

Charles Hoots

Curriculum Vitae

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Career Experience

Geophysicist, University of Hawai'i 2023 to current

Dissertation research on ocean-bottom seismometer (OBS) tilt and compliance corrections, harmonic-percussive separation, pressure coherent long-period seismic noise characterization and reduction for recent OBS deployments Cascadia, PLUME, AACSE, & NoMelt.

Member of Technical Staff R&D S&E, Sandia National Laboratories 2016 to 2021

Managed, developed, and delivered on dozens of multi-lab and LDRD research initiatives in the fields of Computational Geophysics and Data Science. Publications, conference talks, and field experiments focused primarily on the study of seismic and infrasound Source Physics, Nuclear Nonproliferation, Machine Learning, and fiber-optic Distributed Acoustic Sensing (DAS). Work mostly falls under RD/SBU (HSPD-12) by the DOE/NNSA.

Postgraduate Researcher, Sandia National Laboratories Spring 2016

Collaborating with Geophysics Department colleagues to frame an attenuation tomography study, I developed a model of P-wave attenuation beneath Yucca Flat at the Nevada National Security Site (NNSS) using high-performance computing (HPCs) with incumbent spectral ratios observed from a novel seismic source, demonstrating Member of Technical Staff levels of contribution to the lab's remote surface and subsurface geophysical characterization activities.

Research Assistant, University of New Mexico Fall 2013 to Spring 2016

Thesis work where I deployed, maintained, and aggregated data from a 240km wide broadband array made of fifty-three 3C broadbands for the Central California Seismic Experiment (CCSE) for CalTech & UNM. Combining with past deployments for scattered wave imaging (CCP) regional models of the LAB through multi-channel spectral deconvolution of S_p receiver functions, results provided a higher resolution discrimination of the Isabella Anomaly through advisement from Dr. Brandon Schmandt.

Intern, Hawai'i Volcano Observatory (USGS) 2011 through 2012

Imaging magma propagation through relocation of transients beneath Kilauea, Hawai'i – cataloging 6,440 events mentored by Dr. Paul Okubo (USGS).

Intern, Tate Geological Museum 2008 through Spring 2009 contributed to the recovery of the largest and most complete Columbian Mammoth skeleton in North America through on-site excavation and laboratory processing under the direction of Dr. Kent Sundell (UW).

Teaching Experience

Graduate Instructor, University of Hawai'i at Mānoa, 2023 to current

Lab lecturing & course development in Geomorphology and Physical Geology.

Graduate Lecturer, University of Colorado Boulder, 2021 to 2023

Course lecturer and lab instructor in Computer System Architecture and Data Science with Probability & Statistics, respectively.

Teaching Assistant, University of New Mexico, 2013 to 2016

Lab lesson development and course lecturing in Physical Geology and Mineralogy & Petrology.

Education

PhD Candidate, Geophysics, 2023 to current University of Hawai'i SOEST 4.0 GPA.

MS, Earth and Planetary Sciences Spring 2016, granted University of New Mexico, 3.96 GPA

BS, Geology; Mathematics minor Spring 2012, granted University of Hawai'i, 3.93 GPA

Skills

Programming: Python, MATLAB, C++, Javascript, SQL, and LaTeX

Software: ArcGIS, GMT, MB-System, AutoCAD, VISTA (SLB), Petrel, Enterprise, MS Office: Excel, Word, and Outlook

Computing: High-performance computing (HPC), large dataset processing, machine learning

Geophysical Methods: Writing reports & proposals, team management, mentoring, active reflection and refraction seismic imaging, passive source imaging, ambient noise characterization, DAS, OBS noise reduction, receiver functions, cross-borehole, infrasound, source physics, change detection

