Geological Sciences Department Annual Report 2018-19

I. Student Success: Fall 2019 Cohort and Progress on Graduation Initiative 2025

Instructions to Department Cal Poly Pomona is committed to making evidenced-based decisions in support of our students' success. The CPP Tableau Dashboards (http://www.cpp.edu/~irpa/dashboards/index.shtml) and CSU Student Success Dashboards (https://csusuccess.dashboards.calstate.edu/public/app/dashboard/dashboard-index.php) are tools to analyze our progress, foster cultures of inquiry, and help us identify and pursue those changes with the greatest potential to benefit our students. Using these tools, reflect on and summarize the Department's efforts in AY 2018-19 to increase the retention and graduation rates of students, including efforts to close equity gaps for Pell-eligible and underrepresented minority students (URM). More specifically, focus on the following strategies, which were strategic priorities this year in alignment with the CSU Graduation Initiative.

1. Progress on improving graduation and retention rates (both freshman and transfer).
   - Where do you see the most significant challenge and the most improvement? What accounts for the progress and what strategies did you employ this year?

Transfer graduation rates in Geology show an upward trend over the past 4 years. The 2-year rate exceeds the CSU goal, and the 4-year rate is approaching the goal. We attribute these positive results to concerted Department efforts to better advise students, and generally good preparation of students entering the major, with an intention of staying in Geology. Historically, our transfer cohort is larger than the freshman cohort, because Earth Science is rarely taught in local high schools

First time freshmen graduation rates show an upward trajectory that currently exceeds the goal for 6-year graduation. However, 4-year rates are on a downward trajectory.

Before the graduation rate metrics can be meaningfully analyzed, issues with the current accounting system need clarification. Geology Department internal records differ from those on Tableau because of differences in how changed majors are counted. A significant portion of our majors switch from other departments such as Engineering after 2 or more years of residence. We are glad to accommodate these students, but this means longer time to graduation. Conversely, many incoming freshman students sign up for Geology with a clear intent to change major to Engineering or Biology or Computer Science for which they don't meet admissions standards. Such students have little interest in Geology as shown by their choice of classes during the first few terms.

Furthermore, the current practice of admitting students to our program who score 300's to 400's on the Math SATs works against the graduation initiative. All Geology majors must complete a full year of Calculus, Physics, and Chemistry. Despite our best of intentions, students admitted with math deficiencies will progress slowly through the program.

2. Progress on addressing high DUF and high equity gap courses.
   - Identify the courses with the highest DUF and equity gap. Which strategies were adopted to achieve improvements? Please discuss the results obtained.

DUF data from the 2017 academic year show all but one GSC course plotting in the single digits or teens. None of our courses are singled out in the top 10 high DUF courses for the College of Science. These good results reflect special efforts by Geology instructors to scaffold students through our program and understand CPP's student success goals. The one anomalous class (GSC 424/GSC 425L-Igneous & Metamorphic Petrology) had a 27% DUF rate (4 out of 15 students). This was due mainly to three Geology majors well known in the department for chronic absences and missing homework assignments. The instructor was generous with students in accepting late work, but when assignments were never completed, final grades suffered.

It is noteworthy that our instructor for GSC 321/321L--Engineering Geology became concerned about his 16% DUF rate (up from 4% in 2015 and 3% in 2016). This is a required service course for all CE majors and double counts as Upper Division synthesis GE. Instructor Roumelis recognized that the DUFs were largely due to poor performance on three take-home problem sets assigned during the second half of term. In 2018-19 five additional lab sessions were available in the semester conversion. He offered three "problem set workshops" during official class meetings of GSC 3210L, and reports significant improvements in recently submitted work products. DUFs in Engineering Geology will likely be lower in the 2018-19 Academic year.

The Geology Department has one of the most diverse student populations in the College of Science, and we graduate a large proportion of students identified as URM. In the 2017 academic year, achievement gaps for URM students showed up in the top 10 of the College of Science up for three GSC courses: GSC 320 Studies of a Blue Planet; GSC 195 Earthquake Country; and GSC 145L Megascopic Petrography. A Pell grant gap is noted in the top 10 for one additional GSC course: GSC 141L Principles of Geology Lab. In only one case is the low end of the gap in the D range (below mean GPA of 2.0).

3. Progress on closing equity gaps (both freshman and transfer).
   - Which specific strategies, interventions and/or programs were used to address URM and/or Pell gaps.

Instructors have been counseled that DUF and equity gap data exists. We are pondering reasons for the gaps and discussing mitigation strategies. We have studied the CSU suggestions for reducing equity gaps and find it concerning that *efforts to improve attendance are not even mentioned, nor is the chronic problem of students distracted by smart phones during class meetings*. In all the DUF and equity gap cases listed above, *a direct correlation between course grade and attendance can be documented*. Also, two of the classes have MWF meetings, and Friday attendance is measurably lower, even though the campus parking challenges are reduced on Fridays. Several instructors state that "academic rigor" fundamentally begins with class attendance, and attention to the instructor rather than phones. A growing body of our instructors believe that some of the responsibility for student success resides with the student. They make a strong case.

The CSU website mentions interventions to reduce DUFs and URM / Pell gaps. *We view classroom attendance and phone distraction issues as very real impediments to student success.* Some instructors have enforced attendance requirements and banned smart phone usage in the classroom. Unfortunately, this leads to student boycotts of certain classes which in turn harms enrollments that are the main metric for allocating resources. Unless the CSU implements universal standards, the problems described above will inevitably worsen. We welcome constructive guidance on these matters.

II. Teacher-Scholar Support and Activities*

****Especially noteworthy faculty and student activities and accomplishments are highlighted in red font****

1. Research, scholarly, and creative activities – works published, juried, or judged in academic forums, shows, venues, performances, journals, works, etc.

Arcas, D., **Marshall, J.**, Sheehan, A., 2018, The Science of Extreme Events: Research, Monitoring, and Mitigation of Coastal Natural Hazards: *White Papers, 2018 San Diego Scoping Workshop, NSF Coastlines & People (CoPe)*, https://coastlinesandpeople.org, 4 p.

