

## Cody J. Steven

### Education

B.S. Geology, University of Idaho, Moscow, ID May 2014  
Ph.D. Geology, University of Idaho August 2020

### Employment History

Work Study student  
Idaho Geological Survey, University of Idaho 2010 – 2013  
Research Assistant  
Department of Geological Sciences, University of Idaho 2012 – 2014  
Research Assistant  
Idaho Geological Survey, University of Idaho 2013 – 2014  
Teaching Assistant  
University of British Columbia 2014 – 2015  
Teaching Assistant  
University of Idaho 2016 – 2018  
Research Assistant  
University of Idaho 2018 – 2020  
Postdoctoral Researcher  
Planetary Science Institute 2020 – present

### Research Interests

Mineralogy, optical mineralogy, transmission electron microscopy, X-ray crystallography.

### Teaching Experience

University of British Columbia

**Teaching Assistant:** Introduction to Gems and Minerals (Fall 2014), Field Techniques (Spring 2015), Geomorphology (Fall 2015), Petrology (Fall 2015)

University of Idaho

**Teaching Assistant:** Geology 101 (Spring 2016), Petrology (Fall 2016, 2017), Mineralogy (Spring 2017, 2018), Field Geology 2 (Summer 2016, 2017, 2018,

2019)

## Skills

- **Powder XRD (Siemens/Bruker D5000)**
  - Sample preparation and running scan routines for powder XRD
  - Familiarity with the MDI-Jade software suite for diffraction pattern indexing along with whole-pattern fitting and refinement
  - Experience with maintenance of powder diffractometers
- **Single Crystal XRD (Siemens/Bruker SMART XRD)**
  - Single crystal X-ray diffraction and crystal structure determination
  - Experience with maintenance of a single crystal XRD
- **Polarized Light Microscopy**
  - Optical characterization of minerals using spindle stage and universal stage methods
  - Petrographic analysis of rocks and preparation of petrographic polished thin sections
  - Familiarity with dispersion staining methods
- **Scanning Electron Microscopy (Zeiss Leo FE)**
  - Experience with sample preparation methods for SEM, including carbon coating and polished epoxy mounts
  - Experience with EDS acquisition and interpretation
  - Familiarity with EBSD
- **Transmission Electron Microscopy (JEOL JEM 2010)**
  - Experience with sample preparation methods, including grain mounts, and in situ sample mounts with argon ion milling
  - Experience with selected area and convergent beam electron diffraction
  - Experience with high resolution transmission electron microscopy and image simulation
  - Experience with maintenance of TEM's and argon ion mills.
- **Field Geology**
  - Experience with geologic mapping and sampling methods

## Current projects

### Optical and Crystallographic Calculations for Orienting Anisotropic Minerals

- Created a spreadsheet that calculates the optical orientation and crystallographic orientation of minerals using extinction data on a spindle stage or universal stage.
- Developed spreadsheets containing supplementary calculations for determination of mineral refractive indices using the double variation method

- Integrated methods for optical and crystallographic orientation solution to characterize minerals
- Corrected a discrepancy in reference text between the crystallographic setting and principle optical vectors of clinoamphiboles

Oriented XANES and structural refinement of pyroxenes.

- Developed an empirical model for analyzing ferric-ferrous ratio in pyroxenes
- Modeled polarization effects of anisotropic single crystals in XANES
- Solved and refined crystal structures of pyroxenes with SC-XRD

Structural variation in antigorite from western Idaho.

- Characterized and indexed polysomatic variation in antigorite structures using HRTEM and SAED
- Evaluated structural differences in different generations of antigorite
- Constructed a crystallographic model for two-layer antigorite in 3+1D

Nanotextures of ultramafic mineral assemblages from western Idaho.

- Characterized asbestiform mineral types and textures from western Idaho
- Tabulated mineral defects that are associated asbestiform minerals

## **Publications**

**Steven, C.J.**, and Gunter, M.E. (2020). EXCALIBR to EXCELIBR and the optical orientation of minerals: Correcting the optical orientation of clinoamphiboles. *American Mineralogist: Journal of Earth and Planetary Materials*, 105(6), 955-962.

**Steven, C.J.**, and Gunter M.E. (2017). EXCELIBR: An Excel Spreadsheet for Solving the Optical Orientation of Uniaxial and Biaxial Crystals. *The Microscope* 65 (4), 147-152.

Schmidt, K.L., Gray, K.D., Lewis, R.S., **Steven, C.J.**, and Isakson, V.H. (2016). Mesozoic tectonics west of the accretionary boundary in west-central Idaho: A road log along US Highway 95 between Moscow and New Meadows, Idaho. *Exploring the geology of the inland northwest: Geological Society of America Field Guide*, 41, 175-209.

## **Awards**

Alumni Achievement Award, Geology, University of Idaho 2014, 2018

Outstanding Graduate in Geology, University of Idaho 2019

### **Conference Abstracts**

**Steven, C. J.** (2013, October). Petrogenesis and Field Relations of a Serpentinite Body Near Riggins, Idaho. In 2013 GSA Annual Meeting in Denver.

**Steven, C. J.**, and Lewis, R.S. (2016, May). Island-Arc Serpentinite in West-Central Idaho, Analog for Modern-Day Marianas Serpentinite? In 2016 Rocky Mountain Section Meeting in Moscow.

**Steven, C.J.** and Gunter, M.E. (2017). EXCELIBR: An Excel Spreadsheet for Solving the Optical Orientation of Uniaxial and Biaxial Crystals. Inter/Micro 2017. McCrone Research Institute.

**Steven, C.J.** and Gunter, M.E. (2017). An Excel Spreadsheet for Solving the Optical Orientation of Uniaxial and Biaxial Crystals. In 2017 GSA Annual Meeting in Seattle.

**Steven, Cody J.**, Dyar, M. Darby, McCanta, Molly C. (2018). Determination of Ferric-Ferrous Ratio in Pyroxenes with X-ray Absorption Spectroscopy. In 2018 GSA Annual Meeting in Indianapolis.

**Steven, Cody J.** (2019). Textural Variation in Ultramafic Mineral Assemblages from Western Idaho. In 2019 GSA Annual Meeting in Phoenix.

### **Professional Affiliations**

Mineralogical Society of America member  
Geological Society of America member