

# Demian A. Nelson

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## **EDUCATION**

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- 2018 Ph.D. - Geological Sciences, UCSB, *4.0 GPA*  
Dissertation: *Investigating the secular geochemical & geodynamic evolution of accretionary orogens with zircon petrochronology: A case study from West Antarctica.*  
Advisor: Prof. John Cottle  
  
Support: NSF Graduate Research Fellowship (3yrs), UCSB Doctoral Scholar Fellowship (2yrs)
- 2018 Certificate in College & University Teaching, UCSB
- 2013 B.S. - Earth Sciences, UC San Diego, *Summa Cum Laude, 3.90 GPA*  
Thesis: *Platinum group element (PGE) mineralization in chromitite layers within mafic-ultramafic layered intrusions.*  
Advisor: Prof. James Day  
  
Support: McNair Post-baccalaureate Achievement Program
- 2010 A.A. - Cuesta College, San Luis Obispo, *High Honors 3.95 GPA*

## **PROFESSIONAL EXPERIENCE**

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- 2018–*present* Postdoctoral Researcher, Department of Earth Science, UCSB  
PI: Prof. John Cottle
- 2018–*present* Part-time Instructor, Cuesta College, San Luis Obispo, CA
- 2018–*present* Part-time Instructor, Santa Barbara City College, Santa Barbara, CA
- 2013-2018 Graduate Researcher, Teaching Assistant and Associate  
Department of Earth Science, UCSB
- 2018 NSF GRIP Intern, USGS, Volcano Science Center, Menlo Park, CA  
Host: Dr. Jake Lowenstern
- 2012-2013 Undergraduate Research Assistant, Scripps Isotope Geochemistry Laboratory, UCSD  
PI: Prof. James Day

## **TEACHING EXPERIENCE**

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### *Pedagogy*

- Certificate in Distance Education, Cuesta College (Fall, 2018)  
Certificate in College and University Teaching, UCSB (June 2018)  
Summer Teaching Institute for Associates, UCSB (Summer 2017)

### *Instructor*

#### Cuesta College, 2018 – present

- Geology of California
- Environmental Geology
- Geological Field Studies (Yosemite/Eastern Sierra/Death Valley)

#### Santa Barbara City College, 2018 – present

- Physical Geology (*Lab*)

#### UCSB, 2017

- Antarctica – The Last Place on Earth: themed intro to physical geology & oceanography.

### *Assistant*

#### UCSB, 2013 – 2018

- Mountains, Boots, and Backpacks (field course: Yosemite/Eastern Sierra)
- Antarctica – The Last Place on Earth
- Geological Catastrophes
- Summer Field Mapping (field course: Santa Cruz Island)
- Senior Honors Thesis
- Independent Studies

## **RESEARCH INTERESTS/EXPERIENCE**

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### *Fields*

Igneous petrology, volcanology, geochronology, petrochronology, paleoclimate

### *Topics*

- Long-term tectonic, magmatic, and geochemical evolution of continental arcs
- Detailed field- and laboratory-based volcanology investigations of magma degassing
- Secondary hydration of volcanic glass by environmental water as a paleoclimate proxy

### *Methodology*

My scientific approach combines detailed fieldwork and petrography with state-of-the-art high-precision geochronology and geochemistry. I utilize both *in situ* and single crystal solution zircon U-Pb radiometric dating using a laser ablation-inductively coupled plasma-mass spectrometer (LA-ICP-MS) and a thermal ionization mass spectrometer (TIMS). My geochemical approach relies on bulk rock and *in situ* mineral analyses of major and trace elements, stable and radiometric isotopes, and water content and speciation. This work can be accomplished with a variety of analytical techniques, including: X-ray fluorescence (XRF), scanning electron microscopy (SEM), electron probe microanalysis (EPMA), LA-ICP-MS, fourier transform infrared spectroscopy (FTIR), secondary ion mass spectrometry (SIMS), et al.

Analytical needs are met by working with collaborators. In particular, my collaboration with Prof. Cottle at UCSB provides access to mineral separation and sample preparation laboratories, SEM, EPMA, LA-ICP-MS, XRF. Ongoing collaboration with Dr. Lowenstern at the USGS and Prof. Bindeman at OSU provides access to FTIR and several analytical devices to measure stable isotopes.

## **AWARDS**

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2018 **Schmidt Science Fellows Award UCSB Nominee** (*Competition Ongoing*)  
2017 NSF Graduate Research Internship Program Award (\$13,000)  
2016 GSA 35<sup>th</sup> IGC travel grant (\$3000)  
2016 Goldschmidt Conference NASA travel grant (\$600)  
2016 Global Field Travel Fund, UCSB departmental travel grant (\$1800)  
2015 Fugro Field Award, Fugro Company (\$1500)  
2015 GSA Mineralogy, Geochemistry, Petrology, and Volcanology Award (\$2000)  
2015 Exxon Mobil/Geological Society of America Student Research Grant (\$7500)  
2014 Antarctic Science Bursary Award (\$8000)  
2014 Earth Research Institute Fellowship (\$2000)  
2014 Graduate Opportunity Award, UCSB departmental research grant (\$4000)  
2014 Global Field Travel Fund, UCSB departmental travel grant (\$1800)  
2013 **NSF Graduate Research Fellowship** (\$32k/year x3)  
2013 UCSB Doctoral Scholar Fellowship (\$24k/year x2)  
2013 Outstanding Undergraduate of the Year, Scripps Institution of Oceanography  
2012 Student Research Grant, Society of Economic Geologists - SEG (\$2500)  
2012 Student Field Trip Grant Cu-Porphyry Systems of Peru, SEG (\$2000)  
2012 **McNair Post-baccalaureate Achievement Program**, UCSD (\$5000)  
2012 Darcy and Robert Bingham Scholarship, UCSD (\$2000)  
2010-2013 Provost Honors, UCSD  
2010 Warren Hansen Scholar Athlete of the Year, Cuesta Community College