Marshall, J., and Pilarczyk, J., 2018, Sizing up the Taniwha: Seismogenesis at Hikurangi Integrated Research Experiment (SHIRE): *NSF GeoPRISMS News, v. 40, Spring 2018,* p. 22-25.

Nourse, Jonathan A., and Miranda, Danny, 2018, *Hydrogeology of Icehouse Canyon, San Gabriel Mountains, California,* Field Trip Guidebook for American Association for Advancement of Science Pacific Section Meeting,

Cal Poly Pomona., June 12-15, 26 p.

Ng, R. and **J. Polet** (2018), Site Response Across The Los Angeles Basin From Ambient Noise Recorded By A High Density Array, Paper in the *Proceedings of the 11th National Conference on Earthquake Engineering*, Los Angeles, CA, 10 pp.

McIntosh, JC, Hendry, MJ, Ballentine, C, Haszeldine, RS, Mayer, B, Etiope, G, Elsner, M, Darrah TH, Prinzhofer, A, **Osborn, S**, Kuloyo, O, Lu, ZT, Martini, A, and Sherwood Lollar, B, 2018. A Critical Review of State-of-the-Art and Emerging Approaches to Identifying Fracking-Derived Gases and Associated Contaminants in Aquifers, Environmental Science & Technology, V. 53, iss. 3, pp. 1063-1077.

Martini, A., **Osborn, S.**, and McIntosh, J., in-press. Methane in Groundwater: Understanding the Pathways, in Encyclopedia of Water: Science, Technology, and Society, by Wiley Science

2. Presentations at conferences related to work as a faculty member at Cal Poly Pomona

Arcas, D., **Marshall, J.**, Sheehan, A., 2018, The science of extreme events: Research, monitoring, and mitigation of coastal natural hazards, *NSF Coastlines & People (CoPe) Scoping Workshop*, San Diego, CA, September 26-28, 2018.

Marshall, J.S., 2018, ***Invited Short Talk:*** Broadening participation in coastal science: Perspectives from the shorelines of southern California and the classrooms of the California State University, *NSF Coastlines & People (CoPe) Scoping Workshop*, San Diego, CA, September 26-28, 2018.

Marshall, J.S., 2018, Sizing up the subduction beast: A tale of earthquakes and ancient shorelines in Costa Rica and New Zealand: Cal Poly Pomona College of Science, Ralph W. Ames Distinguished Research Award Lecture, November 1, 2018.

Marshall, J.S., 2018, ***Invited Lecture:*** Sizing up the subduction beast: A tale of earthquakes and ancient shorelines in Costa Rica and New Zealand: Joint Meeting of Southern California Association of Environmental and Engineering Geologists & South Coast Geological Society, Orange, CA, August 22, 2018.

Marshall, J.S., 2018, Morphotectonics of the Hikurangi Margin, New Zealand: An uplifting tale of forearc emergence, *NSF SHIRE Project Meeting (Seismogenesis at Hikurangi Integrated Research Experiment)*, University of Texas, Institute for Geophysics, Austin, TX, June 28-29, 2018.

Marshall, J.S., 2018, SHIRE Project Education and Outreach: REU Program and Media Coverage, *NSF SHIRE Project Meeting (Seismogenesis at Hikurangi Integrated Research Experiment)*, University of Texas, Institute for Geophysics, Austin, TX, June 28-29, 2018.

McKinney, E., **Marshall, J.S.**, Angenent, J.M., Hamel, J.E., Miller, C.N., Valenciano, J.L., White, C.J., Zohbe, N.M., Clark, K.J., Litchfield, N.J., 2018, Coseismic uplift and coastal emergence along the southern Hikurangi margin, North Island, New Zealand: *Eos, Transactions American Geophysical Union, 99, Fall Meeting Supplement 2018,* Abs. T51I-1928.

Murray, B.P. and Al-kaabi, A., 2018, Preliminary stratigraphic interpretations of the Soledad Rojo formation in the lower Colorado River extensional corridor, western Palo Verde Mountains, southeastern California: Geological Society of America *Abstracts with Programs*, v. 50, no. 5, doi: 10.1130/abs/2018RM-314270

Nourse, Jonathan A., and Miranda, Danny, 2018, *Hydrogeology of Icehouse Canyon, San Gabriel Mountains, California,* Field Trip Guidebook for American Association for Advancement of Science Pacific Section Meeting, Cal Poly Pomona., June 12-15, 26 p.

Nourse, Jonathan A., Gonzalez-Leon, Carlos M., Solari, Luigi, Zapata-Martinez, J. Angel, *Magmatic and Structural Evolution of the Magdalena-Madera Metamorphic Core Complex, Sonora, Mexico,* 2018, Geological Society of America Abstracts with Programs, vol. 50, no. 5.

Nourse, Jonathan A., Gonzalez-Leon, Carlos M., Solari, Luigi, Zapata-Martinez, J. Angel, *New U-Pb Zircon Analyses Record Paleocene and Mid Eocene-Early Oligocene Melting Of Late Cretaceous, Jurassic, and Proterozoic Crust in Lower Plate of the Magdalena-Madera Metamorphic Core Complex, Sonora, Mexico,* 2018, Geological Society of America Abstracts with Programs, vol. 50, no. 5.

Gonzalez-Leon, Carlos M., Sanchez, T., Vasquez, M., Solari, Luigi, **Nourse, Jonathan A.**, Amaya-Martinez, R., and Zapata-Martinez, J. Angel, 2018, *Geology and LA-ICPMS U-Pb Geochronology of the Western Lower Plate of the Magdalena-Madera Metamorphic Core Complex, Northern Sonora, Mexico*, Geological Society of America Abstracts with Programs, vol. 50, no. 5.

Vermillion, Karissa B., and **Nourse, Jonathan A.**, 2018, *Proterozoic Metasediments and Mesozoic Intrusives in Placerita Canyon, Western San Gabriel Mountains, California: New Insights from Reconnaissance U-Pb Geochronology,* American Association for Advancement of Science Pacific Division Meeting, Cal Poly Pomona., June 12-15, vol. 37. Part I, p. 141.

