Stephanie Nale
Curriculum Vitae

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EDUCATION

Cornell University, **M.S. Geological Sciences**, with concentrations Geotectonics, Seismology, and Structural Geology, 2017

U.C. Santa Cruz, **B.S. Earth Science**, Cum Laude, 2012
Senior Thesis: *Stability Analysis of a Borehole to be Drilled into the Tohoku Fault Zone, Japan;* Chancellor's Award, Departmental Honors.

Skyline College, **A.S. Natural Science** (High Honors), 2010
Additional degrees: A.A. University Studies (High Honors), A.A. Liberal Arts (High Honors), A.A. Dance (High Honors)

TEACHING AND OUTREACH EXPERIENCE

Teaching Assistant
January 2016 – May 2016
Cornell University Department of Earth and Planetary Sciences, Ithaca NY
Course: EAS/ENGRI 1220 Earthquake!, ~200 students.
Educated students on natural hazards including earthquakes, volcanoes, tsunami, hurricanes, wildfires, etc., with emphasis on the science, societal impacts, and mitigation; held weekly office hours; assisted students in understanding course material; wrote, administered and assigned grades for makeup quizzes and exams; assisted with planning and implementation of group projects; advised and encouraged exploration of students' interest outside the course requirements as well as in experience and opportunities in earth sciences; developed and taught lecture on notable earthquakes in western North and Central America.
Actively participated in weekly workshops through the Cornell University Center for Teaching Excellence (CTE) Graduate students, future Educators, and Teaching assistants pursuing Scholarship and Excellence in Teaching (GET SET), contributing to discussion and learning of techniques and resources to create a more engaging and inclusive teaching experience. Earned multiple certificates of completion. Participant in the spring 2016 University-wide Teaching Conference.

Teaching Assistant
April 2012 – June 2012
U.C. Santa Cruz, Earth and Planetary Sciences Department, Santa Cruz, CA
Course: EART 120 Sedimentology and Stratigraphy, ~25 students
Planned, prepared and taught lab exercises based on the syllabus for the course and previous

years' exercises; created grading rubrics and assigned grades to students' labs, communicated with the other two TAs to ensure fair and accurate grading across multiple lab sections; assisted in the leadership and guidance during fieldwork exercises; attended the lectures, assisted the instructor in class activities; held weekly office hours to assist students with class material, homework, labs, and exam preparation.

Learning Assistant
January 2012 – March 2012
U.C. Santa Cruz, Earth and Planetary Sciences Department, Santa Cruz, CA
Course: EART 110B Earth as a Chemical System, ~80 students
Lead several weekly Modified Supplemental Instruction (MSI) interactive discussion and learning sessions for ~10-15 students at a time; prepared topic reviews, minute quizzes, and examples relevant to course topics to encourage creative thinking and deeper understanding of the class material; attended lectures; wrote practice exam questions and lead extra exam review sessions.

Campus Ambassador, Senior Team Leader
October 2005 – July 2010
Skyline College, San Bruno, CA
Planned and presented independent and collaborative inreach and outreach events aimed at raising student population in college and for increasing awareness and access to funding for Federal and State Financial Aid and Scholarships; provided individual assistance with processes of matriculation, class registration, admissions and Financial Aid applications; presented to classes on campus, small groups in specific programs, and to larger audiences with other Campus Ambassadors at community centers and local high schools; individually established a connection at two of the local public libraries to set up an information table and offer computer assistance to community members on a weekly basis; Provided general information about Skyline College programs and services over the phone and at the Information Center.
As Senior Team Leader: Member of hiring committee; Represented Campus Ambassador team to other departments on campus.

CalTeach Elementary Teacher's Assistant
Fall 2009
ESPM 78A, CalTeach, U.C. Berkeley, Berkeley, CA
As a fellow in the Environmental Leadership Pathway program at U.C. Berkeley (via course ESPM 78A and CalTeach), assisted a public school teacher in the weekly earth science lessons to a second-grade class at Commodore Sloat Elementary School in San Francisco, CA.; planned and taught a lesson on fossils.

VOLUNTEER

Session Planner and Presenter
April 2015

Cornell University Earth and Atmospheric Sciences Department, Cornell University, Ithaca, NY
Event planning and curriculum development committee member and session presenter for two days of hands-on earth science workshops for 150 students from Dewitt Middle School in Ithaca, NY.

Children's Activity Center Volunteer
April 2012
Santa Clara Gem and Mineral Society Annual Gem, Mineral and Jewelry Festival, Santa Clara County Fairgrounds, San Jose, CA
Educated more than 1500 grade-school students over 2 days on the rock cycle, volcanoes, minerals and soils using games, worksheets and quiz activities, as well as hands-on rock sample exhibits.