Interests: Geophysics, mantle dynamics, data science, snow and camping

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- Hoots, C. R., and Janiszewski, H. A., 2024. "A comparison of ocean bottom seismometer noise reduction techniques". In AGU Fall Meeting Abstracts, Vol. 2024 of *AGU Fall Meeting Abstracts*, pp. S33B–3296.
- Gao, K., Huang, L., Knox, H., Schwering, P. C., Hoots, C., Ajo-Franklin, J., and Kneafsey, T., 2020. "Anisotropic elastic properties of the first EGS Collab testbed revealed from the campaign cross-borehole seismic data". In Proceedings 45th Workshop on Geothermal Reservoir Engineering, Stanford University, SGPTR-216.
- Schwering, P. C., Hoots, C. R., Knox, H. A., Abbott, R., and Preston, L., 2019. "Near-Field Imaging of Shallow Chemical Detonations in Granite using Change Detection Methods of Borehole Seismic Data.". *Sandia National Lab.(SNL-NM), Albuquerque, NM (United States)*.
- Hoots, C. R., Jensen, R. P., Preston, L., and Poppeliers, C., 2019. "Detection of Buried Machinery in Underground Tunnels Using Three-Dimensional Seismic Gradiometry.". In IDGA, Sandia National Lab.(SNL-NM), Albuquerque, NM (United States).
- Linneman, D., Knox, H., Schwering, P., and Hoots, C. R., 2018. "The EGS Collab Hydrofracture Experiment at the Sanford Underground Research Facility-Campaign Cross-Borehole Seismic Characterization". *GRC Transactions, 2018*, pp. H11Q–1689.
- Schwering, P., Condon, K., Knox, H. A., Linneman, D., and Hoots, C. R., 2018. "EGS Collab: Cross-well Seismic". *DOE Geothermal Data Repository; Lawrence Berkeley National Lab*.
- Linneman, D., Knox, H. A., Schwering, P. C., and Hoots, C. R., 2018. "The EGS Collab Hydrofracture Experiment: Seismic Velocity and Elastic Moduli Characterization.". *Sandia National Lab.(SNL-NM), Albuquerque, NM (United States)*.
- Hoots, C. R., Knox, H. A., Abbott, R., and Preston, L., 2017. "Cross Borehole Change Detection Imaging for the Source Physics (SPE) at the Nevada National Security Site (NNSS)". *Sandia National Lab.(SNL-NM), Albuquerque, NM (United States)*.
- Hoots, C. R., Abbott, R., and Preston, L., 2017. "P-wave Attenuation of Yucca Flat Nevada National Security Site.". *Sandia National Lab.(SNL-NM), Albuquerque, NM (United States)*.
- Knox, H., Abbott, R., Preston, L., Hoots, C., and Schwering, P., 2017. "Cross Borehole Change Detection". *Sandia National Laboratories (SNL-NM), Albuquerque, NM (United States)*.
- Abbott, R., Toney, L. D., Knox, H. A., Preston, L., and Hoots, C. R., 2016. "Surface Wave Dispersion at the NNSS". *Sandia National Lab.(SNL-NM), Albuquerque, NM (United States)*.
- Toney, L. D., Abbott, R. E., Knox, H. A., Preston, L. A., and Hoots, C. R., 2016. "Surface Wave Tomography of Yucca Flat, Nevada". *AGU Fall Meeting Abstracts, 2016*, pp. S51A–2744.
- Hoots, C. R., Schmandt, B., Clayton, R. W., Hansen, S. M., and Dougherty, S. L., 2015. "Is the Isabella anomaly a fossil slab or the foundered lithospheric root of the Sierra Nevada batholith?". *AGU Fall Meeting Abstracts, 2015*, pp. S13A–2796.
- Hoots, C., 2014. "Seismic imaging of the lithosphere-asthenosphere boundary with a dense broadband array in central California". *Thesis. University of New Mexico. Albuquerque, New Mexico*.
- Hoots, C. R., Schmandt, B., Clayton, R. W., Dougherty, S. L., and Hansen, S. M., 2014. "Imaging the Isabella Anomaly in Southern California: Surface Wave Tomography, Receiver Function Analysis, and Basin Analysis". *AGU Fall Meeting Abstracts, 2014*, pp. S23C–4532.