Miranda, Danny, and **Nourse, Jonathan A.**, 2018, *Response of Streamflow and Spring Discharge to Precipitation Discharge Events in Icehouse Canyon Watershed, Eastern San Gabriel Mountains, California: New Insights from Reconnaissance U-Pb Geochronology,* American Association for Advancement of Science Pacific Division Meeting, Cal Poly Pomona., June 12-15, vol. 37. Part I, p. 142.

Dykstra, Michael R., Van Buer, Nicholas J., and **Nourse, Jonathan A.**, 2018, P*etrography, Whole-rock geochemistry, and preliminary U-Pb zircon analysis of Oligocene intrusives in the eastern San Gabriel Mountains,* American Association for Advancement of Science Pacific Division Meeting, Cal Poly Pomona., June 12-15, vol. 37. Part I, p. 153.

Murphy, Clark, *James, Larry J., and **Nourse, Jonathan A.**, 2018, *Geologic Observations on Proterozoic and Mesozoic Rocks exposed by the Creek Wildfire in Limerock Canyon Assemblage, Southwestern San Gabriel Mountains, California,* American Association for Advancement of Science Pacific Division Meeting, Cal Poly Pomona., June 12-15, vol. 37. Part I, p. 154.

Young, Alyssa L., and **Nourse, Jonathan A.**, 2018, *Correlation and Response Between Streamflow and Precipitation in the San Dimas Experimental Forest, San Gabriel Mountains, California,* Geological Society of America Abstracts with Programs, vol. 50, no. 4.

Murphy, Clark, James, Larry J., and **Nourse, Jonathan A.**, 2018, *Geology and Structure of Limerock Canyon Assemblage, Southwestern San Gabriel Mountains, California,* Geological Society of America Abstracts with Programs, vol. 50, no. 5.

Vermillion, Karissa B., and **Nourse, Jonathan A.**, 2018, *Geology and U-Pb Geochronology of Placerita Canyon, Western San Gabriel Mountains, California,* Geological Society of America Abstracts with Programs, vol. 50, no. 5.

Dykstra, Michael R., Van Buer, Nicholas J., and **Nourse, Jonathan A.**, 2018, *Whole-rock geochemistry, petrography, and preliminary U-Pb zircon analysis of Oligocene intrusives in the eastern San Gabriel Mountains,* Geological Society of America Abstracts with Programs, vol. 50, no. 5.

Colin, Homar, and **Nourse, Jonathan A.**, 2018, *Mapping and Petrographic Analysis of Lost Canyon and Delker Canyon Within the Eastern San Gabriel Mountains,* Geological Society of America Abstracts with Programs, vol. 50, no. 5.

Faherty, D. and **J. Polet** (2018), Geophysical investigation of fault-groundwater interaction: San Andreas Oasis site study, *Expanded Abstracts of the 88th SEG Annual meeting*, Anaheim, CA, 4 pp.

Tyagi, A., Grenier, M., Kreuziger, R., Kays, J. and **J. Polet** (2018), Preliminary results of the analysis of site response across the San Gabriel and San Bernardino Basins using ambient noise spectral ratio measurements, *Expanded Abstracts of the 88th SEG Annual meeting*, Anaheim, CA, 4 pp.

Badillo, S.[##], Moody, S.[##] and **J. Polet** (2018, May), "Using Ground Penetrating Radar to Image the Portuguese Bend Landslide", 13th Annual College of Science Research Symposium, Cal Poly Pomona, CA

Barragan, K.[##], Alvarez, K.[##] and **J. Polet** (2018, May), "Ground-Based Magnetic Survey Across the San Andreas Fault near Durmid Hill", 13th Annual College of Science Research Symposium, Cal Poly Pomona, CA

Carson, T.[##], Faherty, D.[##] and **J. Polet** (2018, May), "Applying Magnetic and VLF Electromagnetic Techniques To Image Groundwater Flow and Faults at San Andreas Oasis", 13th Annual College of Science Research Symposium, Cal Poly Pomona, CA

Del Rio, M.[##], Faherty, D.[##] and **J. Polet** (2018, May), "Resistivity and Magnetic Field Measurements for the Detection of Groundwater and Faults in the Northern Dos Palmas Preserve Area", 13th Annual College of Science Research Symposium, Cal Poly Pomona, CA

Kreuziger, R. [##], Tyagi, A.[##] and **J. Polet** (2018, May), "Preliminary Site Response Results of the Central San Gabriel Basin Using Ambient Noise Spectral Ratio Analysis", 13th Annual College of Science Research Symposium, Cal Poly Pomona, CA

Rivera, A.[##] and **J. Polet** (2018, May), "Geophysical Imaging of Shallow Conduits for Carbon Dioxide Emission at Horseshoe Lake, Mammoth Mountain, California", 13th Annual College of Science Research Symposium, Cal Poly Pomona, CA

Ruiz, K.[##], Alvarez, K.[##] and **J. Polet** (2018, May), "Surface Measurements of Creep Along the Southern San Andreas Fault at Durmid Hill", 13th Annual College of Science Research Symposium, Cal Poly Pomona, CA

Gage, N.[##], and **J. Polet** (2018, June), "Imaging Intermediate Depth Seismicity in the Izu-Bonin Subduction Zone", 99th annual meeting of the Pacific Division of the American Association for the Advancement of Science, Pomona, CA

Grenier, M.[##], and **J. Polet** (2018, June), "Preliminary Site Response Results of the Western San Gabriel Basin Using Ambient Noise Spectral Ratio Analysis", 99th annual meeting of the Pacific Division of the American Association for the Advancement of Science, Pomona, CA

Rivera, A.[##], and **J. Polet** (2018, June), "Geophysical Investigation of Conduits for Carbon Dioxide Emission at Horseshoe Lake, Mammoth Mountain, California", 99th annual meeting of the Pacific Division of the American Association for the Advancement of Science, Pomona, CA

Ng, R. [##] and **J. Polet** (2018, June), "Site Response Across The Los Angeles Basin From Ambient Noise Recorded By A High Density Array", 11th National Conference on Earthquake Engineering, Los Angeles, CA

De Silveira, C.[##], and **J. Polet** (2018, July), "An Investigation of the Seismic Site Response of the Area Surrounding the New Student Housing at Cal Poly Pomona Using Spectral Ratio Analysis", 4th Annual Creative Activities & Research Symposium, Pomona, CA