RESEARCH EXPERIENCE

Graduate Student, Geophysics
August 2014 – 2017
Cornell University, Earth and Atmospheric Sciences, Seismology and Tectonics Group (Keranen), Ithaca NY
(Graduate Committee: Katie Keranen, Geoff Abers, and Rick Allmendinger)
High-precision earthquake relocation in the Shumagin Gap region of the Alaska-Aleutian subduction zone. Catalog locations are taken from a legacy dataset spanning nearly a decade of seismicity, from 1982 – 1991, operated by the Lamont-Doherty Earth Observatory. Study of the location of seismicity along the subduction interface elucidates properties and processes of active deformation and seismicity along the mega-thrust. Locations are calculated with the program hypoDD, using the double-difference relative relocation algorithm, to improve the hypocentral precision by as much as an order of magnitude. Results elucidated the seismogenic character of the shallow thrust zone, with an abrupt transition in seismicity at 44 km depth and shallow structures, ~35 – 40 km depth, that suggest active normal splay faults which may have important implications relating to tsunami hazard of the region. I also gained field experience servicing seismic stations and collecting data in Ethiopia in Fall 2014.

Junior Specialist, Geophysics
June 2013 – May 2014
U.C. Santa Cruz, Seismology Lab, Brodsky Group, Santa Cruz, CA
Studied the amplitude and phase lag of water level response to earth tides in geologically correlated wells in the Santa Susana Field Laboratory (SSFL) to build a fault permeability architecture. Dataset provides the unique opportunity to answer important questions about permeability changes in relation to the fault zone architecture and earthquakes. **Developed the tidal response software SlugTide**, a suite of MATLAB codes to analyze tidal responses from water well data. The software package and documentation can be found here: http://pmc.ucsc.edu/~seisweb/SlugTide/
Participated in planning and revision meetings, as well as a public information and community

update meeting on the progress and impacts of the SSFL project. Deployed gravimeter, collected gravity data, and assisted with pressure and thermistor instrumentation of wells at Logan Quarry.

Junior Specialist, Marine Geophysics
March 2013 – September 2013
U.C. Santa Cruz, Crustal Imaging Lab, Santa Cruz ,CA
Utilized neural networks of multiple seismic attributes to create probability cubes in OpendTect to identify faulting, fluid 'chimney' pathways, and gas-charged reservoirs. Data are a subset of the 3D seismic volume including the continental shelf offshore of the Osa Peninsula, southern Costa Rica collected for the Costa Rica Seismogenesis Project (CRISP) in 2011. This work is related to understanding the outer forearc permeability structure and how this relates to fluid conditions along the plate boundary.

Student Researcher (Undergraduate Senior Thesis)
June 2011 – March 2012
U.C. Santa Cruz, Seismology Lab, Santa Cruz ,CA
Stability Analysis of a Borehole to be Drilled into the Tohoku Fault Zone, Japan
(Advisor: Emily Brodsky)
Performed numerical analyses in MATLAB to predict wellbore stability for a borehole drilled into the Tohoku megathrust fault (Japan) in Spring 2012 for the IODP Expedition 343 JFAST project. Studied three possible farfield stress regimes and modeled the stresses acting around the circumference of the borehole over a range of rock strength properties and drill depths. This study determined whether the borehole would fail under assumed stress regimes, and aided in the engineering design of the borehole.

Student Research Assistant
October 2010 – October 2011
U.C. Santa Cruz, Ocean Sciences, Delaney Lab, Santa Cruz ,CA
Sorted, catalogued and prepared ocean sediment and ocean water samples in preparation for testing of neodymium, nutrient, and trace metal content for projects relating to paleo-oceanography and paleo-ocean current conditions corresponding to the opening of the Drake Passage.

Summer Research Intern / Field Assistant
June 2009 – July 2009
U.C. Berkeley, Wildland Fire Sciences Lab, Berkeley ,CA
Catalogued historical fire occurrences in the Sierra Nevada by fire scar dendrochronology. Assisted in fieldwork in Eastern Sierra Nevada, CA; Yosemite National Park, CA; and Crater Lake, OR.

Summer Research Intern (Immunology)
June 2002 – August 2002 & June 2003 – August 2003
City of Hope, Beckman Research Institute, Duarte, CA
Conducted experiments on the effects of the selective estrogen receptor modulator, Tamoxifen, on dendritic cell differentiation and activation.

