site visits for 50+ sites.
- Geophysical surveys** 2013-2016
Seismic refraction, resistivity, gravity, electromagnetic

TEACHING EXPERIENCE

Teaching Assistant, UC Santa Cruz

Geologic Hazards

Fall 2019, Fall 2020

Course covers recognizing, evaluating and mitigating geologic hazards in a flipped classroom environment and teaches the tools required to address these hazards in geologic consulting. There are numerous hands-on group exercises and two geologic reports. I graded exercises and reports, actively engaged with students during class, and held office hours.

Geographic Information Systems with Applications in Earth Sciences

Spring 2019

Capstone course provides an introduction to Geographic Information Systems (GIS) for geologic mapping and interpretation. I taught and graded GIS labs and held office hours. Helped students with field mapping and writing geologic reports during the 10-day field geology component.

The Dynamic Earth

Spring 2018

Upper division geophysics course that covers physical processes from the Earth's interior to the surface. Taught and graded labs and held office hours

CONSULTING EXPERIENCE

Environmental Services Manager, Petralogix Engineering, Lodi, CA

2015-2016

Project manager for all environmental projects and various geologic and hydrogeological projects. Focus on geological assessments using geophysical characterization combined with geological mapping, risk-based corrective action, geologic/seismic hazard evaluations and mitigation, technical proposal preparation and grant writing for public agencies.

Environmental Department Manager, Neil O. Anderson, Lodi, CA

2014-2015

Manager for all environmental projects. Supervised Staff Geologists, Staff Environmental Scientists and Environmental Technicians and prepared all environmental scope and cost proposals. Managed extensive environmental due diligence portfolio projects, provided significant liaison with regulatory agencies, and delivered presentations of environmental findings at public agency meetings.

Staff Geologist, Neil O. Anderson, Lodi, CA

2013-2014

Performed field work, data analysis, and technical report preparation for various environmental and geological hazard projects under the supervision of a Professional Geologist.

HONORS & AWARDS

ARCS Foundation Scholarship

2019-2020

SSA Travel Grant Recipient

2020

Aaron and Elizabeth Waters Award (outstanding Ph.D. thesis proposal)

2019

Pass with Honors, Ph.D. Oral Qualifying Examination

2019

Travel Grant for 2nd Cargese Workshop on Earthquakes

2017

NSF Graduate Research Fellowship Honorable Mention

2016

Cota-Robles Graduate Fellowship, UC Santa Cruz

2016-2019

Provost's Scholarship, CSU Stanislaus

2008-2012

Dean's Award of Excellence, CSU Stanislaus

2013

MENTORING

GEOPATHS Mentor

2020

- Mentor to one undergraduate student. Helped with coursework, course selection, resume, cover letter, writing sample, and her job search after she graduated in June 2020. She was hired at an engineering firm in October 2020.

Research Mentor 2017-2018

- Co-supervised a group research project for 2 undergraduate and 4 high school students. The project involved creating and analyzing an earthquake catalog in southern Cascadia using land and ocean-bottom seismic data. The 2 undergraduate students and 3 of the high school students submitted an abstract and presented this work at the AGU Fall 2018 meeting.

OUTREACH

Virtual Visit to Soquel High School's Women in Science Club, UC Santa Cruz February 2021
Volunteered with the Women in Science and Engineering group at UC Santa Cruz to discuss STEM careers with high school students.

First Generation as a Graduate Student Panel Member, UC Santa Cruz October 2019
Panel for Earth & Planetary Sci. undergraduate students discussing how to navigate graduate school as a first-generation college student

Volunteer at Santa Cruz Museum of Natural History Museum October 2019
Led several exhibits related to the 30th anniversary of the 1989 Loma Prieta earthquake. Discussed earthquakes and seismic hazards in general with the public in addition to the Loma Prieta earthquake and participated in a Q&A session.

Volunteer in California Summer School for Mathematics and Science (COSMOS) 2017
Volunteered in the earthquakes portion of the COSMOS program for high school students at UC Santa Cruz. I lectured once, taught the class of 20 high school students Python and ObsPy to analyze seismic data, and supervised the research project of a group of 4 students.