Clayton, R., Denolle, M., Olsen, K., Persaud, P. and **J. Polet** (2018, September), "Basin Amplification Seismic INvestigation: tracking the propagation of waves from the San Andreas Fault to Los Angeles", Southern California Earthquake Center Annual Meeting, Palm Springs, CA

Faherty, D.[##] Petrashek, S.R.[##], Contreras, R.[##], Pulver, N.W.[##] and **J. Polet** (2018, September), "Characterization of Faulting at the San Andreas Oasis in the Dos Palmas Preserve Using Ground-based Magnetics, VLF and DC Resistivity", Southern California Earthquake Center Annual Meeting, Palm Springs, CA

Sutkowski, C.[##] , Prado, O.[##], Hernandez, V.[##] and **J. Polet** (2018, September), "Preliminary Results of a Study to Identify Archaeological Artifacts from San Salvador in Colton, CA, Using Ground Penetrating Radar", Southern California Earthquake Center Annual Meeting, Palm Springs, CA

Tyagi, A.[##], Grenier, M.[##], Kreuziger, R.[##], Kays, J.[##] and **J. Polet** (2018, September), "Preliminary Site Response Results across the San Gabriel and San Bernardino Basins Utilizing the Ambient Noise Spectral Ratio Method", Southern California Earthquake Center Annual Meeting, Palm Springs, CA

Hernandez, V.[##], Prado, O.[##], Sutkowski, C.[##] and **J. Polet** (2018, November), "Imaging Archaeological Artifacts from San Salvador in Colton, CA, Buried During The Great Flood of 1862, Using Ground Penetrating Radar", Southern California Conference for Undergraduate Research, Pasadena City College, CA

Petrashek, S.R.[##], Faherty, D.[##], Contreras, R.[##], Pulver, N.W.[##] and **J. Polet** (2018, December), "Investigation of Structural Controls on Groundwater Flow Using Ground-based Magnetics, VLF, and DC Resistivity Near the San Andreas Oasis, CA", American Geophysical Union Fall Meeting, Washington DC

Sutkowski, C.[##] , Prado, O.[##], Hernandez, V.[##] and **J. Polet** (2018, December), "Locating Archaeological Artifacts from San Salvador in Colton, CA, Buried During the Great Flood of 1862 Using Ground Penetrating Radar, Electro-Magnetic Induction, and Magnetic Gradiometry", American Geophysical Union Fall Meeting, Washington DC

Thio, H.K. and **J. Polet** (2018, December), "Site-Specific Probabilistic Tsunami Hazard from Earthquakes and Landslides using Reciprocal Green's Functions", American Geophysical Union Fall Meeting, Washington DC

Tyagi, A.[##], Grenier, M.[##], Kreuziger, R.[##], Kays, J.[##] and **J. Polet** (2018, December), "Analysis of Site Response Across the San Gabriel and San Bernardino Basins from Linear Seismic Node Arrays Using the Ambient Noise Spectral Ratio Method", American Geophysical Union Fall Meeting, Washington DC

Brown (undergraduate advisee, presenter), RV, KS Craig (graduate advisee), and **SG Osborn**, 2018. Porter Ranch Soil Gas Investigation in Relation to Aliso Canyon Gas Leak, GSA Cordilleran Section Annual Meeting, Flagstaff, AZ.

Sherwood, O., Stanish, L., Lackey, G., **Osborn, S.G**., and Ryan, J.N., 2018. The Microbiology of Groundwaters Across a Methane Concentration Gradient in the Denver-Julesburg Basin, Colorado, American Geophysical Union, Fall Meetings.

Dykstra, M.R.(G), **Van Buer, N.J**., and Nourse, J.A., Whole-rock geochemistry and U-Pb zircon analysis of Oligocene intrusives in the eastern San Gabriel Mountains: 99th Annual Meeting of the Pacific Division of the American Association for the Advancement of Science, Pomona, CA, June, 2018.

Pimentel, A.(UG), Geology of the Jackrabbit Hill Quadrangle, Mojave Desert, California: 99th Annual Meeting of the Pacific Division of the American Association for the Advancement of Science, Pomona, CA, June, 2018.

Prizlow, A.N.(UG), and **Van Buer, N.J.,** Geochemical analysis of plutonic rocks in the northwestern Mojave Desert, California: 99th Annual Meeting of the Pacific Division of the American Association for the Advancement of Science, Pomona, CA, June, 2018.

Wieland, A.K.(UG), Vermillion, K.B.(UG), and **Van Buer, N.J.,** Geology of the Adobe Mountain Quadrangle, western Mojave Desert, CA: 99th Annual Meeting of the Pacific Division of the American Association for the Advancement of Science, Pomona, CA, June, 2018.

LeBeau, A.G.(UG), and **Van Buer, N.J**., Evidence of Late Cretaceous extensional detachment faulting in the north Big Maria Mountains, Riverside County, California: Southern California Academy of Sciences 111th Annual Meeting, Pomona, CA, May, 2018.

Vermillion, K.(UG), and **Van Buer, N.J**., The geochemical evolution of the central Mojave batholith: Southern California Academy of Sciences 111th Annual Meeting, Pomona, CA, May, 2018.

Dykstra, M.R.(G), **Van Buer, N.J.,** and Nourse, J.A., Whole-rock geochemistry, petrography, and preliminary U-Pb zircon analysis of Oligocene intrusives in the eastern San Gabriel Mountains: Geological Society of America Joint Rocky Mountain/Cordilleran Sections Annual Meeting, Flagstaff, AZ, May, 2018.

LeBeau, A.G.(UG), and **Van Buer, N.J**., Refinement of tectonostratigraphy of the northeast Big Maria Mountains, Riverside County, California: Geological Society of America Joint Rocky Mountain/Cordilleran Sections Annual Meeting, Flagstaff, AZ, May, 2018.