HONORS

U.C. Santa Cruz Chancellor's Award for Outstanding Senior Thesis Project, 2012
U.C. Santa Cruz Earth and Planetary Sciences Departmental Honors on Senior Thesis, 2012
U.C. Santa Cruz, Dean's Honors, Fall 2010
Skyline College Dean's List of Honors, Fall 2005 – Summer 2010

AWARDS

McMullen Fellowship at Cornell University, 2014-2015
Karl S. Pister Leadership Opportunity Program fellow at U.C. Santa Cruz, 2010-2012
Environmental Leadership Pathway Program fellow at U.C. Berkeley, 2009
Van Couvering Award to attend the AAPG Pacific Section Meeting 2013
U.C. Santa Cruz Chancellor's Award for outstanding senior thesis project, 2012
Santa Clara Valley Gem and Mineral Society Scholarship, 2012
Victor Valley Gem and Mineral Club Scholarship, 2010
Skyline College Honors Transfer Program Scholarship, 2010
American Association of University Women Transfer Scholarship, 2010
Ellis W. Garlington Scholarship, 2010
Associated Students of Skyline College Scholarship, 2009
Atkinson Foundation Scholarship, 2009
Dale and Helen Mersereau Scholarship, 2008
Friends of Skyline Scholarship, 2008
Luis Kemnitzer Honors Anthropology Scholarship, 2007
Student Services Scholarship, 2007
Cypress Lawn Community Support Scholarship, 2006 and 2007
Carl Sitton Vocal Scholarship, 2006
Governor's Scholars Award, 2001 (Biology) and 2002

PUBLICATIONS AND PRESENTATIONS

Nale, S. M., 2017. Distribution of Seismicity on the Megathrust: Characterizing the Seismogenic Zone in the Shumagin Gap, Alaska with Precise Earthquake Locations (Master's Thesis). Cornell University, Ithaca, NY, USA.

Allègre, V., Brodsky, E. E., Xue, L., Nale, S. M., Parker, B. L., and J. A. Cherry, 2016. Using earth-tide induced water pressure changes to measure in situ permeability: A comparison with longterm pumping tests, *Water Resour. Res.,* 52, 3113–3126, doi:10.1002/ 2015WR017346.

Allègre, V., Brodsky, E. E., Nale, S., and N. Johnson, 2014. A systematic comparison of tidally induced water pressure changes with a standard aquifer test to infer permeability. AGU Fall Meeting, 2014, San Francisco, CA. H51P-02.

Nale, S., Kluesner, J.W., Silver, E.A., Bangs, N.L., McIntosh, K.D., and C.R. Ranero, 2013. Mega-pockmarks surrounding IODP Site U1414: Insights from the CRISP 3D seismic survey. AGU Fall Meeting 2013, San Francisco, CA. Poster T31F-2574.

Silver, E.A., Kluesner, J.W., Nale, S., Bangs, N.L., McIntosh, K.D., Ranero, C.R., Tryon, M.D., Spinelli, G.A., Rathburn, T., and R. von Huene, 2013. Could Fluid seeps Originate from the Seismogenic Zone? Evidence from Southern Costa Rica. AGU Fall Meeting 2013, San Francisco, CA. Talk T33C-05.

Kluesner, J.W., Silver, E.A., Nale, S., Bangs, N.L., and K.D. McIntosh, 2013. 3D seismic detection of shallow faults and fluid migration pathways offshore Southern Costa Rica: Application of neural-network meta-attributes. AGU Fall Meeting 2013, San Francisco, CA. Talk T31F-2573.

Nale, S., Kluesner, J., Silver, E., Bangs, N., and K.D. McIntosh, 2013. Application of supervised neural network meta-attributes to 3D seismic data for detection and visualization of shallow faults and fluid flow pathways offshore southern Costa Rica. SCEC 2013 Fall Meeting. Palm Springs CA, Poster 071.

Kluesner, J., Silver, E., Nale, S., Bangs, N., and K.D. McIntosh, 2013. Fluid migration along a dense, intersecting array of faults on the outer-shelf of Southern Costa Rica: insights from 3D seismic attributes and multibeam data. *Mineralogical Magazine*, **77(5)** 1480.

Nale, S. and E.E. Brodsky, 2011. *S*tability Analysis for a Proposed Borehole to be Drilled into the Tohoku Fault Zone, Japan. AGU Fall Meeting 2011, San Francisco, CA. Poster T21B – 2343.

Nalbandian, G., Paharkova-Vatchkova, V., Mao, A., Nale, S. and S. Kovats, 2005. The Selective Estrogen Receptor Modulators, Tamoxifen and Raloxifene, Impair Dendritic Cell Differentiation and Activation. *J. Immunol*, vol. 175 no. 4, 2666-2675.

MEMBERSHIPS

American Geophysical Union
Geological Society of America
Seismological Society of America
Society of Exploration Geophysicists
Association for Women Geoscientists