

Russel Wilcox-Cline

CONTACT INFORMATION 2534 C. C. Little Building Voice: (508) 648-8516
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EDUCATION **University of Michigan**, Ann Arbor, Michigan USA
PhD. Geophysics and Scientific Computing (expected 2021)
GPA 3.95/4.00

Boston University, Boston, Massachusetts USA
B.A., Physics with Honors (2013)
GPA 3.37/4.00

COMPUTER SKILLS • Programming Languages: Python, Julia, Javascript, Bash, Fortran, Ruby
• Scientific Packages: Matlab, R
• Front End Development: HTML, CSS
• Operating Systems: Unix, Linux

RESEARCH EXPERIENCE **University of Michigan**, Ann Arbor, Michigan USA
Graduate Student Research Assistant/Rackham Merit Fellow **September, 2016 - present**

Skills

1. Bayesian Statistics and Machine Learning
2. Seismic Waveform Analysis and Tomography
3. Geophysical Modeling using Finite Element and Spectral Methods
4. High Performance Scientific Computing
5. Stochastic Processes and Inverse Theory
6. Scientific Writing and Communication

My research is concerned with geophysical inverse problems, including seismic tomography and earthquake mechanics. My current interests lie in the inversion of focal mechanism data, using Bayesian statistics and machine learning, to resolve Earthquake stress parameters to improve the understanding of the stresses that cause earthquakes for both earthquake prediction and hazard mappings and the inversion of global seismic data to better resolve the chemical composition of the deep mantle using P and S wave amplitudes.

United States Geological Survey, Woods Hole, Massachusetts USA

Physical Science Technician **June, 2007 - 2013**

Skills

1. Sediment Strength Testing
2. Well-Log Data Analysis
3. Data management and analysis for large data sets
4. Website Design

5. Scientific Writing and Communication

My research with the USGS has been concerned with methane gas hydrates, namely the investigation of the physical properties of hydrate bearing sediments. I have experience in running standard geotechnical testing procedures, such as Atterberg limits, consolidation testing, grain size analyses, grain density measurements, and triaxial strength testing. I was also responsible for analyzing well-log data, including LWD and Wireline measurements from the NGHP-01 expedition that occurred in 2007. Along with sediment strength testing, I was responsible for managing and maintaining lab equipment along with compiling and managing data that have appeared in scientific publications and conference proceedings. In addition to laboratory activities I developed a website for the Geotechnical Laboratory and frequently gave presentations to visiting scientists on current research and laboratory activities.

Boston University, Boston, Massachusetts USA

Seismology Research Assistant

January, 2010 - 2013

1. Seismic Tomography
2. Forward/Finite Element Modeling
3. Scientific Computing
4. Signal Processing

Under the supervision of Dr. Colleen Dalton, I investigated seismic velocity variations on a global scale. My research area was focused on correlating seismic velocity fluctuations and the relative concentrations of Na⁸ and Fe⁸ at mid-ocean ridges. I also investigated whether anomalies in shear-wave speed in cratons are in fact real or whether they arise due to poor constraints in current Earth models. To address this issue, I applied a forward-modeling approach to the travel times of seismic surface waves traveling along predominantly cratonic paths.

TEACHING EXPERIENCE

Cape Cod Academy, Osterville, Massachusetts USA

Lead Physics Instructor/Director of Science Internships

September, 2014 - June, 2016

1. Develop curriculum new physics and computer science curriculum based on active learning and flipped classroom approaches
2. Communicate with parents and administration on student progress and curriculum development
3. Develop and organize science internship opportunities for students

As a lead physics instructor I was in charge of teaching 3 sections of physics (general, honors, and advanced placement) and redesigning the physics curriculum at Cape Cod Academy. In addition to these duties I was also responsible for teaching one mathematics course per year. I applied a flipped classroom approach where I developed instructional videos for the students to view outside of class in order to make the classroom an effective active-learning environment. I also implemented computational methods using Numpy to laboratory sections, in order to expose students to basic programming and numerical methods in the physical sciences. In addition to teaching, I was responsible for organizing and managing a scientific internship program. I oversaw internship placements, monitored student progress, managed all required documents, and organized the student's final presentation to faculty and students.

Boston University, Boston, Massachusetts USA

As a learning assistant I aided the graduate student teaching fellows in teaching and running discussion/recitation sections of PY212 (an introductory course on calculus based electromagnetism), PY355 (Mathematical Methods for Physicists, which covered vector calculus, functions of a complex variable, linear algebra, and ordinary/partial differential equations), and PY451 (Quantum Mechanics 1, which covered the Heisenberg Uncertainty Principle, Angular Momentum, Zeeman Effect, and Shrodinger Equation). I also held weekly office hours where students could ask for assistance on homework problems and the material taught in the courses.

AWARDS

- Rackham Merit Fellowship

PUBLICATIONS

Winters, W. J., **R. Wilcox-Cline**, P. Long, S. K. Dewri, P. Kumar, L. Stern, and L. Kerr. "Comparison of the physical and geotechnical properties of gas-hydrate-bearing sediments from offshore India and other gas-hydrate-reservoir systems." *Marine and Petroleum Geology* (2014).

ABSTRACTS,
POSTERS, AND
PRESENTATIONS

Wilcox-Cline, R., and E. Hetland (2017) Stress Inversion of Focal Mechanisms: A Markov-Chain Monte Carlo Approach, CIG Crustal Deformation Workshop, CO, USA

Hetland, E., T.T. Hines, L. Medina-Luna, R. Styron, and **R. Wilcox-Cline** (2017) Using Coseismic Slip Models, Focal Mechanisms, and Topography to Constrain Seismogenic Stresses, Seismological Society of America, CO, USA

Wilcox-Cline, R. (2012), Analyses on the Physical Properties of Hydrate Bearing Sediment, *Invited Talk*: Boston University Solid Earth Seminar, MA, USA

Wilcox-Cline, R., and W.J Winters (2011) The Influence of Grain Size on the Thermodynamic Properties of Gas Hydrate, Joint Meeting of the New England Sections of APS, AAPG, and SPS, Fall Meeting, MA, USA

Wilcox-Cline, R., and N. Shokri (2011) The Effect on Pore-Scale Processes on the Formation of THF Hydrate, Society of Physics Students Zone 1 Regional Conference, MA, USA

Winters, W.J., T. Collett, S. Bryant, I. Novosel, and **R. Wilcox-Cline** (2009) Comparison of the Physical Properties of Marine and Arctic Gas-Hydrate-Bearing Deposits, American Geophysical Union, Fall Meeting, CA, USA