Shulaker, D.Z., Grove, M.J., **Van Buer, N.J.,** Howard, K.A., Barth, A.P., Jacobson, C.E., and Sharman, G.R., Source of Eocene sediment transported through the breached Mojave segment of the mid-Cretaceous California batholith: Constraints from coupled Pb isotopic and Ar-Ar age results from detrital K-feldspar: Geological Society of America Joint Rocky Mountain/Cordilleran Sections Annual Meeting, Flagstaff, AZ, May, 2018.

Strom, C.A.(G), Determining controls of rock glacier formation on Earth and Mars, Lunar and Planetary Science Conference, Houston, TX, March, 2018.

3. Grants, contracts, fellowships, etc. (submitted/applied for and awarded)

External Grants:

Marshall In Review: *Collaborative Research: Stress Transfer Across the Subduction Environment: Driving Permanent Strain and Hazards Inland of the Megathrust,* NSF Frontier Research in Earth Sciences (FRES) Program, $492,000

Marshall 2016-2020: *Collaborative Research: Controls on Along-Strike Variations in Locked and Creeping Megathrust Behavior at the Hikurangi Convergent Margin*, NSF Integrated Earth Systems (IES) Program, $378,000

Polet, J., & Denolle, M. (Harvard), Data Collection for Virtual Earthquakes on Cajon Pass, Southern California Earthquake Center, University of Southern California/National Science Foundation; Amount $7,000. Feb. 2018-Jan. 2019 (awarded)

Osborn, S.G., 2018: NSF-Integrated Earth Systems (Not funded, $295,459), Sources and Dynamics of Fluid Migration through Sedimentary Basins to the Critical Zone.

Intramural Grants:

Nourse: ***Ground-Based LiDAR System for Precise Surveying of Dynamic Landscapes:*** **$100,000** awarded by Cal Poly Pomona Lottery Fund; April 2018.

Nourse and Murray, 2018-2019: Special Projects for Improving the Classroom Experience (SPICE) Classroom Modernization program grant "Digital Point Counting Systems for Petrology Laboratory" – funded approved for $15,300, May 2018

4. Awards and honors

Faculty Awards:

Marshall, 2018: Ralph W. Ames Distinguished Research Award, Cal Poly Pomona University College of Science

Marshall 2018: Provost Teacher-Scholar Award, Cal Poly Pomona University

Nourse, Roumelis, and Marshall 2018: Golden Leaves Award, Cal Poly Pomona University Library

Nourse 2018: Provost Teacher-Scholar Award, Cal Poly Pomona University

Polet 2018: Provost Teacher-Scholar Award, Cal Poly Pomona University

Polet, J. (2018). Selected for full travel support for UNAVCO "Using Kinematic and Static GPS in Undergraduate Field Courses" Short Course at Idaho State University

Polet, J. (2018). 2018-19 Provost's Teacher-Scholar Award ($6000 supplies)

Van Buer: College of Science Distinguished Teaching Award finalist, 2018

Polet Student Awards:

Anisha Tyagi (G) PPOHA MENTORES Fellowship recipient (Winter 2018)
Kyle Macy (G) PPOHA MENTORES Fellowship recipient (Winter 2018)
Stacey Petrashek (G) PPOHA MENTORES Fellowship recipient (Winter 2018)

Karen Alvarez (G) PPOHA MENTORES Fellowship recipient (Winter 2018)

Stacey Petrashek (G), Raul Contreras (UG) and Nathan Pulver (UG) selected for funding ($8000) from the Learn Through Discovery program and recognized as President's Discovery Fellows (May 2018)

Chloe Sutkowski (G), Veronica Hernandez (UG) and Oscar Prado (UG) selected for funding ($8000) from the Learn Through Discovery program and recognized as President's Discovery Fellows (May 2018)

Katelyn Ruiz (UG) Henderson-Valles Scholarship Award recipient (May 2018)

Margaret Grenier (UG) Henderson-Valles Scholarship Award recipient (May 2018)

Rachel Kreuziger (UG) Henderson-Valles Scholarship Award recipient (May 2018)

Kyle Macy (G) Geophysical Field Assistance Award from Geological Sciences Department (May 2018)

Margaret Grenier (UG), American Association for the Advancement of Science, Pacific Division, Awards of Excellence, Earth Science section, 3rd place (June 2018)

Nicole Gage (UG), American Association for the Advancement of Science, Pacific Division, Awards of Excellence, Earth Science section, Honorable Mention (June 2018)

Nicole Gage (G), Pathways United States Geological Survey summer intern, National Earthquake Information Center, Golden, Colorado (summer, 2018)

Margaret Grenier (UG), Southern California Earthquake Center SURF summer intern, University of San Diego, CA (summer, 2018)

Anisha Tyagi (G), recipient of registration grant for the 2018 Annual meeting of the Society of Exploration Geophysicists

Margaret Grenier (UG), recipient of registration grant from Dr. Kristine Larson for the 2018 Fall American Geophysical Union meeting

Rachel Kreuziger (UG), recipient of registration grant from Dr. Kristine Larson for the 2018 Fall American Geophysical Union meeting

Raul Contreras (UG) awarded travel support through the ASI Administrative Fund (Fall 2018)

Maggie Grenier (UG) awarded travel support through the ASI Administrative Fund (Fall 2018)

Veronica Hernandez (UG) awarded travel support through the ASI Administrative Fund (Fall 2018)

Rachel Kreuziger (UG) awarded travel support through the ASI Administrative Fund (Fall 2018)

Stacey Petrashek (G) awarded travel support through the ASI Administrative Fund (Fall 2018)

Oscar Prado (UG) awarded travel support through the ASI Administrative Fund (Fall 2018)

Anisha Tyagi (G) awarded travel support through the ASI Administrative Fund (Fall 2018)

Margaret Grenier (UG) awarded OUR Conference Presentation Scholarship (November 2018)

Rachel Kreuziger (UG) awarded OUR Conference Presentation Scholarship (November 2018)

Stacey Petrashek (G) awarded OUR Conference Presentation Scholarship (November 2018)

Nathan Pulver (UG) awarded OUR Conference Presentation Scholarship (November 2018)

Anisha Tyagi (G) awarded OUR Conference Presentation Scholarship (November 2018)

Van Buer Student Awards:

Vanessa Peña (UG), Louis Stokes Alliance for Minority Participation (LSAMP) research fellowship