## **FIELDWORK**

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(*Ongoing*) Coast Ranges, California, sample collection of Coast Range Volcanics  
2016 Central Transantarctic Mountains, Antarctica, NSF Award: #1443296  
2016 Orange River, South Africa, field reconnaissance  
2016 Rebun Island, Japan, sample collection of the Momo-Iwa Cryptodome  
2015 Dry Valleys, Antarctica, NSF Award: #1443296  
2014 Central Andes, Chile, field assistant mapping volcanic deposits  
2014 Advanced Field Methods, UCSB, Iron Mountain, CA, Instructor: Phil Gans  
2014 Iceland summer field course, University of Iceland  
2014 6-week summer field course: New Mexico and North Lake Tahoe  
2012 Isle of Rum, Scotland, sample collection of the Eastern Layered Intrusion  
2012 Stillwater, Montana, sample collection of the Stillwater Igneous Complex  
2012 SEG Student Dedicated Field Course, Cu-Porphyry systems of Southern Peru

## **JOURNAL PUBLICATIONS**

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Nelson, D. A., & Cottle, J. M. (in press). Tracking voluminous Permian volcanism of the Choiyoi Province into central Antarctica. *Lithosphere*.

Nelson, D. A., & Cottle, J. M. (2018). The secular evolution of accretionary orogens: linking the Gondwana arc record of West Antarctica, Australia, and South America. *Gondwana Research*. doi.org/10.1016/j.gr.2018.06.002

Nelson, D. A., & Cottle, J. M. (2017). Long-term geochemical and geodynamic segmentation of the paleo-Pacific margin of Gondwana: Insight from the Antarctic and adjacent sectors. *Tectonics*, 36. doi.org/10.1002/2017TC004611

### **CONFERENCE ABSTRACTS**

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Nicole, F., Kimbrough, D., Behl, R., and Nelson, D. A. (2017). Laser ablation ICP-MS zircon U-Pb dating of Monterey Formation tuff in the Los Angeles and Santa Barbara basins. *Geological Society of America Abstracts with Programs* (Vol. 49, No. 6).

Browne, N., Cottle, J., and Nelson, D. A. (2017). Petrogenesis of late-stage, high-K magmas within a continental arc: an example from the Ross Orogen, Antarctica. *Geological Society of America Abstracts with Programs* (Vol. 49, No. 6).

Nelson, D. A., and Cottle, J. M. (2016). Formation of layering in a hypabyssal intrusion by shear-induced fracture, exsolution, and rapid devitrification. *Goldschmidt Abstracts* (2262).

Nelson, D.A., and Cottle, J.M. (2016). Origin of the Hanson Formation, Antarctica—unlocking the pre-breakup history of the paleo-Pacific margin of Gondwana. *35<sup>th</sup> IGC*, Cape Town, South Africa.

Nelson, D.A., and Cottle, J.M. (2015). Petrogenesis of the Butcher Ridge Igneous Complex, a unique layered glassy silicic intrusion within the Ferrar Large Igneous Complex, Antarctica. *XII International Symposium on Antarctic Earth Science*, Goa, India.

Nelson, D. A., Cottle, J. M., Barboni, M., & Schoene, B. (2014). Petrologic significance of silicic magmatism in the Ferrar Large Igneous Province: geochemistry and geochronology of the Butcher Ridge Igneous Complex, Antarctica. In *AGU Fall Meeting Abstracts* (Vol. 1, p. 4831).

### **INVITED TALKS**

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December 2018. The life cycle of a continental arc preserved in the Transantarctic Mountains, Antarctica. Special panel on Antarctica. AGU Fall Meeting

February 2018. Evolution of the paleo-Pacific margin of Gondwana in the Antarctic sector. Lithosphere Dynamics Lecture Series, University of Southern California

October 2017. The Metamorphic and Magmatic History of the Ross Orogen in Southern Victoria Land, Antarctica. 3rd Interdisciplinary Antarctic Earth Sciences meeting, Washington

December 2016. The Metamorphic and Magmatic History of the Ross Orogen in Southern Victoria Land, Antarctica. McMurdo Station Science Lecture Series

### **PROFESSIONAL SERVICE/MEMBERSHIP**

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#### *Reviewer*

Geological Society of America, *Lithosphere*  
Geological Society of America, *Geosphere*

#### *Member*

Geological Society of America ♦ Geochemical Society ♦ American Geophysical Union