Science Fair Judge at Westlake Elementary, Santa Cruz, CA Feb. 2017

Geology Speaker at the San Joaquin Delta College Scientists in Residence Day 2015
1-hour presentation about working as a Consulting Geologist followed by discussion with students

First Generation College Student Panel Member, CSU Stanislaus 2014
Panel for STEM undergraduate students discussing how to navigate college as a first-generation college student and career options after graduation

Volunteer tutor at the Lodi Public Library, Lodi, CA 2014
Helped 6-8th grade students with math and science homework after school

Volunteer at CSU Stanislaus Science Day 2012
Helped run the Geology exhibit at this event intended to engage the community in general science and active research at the university

SERVICE AND LEADERSHIP

Reviewer for *Journal of Geophysical Research* and *Seismological Research Letters* 2019-Present

Graduate Student Representative, UC Santa Cruz 2020-2021
Represented graduate students at Earth & Planetary Sci. Dept. faculty meetings

Graduate Student Representative to faculty search committee, UC Santa Cruz 2019
Served as search committee member and represented graduate student interests

Organizer of Institute of Geophysics & Planetary Physics Seminar, UC Santa Cruz 2018
Invited and hosted seminar speakers

Organizer of Advanced Signal Processing Discussion Group, UC Santa Cruz 2018
Organized and led a graduate-student discussion group of advanced signal processing techniques.

Vice President of Geological Society, Gamma Phi Kappa, CSU Stanislaus 2011-2013
Organized outreach, fundraising, and social events for the Geological Society

Editor of University Honors Program Magazine, CSU Stanislaus 2009

WORKSHOPS AND SHORT COURSES

2020 AGU Distributed Acoustic Sensing (DAS) Workshop:	December 2020
1-day workshop that provided an overview of the technology and principles of DAS.	
AGU Seismology Section Summer School:	Summer 2020
Remote Online Sessions for Emerging Seismologists (ROSES)	
11-week workshop focused on online learning in seismology.	
Workshop offered Python-based tutorials in data processing, modeling and interpretation.	
Include is a Verb: How Allies Make Inclusion a Reality	June 2020
2-hour workshop focused on how to actively be an ally and create an inclusive culture	
GEOPATHS Mentoring Workshop	January 2020
3-hour workshop focused on how to effectively mentor, including how to set clear expectations, shape the mentoring relationship, initiate and sustain conversations about professional goals, belonging in STEM and academia, and recognize implicit biases.	
Machine Learning for Seismology Workshop	April 2019
4-hour workshop at the 2019 Annual Seismological Society of America meeting about using different machine learning methods with applications to seismology.	
2nd Cargese Workshop on Earthquakes	October 2017
1-week workshop focused on current issues in seismology and facilitating progress among young scientists. Sessions included earthquake nucleation, earthquake triggering and rupture, and the fault slip spectrum.	
2017 CIG LLNL Seismology Workshop	September 2017
1-week workshop focused on accessing, processing, modeling, and visualizing seismic data using advanced tools in seismology research.	

MEMBERSHIPS

Seismological Society of America	2016-Present
American Geophysical Union	2016-Present
The Honor Society of Phi Kappa Phi	2012-Present
National Society of Collegiate Scholars	2012-Present
Central Valley Match & Science Alliance	2012-2013
University Honors Program, CSU Stanislaus	2008-2013

QUALIFICATIONS & CERTIFICATIONS

Coding languages: Python, MATLAB

Software & packages: BRTT Antelope, Seismic Analysis Code (SAC), NonLinLoc, SimulPS, GrowClust, EQtransformer, EQcorrscan, SPEC3D, SW4, Oregon State Tidal Inversion Software (OTIS), Keras, TensorFlow, Generic Mapping Tools (GMT), ArcGIS, QGIS, Adobe Illustrator

General seismology & geophysics skills: Template matching/waveform cross-correlation, earthquake detection & location, filter design, deconvolution, Okada modeling

Data: Seismic (terrestrial and ocean-bottom), seafloor pressure, tide gauge, borehole strainmeter, creepmeter, oceanographic temperature, meteorological, satellite

Graduate-level coursework: Modern Global Seismology, Advanced Seismology, Practical Geophysics, Advanced Signal Processing, Earthquake Physics, Slow Slip seminar, Machine Learning seminar, Physical Oceanography, Order of Magnitude Estimation, Planetary Interiors

Certifications: Geologist-in-Training (GIT) #507