Michael Dykstra (GG), American Association for the Advancement of Science, Pacific Division, Awards of Excellence, Earth Science section, 2nd place (June 2018)

5. Scholarship with students – as co-authors, research assistants, mentees, etc.

Master's Theses:

McKinney, Emmons, (in progress), Fore arc neotectonics and coastal uplift, Cape Kidnappers, North Island, New Zealand, M.S. Thesis, Cal Poly Pomona University. **(Marshall Supervisor)**

White, Christopher J., (in progress), Uplifted Pleistocene Marine Terraces, Riversdale Beach to Flat Point, Southern Wairarapa Coast, North Island, New Zealand, M.S. Thesis, Cal Poly Pomona University. **(Marshall Supervisor)**

Segura, Silvia A., 2018, Place-based high school watershed education: A regenerative approach, M.S. Thesis Cal Poly Pomona, Lyle Center for Regenerative Studies, 114 p. **(Marshall Supervisor)**

Abdulla Al-kaabi (in progress) provenance of the Soledad Rojo Formation (**Murray supervisor**)

Brianna House (in progress) sedimentology & stratigraphy of the Soledad Rojo Formation (**Murray supervisor**)

Miranda, Danny, 2018, *Response of Streamflow and Spring Discharge to Precipitation Recharge Events in Icehouse Canyon Watershed, Eastern San Gabriel Mountains, California*, (defended May 2018)—**Nourse supervisor**

Drew Faherty: Geophysical Controls on Fault-Groundwater Interactions at San Andreas Oasis, Dos Palmas Preserve, (MSc thesis, Fall 2018), **(Polet Supervisor)**

Strom, C., 2018, Correlation between headwall steepness and rock glacier size on Earth and Mars [MS thesis] California State Polytechnic University, Pomona, 145 p. **(Van Buer Supervisor)**

Debbie Kunath (writing thesis, in progress): Investigation of Oil seeps in Towsley Canyon, CA **(Osborn supervisor)**

Kyle Wright (writing thesis, in progress): Investigation of high nitrate in Spring Discharge, San Gabriel Mountains, CA**(Osborn supervisor)**

Oscar Teller (research in progress): Investigation of Oil Seeps, Wiley Canyon, CA **(Osborn supervisor)**

Janet Arroyo (research in progress): Source of High Arsenic and Bromide, Dos Palmas Springs and Nature Preserve, CA **(Osborn supervisor)**

Alyssa Young (research in progress): Investigation of High Sulfate Water, Mt. Baldy Area, CA **(Osborn supervisor)**

Senior Theses:

Valenciano, Jessika, L., 2018, LiDAR Mapping of Earthquake Uplifted Paleo-shorelines: Glendhu Rocks to Flat Point, Southern Wairarapa Coast, North Island, New Zealand, B.S. Thesis, Cal Poly Pomona University. **(Marshall Supervisor)**

Kalie Kelly (in progress) geologic mapping in the Calico Mountains (**Murray supervisor**)

Young, Alyssa, 2018, *Investigation of Rainfall-Runoff Relations in Fern Canyon, San Dimas Experimental Forest*, senior thesis, Cal Poly Pomona, 17 pages plus appendices. **(Nourse supervisor)**

Murphy, Clark and Martin, Larry, 2018, *Observations on Proterozoic and Mesozoic Rocks Exposed by the Creek Wildfire in Limerock Canyon, Western San Gabriel Mountains*, senior thesis, Cal Poly Pomona, 15 pages plus appendices. **(Nourse supervisor)**

Colin, Homar, 2018, *Geology , Petrography, and structure of a Plutonic and Metamorphic Rock sequence in Lost and Decker Canyons, San Gabriel Mountains, CA*., senior project poster, Cal Poly Pomona. **(Nourse supervisor)**

Palmer, Jacob, 2018, *Analysis of folded Proterozoic Strata of the Type Palcerita Formation, Western San Gabriel Mountains, CA.*, senior project poster, Cal Poly Pomona. **(Nourse supervisor)**

Peter Flores (Winter 2018, completed thesis): Soil Gas survey of Porter Ranch, CA (east) **(Osborn supervisor)**

John Sturkie (Winter 2018, completed thesis): Soil Gas Survey of Porter Ranch, CA (West) **(Osborn supervisor)**

Joseph Flores (Spring 2018, completed thesis): Metals Content in Spring Discharge, Coachella, CA **(Osborn supervisor)**

Miscellaneous Student Supervision:

Karen Alvarez (G) "Vertical Aseismic Deformation Across the San Andreas Fault at Durmid Hill" **(Polet supervisor)**
Sam Badillo (UG) "Using Ground Penetrating Radar to Image the Portuguese Bend Landslide" **(Polet supervisor)**
Troy Carson (UG) "Applying Magnetic and VLF Electromagnetic Techniques To Image Groundwater Flow and Faults at San Andreas Oasis" **(Polet supervisor)**
Raul Contreras (UG) "Faults in the Dos Palmas Preserve and Their Interaction with Groundwater" **(Polet supervisor)**
Jason de Cristofaro (G) "The Hilton Creek Fault System near Lake Crowley" **(Polet supervisor)**
Manuel Del Rio (UG) "Resistivity and Magnetic Field Measurements for the Detection of Groundwater and Faults in the Northern Dos Palmas Preserve Area" **(Polet supervisor)**
Henry Echeverria (G) "Spatial and Temporal Relationships Between Inter- and Intra-plate Seismicity in the Central America Subduction Zone" **(Polet supervisor)**
Peter Flores (UG) "Resistivity and Magnetic Models of the Subsurface of the Bonanza Spring Area" **(Polet supervisor)**
Mary Gabito (UG) "Development of a Tsunami Magnitude Scale" **(Polet supervisor)**
Nicole Gage (G) "Analysis of Aftershock Patterns in Different Tectonic Environments" **(Polet supervisor)**
Jose Gomez (G) "Geometry of the San Andreas Fault System Near a Cluster of Seismicity Near the Salton Sea" **(Polet supervisor)**
Margaret Grenier (UG) "Analysis of Site Response Across the Western San Gabriel Basin Using Ambient Noise Spectral Ratio Measurements" **(Polet supervisor)**
Sam Gurley (G) "Analysis of Site Response Across the Eastern San Bernardino Basin Using Ambient Noise Spectral Ratio Measurements" **(Polet supervisor)**
Veronica Hernandez (UG) "Archeogeophysics of La Placita/Agua Mansa" **(Polet supervisor)**
Rachel Kreuziger (UG) "Analysis of Site Response Across the Eastern San Gabriel Basin Using Ambient Noise Spectral Ratio Measurements" **(Polet supervisor)**
Kyle Macy (G) "Earthquake Relocation in the Yorba Linda Area" **(Polet supervisor)**
Jose Martinez-Camacho (UG) "Testing the OpenHVSR-Processing Toolkit Algorithm on Seismic Waveform Data from the San Bernardino Basin" **(Polet supervisor)**
Jonathon Martinez (UG) "Geophysical Characterization of the Blackhawk Landslide" **(Polet supervisor)**
Steven Moody (G) "Geophysical Characterization of Portuguese Bend landslide" **(Polet supervisor)**
Lonny Padilla (UG) "Creep Measurements Across the San Andreas Fault at Hidden Lake" **(Polet supervisor)**
Stacey Petrashek (G) "Faults in the Dos Palmas Preserve and Their Interaction with Groundwater" **(Polet supervisor)**
Jennifer Pfau (UG) "Ambient Noise Spectral Ratio Analysis of the Portuguese Bend landslide" **(Polet supervisor)**
Oscar Prado (UG) "Archeogeophysics of La Placita/Agua Mansa" **(Polet supervisor)**
Nathan Pulver (UG) "Faults in the Dos Palmas Preserve and Their Interaction with Groundwater" **(Polet supervisor)**
Alex Razo (UG) "Geophysical Characterization of the Blackhawk Landslide" **(Polet supervisor)**
Ashley Rivera (UG) "Geophysical Imaging of Shallow Conduits for Carbon Dioxide Emission at Horseshoe Lake, Mammoth Mountain, California" **(Polet supervisor)**
Ashley Rivera (G) "Geophysical Characterization of the Blackhawk Landslide" **(Polet supervisor)**
Katelyn Ruiz (UG) "Surface Measurements of Creep Along the Southern San Andreas Fault at Durmid Hill" **(Polet supervisor)**
Muhammad Salim (UG) "Comparison of Ambient Noise Analysis of Nodal Seismometer Data from the San Gabriel Basin with Broadband Data From Identical Sites" **(Polet supervisor)**
Caleb de Silveira (UG) "Resonance Frequency of the Building Site of the New Student Dorms on CPP Campus" **(Polet supervisor)**
Chloe Sutkowski (G) "Archeogeophysics of La Placita/Agua Mansa" **(Polet supervisor)**
Anisha Tyagi (G) "Analysis of Site Response Across the San Gabriel and San Bernardino Basins Using Ambient Noise Spectral Ratio Measurements" **(Polet supervisor)**
Vanessa Peña (UG). 2018-present. Geochemical mapping of the southern part of the Jackrabbit Hill Quadrangle **(Van Buer supervisor)**

Blachly, Greg (G). 2018-present. Geologic mapping, geochronology, and geochemistry of the Ludlow Batholith. **(Van Buer supervisor)**
Ferguson, Brandon (UG). 2018-present. XRF analysis of Martian soil analogue samples **(Van Buer supervisor)**

Rucker, Benjamin (UG). 2018-present. Mapping and XRF analysis of Bristol Mountains calcite-siderite-ankerite deposit**(Van Buer supervisor)**

Dykstra, Michael (G), 2017-present. Geochemistry and geochronology of Oligocene intrusives, eastern San Gabriels. **(Van Buer supervisor)**

Soto, Paula (G). 2015-present. Petrological study of western Mojave Cretaceous supervolcano-related granitoids. **(Van Buer supervisor)**

Davis, Mathew (UG)*. 2017-2019. Remote sensing and geochemistry of hydrothermal pluton aureoles

Strom, Caleb (G)*. 2017-2019. Correlation between headwall steepness and rock glacier size on Earth and Mars. **(Van Buer supervisor)**

Jacqueline Zùñiga (UG)*. 2017-2019. Chemical analysis of unknown mineral specimens using X-ray fluorescence **(Van Buer supervisor)**

Pimentel, Arnold (UG). 2017-2018. Geologic mapping of the southern part of the Jackrabbit Hill Quadrangle **(Van Buer supervisor)**

Valenciano, Jessika (UG)*. 2017-2018, Reconnaissance geochemical analysis of the southern Sierra Nevada**(Van Buer supervisor)**

Vermillion, Karissa (UG)*. 2017-2018. Using geochemical techniques to visualize the paleogeography of the Mojave Desert**(Van Buer supervisor)**

Wieland, Andrew (UG)*, 2017-2018, Geology of the Adobe Mountain Quadrangle, Western Mojave Desert, California. **(Van Buer supervisor)**

LeBeau, Anthony (UG)*. 2016-2018. Reinterpretation of Faulting and Folding in the Big Maria Mountains, Riverside County, California. **(Van Buer supervisor)**

Prizlow, Allison (UG)*. 2016-2018. Geochemical analysis of Cretaceous plutonic rocks from the northwestern Mojave Desert batholith **(Van Buer supervisor)**

*indicates completed thesis

6. Service to profession – serving as an editorial board member, an officer of a professional organization, etc.

Marshall, 2018 Invited Participant and Presenter: *NSF Coastlines & People (CoPe) Scoping Workshop,* San Diego, California

Marshall, 2018 Invited Participant: *NSF Integrated Earth Systems Program, SHIRE Project Meeting (Seismogenesis at Hikurangi Integrated Research Experiment*, Institute for Geophysics, University of Texas, Austin

Marshall 2004-present Council on Undergraduate Research (CUR)Geosciences Councilor (6 elected terms)

Marshall 2018: Chair, *GSA Cordilleran Section Meeting Undergraduate Research Poster Session*: Flagstaff, AZ

Murray, Reviewer: *Geosphere* manuscript #GS2010 "Sedimentary characteristics and morphology evolution of a coarse-grained fan-delta system: Roles of tectonic and climate" by Jia & Ji, July 2018

Murray, Reviewer: *Geosphere* manuscript #GS1628 "Tectonic significance of the Vincent Gap region of the eastern San Gabriel Mountains, southern California, U.S.A." by Coffey et al., January 2018

Nourse, Reviewer: Revista Mexicana de Ciencias Geológicas, Jacobson et al. Manuscript, "Age of the Altar Schist and latest Cretaceous–Miocene deformation in the Caborca–Altar region of northwestern Sonora" July 2018

Polet: Seismological Society of America Communications Committee (member)

Polet: Global Tsunami Model Working Group (member)

Polet: Powell Center Working Group for Global Earthquake Monitoring (member)

Polet: Primary representative for Voting Member Cal Poly Pomona in Incorporated Research Institutions for Seismology Consortium

Polet: Institutional representative for Participating Institution Cal Poly Pomona in Southern California Earthquake Center

Polet: Institutional representative for Cal Poly Pomona in Western North America InSAR (WInSAR) Consortium

Polet: Institutional representative for Cal Poly Pomona in UNAVCO

Van Buer: United States Geological Survey EDMAP Proposal Review Panel member, January 2018

Van Buer: Reviewed a manuscript for Geosciences, October 2018

III. Faculty Retention, and Diversification and Expansion of Applicant Pools for Tenure-Track Faculty Positions

Instructions to Department Reflect on faculty retention strategies implemented by your department:

- What retention strategies has the department implemented towards retaining faculty?
- What has worked well?
- What changes or new retention strategies would the department propose for implementation in the next academic year?

The Geology Department does not have a faculty retention problem. The only tenure-track faculty member we have ever lost was Dr. Brook Riley, who left in 2005 for personal/family reasons. Reasons for our good retention rate are speculative, but fostering an inclusive, supportive work environment is important. One factor may be that three years ago the Geology Department began holding a faculty retreat during summer term. All faculty members participate in determination of teaching assignments and schedule course scheduling, and frank discussions on many items pertinent to strategic growth of the Department. Another factor is our long-term group endeavor to develop and sustain the Geology MS program. We hold frequent constructive faculty meetings and also discuss specific issues pertaining to student success during many meetings related to graduate thesis proposal and defenses.

If your department had a faculty search in 2018-2019, describe the efforts conducted by the department towards the goal of increasing the number of women and under-represented minorities in applicant pools. Reflect on the recruitment strategies used:

- What new recruitment strategies were used?
- What worked well?
- What changes or new recruitment strategies would the department propose toward supporting the goal stated above in future faculty searches and what resources would be needed?

N/A; Geology Department had no faculty searches during 2018-19

IV. Building Organizational Effectiveness, Efficiency, and Capacity for Growth

Instructions to Department Departments should detail their approaches and strategies related to the items below:

1. Aligning the class schedule with student needs and demands

Two new fully online GE Area B1 courses (GSC 1200 Introduction to Oceanography and GSC 1160 Introduction to Astronomy) were implemented. These courses have become quite popular but at the expense of enrollments in our face-to-face B1 courses. Hybrid versions of GSC 1110 Principles of Geology and GSC 350 Natural Disasters have also been developed for MWF sections of these classes, with Friday designate as the online day.

2. Reducing the number of high-demand, bottleneck courses

N/A; the Geology Department has no bottleneck courses to speak of.

3. Expanding pools of qualified temporary faculty who can teach General Education, lower-division, and upper-division courses

Our active part-time teaching pools is composed almost exclusively of lecturers with PhDs or special certifications needed for effective teaching of certain courses. Long-term Lecturer Ernie Roumelis is taking an increasing role teaching upper division classes such as GSC 4150 and Senior Thesis series (GSC 4610-4620). He is also the primary instructor for GSC 3210/L Engineering Geology, an important Service / GE synthesis course required of all Civil Engineering majors. Dr. Donald Prothero has been active in supervising several Geology MS theses in the area of Paleontology, and regularly teaches our upper division GSC 3310/L Paleontology course as well as three GE Area B5 synthesis courses. Last fall, Prothero and Dr. Alyssa Bell also successfully proposed new GE course: GSC 2700 Age of Dinosaurs.

Three lecturers are on 3-year contracts. Our part time pool has expanded to include three quarterly lecturers earning 1-year teaching entitlements, effective 2019-20. These contracts enhance the job security of our valued lecturers. We also maintain a pool of additional temporary instructors who are occasionally called upon to meet instructional needs at short notice.

4. Implementing classroom renovations and transformations to improve pedagogy and/or capacity

Two of our heavily-used classrooms (4A-634 and 4A608) were upgraded several years ago at Geology Department expense with Smart Boards and new AV equipment. These improvements have enhanced instructional efficiency and allowed faculty to experiment with new teaching pedagogies.

Our student computer laboratory (room 4A-626) was upgraded with new computers through an I&IT classroom improvement initiative. Likewise, our teaching laboratory in 8-239 was upgraded with a new projector, screen, computer, and document camera.

Limited laboratory and research space remains a serious issue, as is work space for our part-time instructors and GTAs. The Geology Department is bursting at the seams with its current space allocation that has not changed since 2000. This problem needs attention, given the new faculty search planned for 2019-20.

5. Implementing flexible class scheduling (e.g., early morning and evening classes; scheduling Monday through Friday and weekend classes)

We are experimenting with strategies have questionable impact. Early morning General Education classes that meet twice a week are fairly popular. Evening GE sections have lost enrollments. We have also noticed that Friday classes are not popular with GE students. These issues are not a problem for our Geology majors, who are expected to attend elective required core classes that meet regularly on Fridays and weekends. To facilitate student planning, a schedule of weekend field trip and laboratory meetings is posted months in advance.

6. Hybrid and online classes and/or programs

See Part 1 above

7. Professional development opportunities for faculty & staff to ensure high-quality delivery of the curriculum.

The Geology Department continues to support faculty travel and research endeavors and related student support activities through its Foundation accounts and state operating budget. These opportunities drive a thriving teacher-scholar program and result in fresh new ideas for modernizing the curriculum. The activities listed in Part II above attest to our success in this area.