

Seth Caley Kruckenberg

Curriculum Vitae

Associate Professor - Boston College
Department of Earth & Environmental Sciences

140 Commonwealth Avenue
Chestnut Hill, Massachusetts 02467 USA
Phone: (617) 552-3647, Fax: (617) 552-2462
Email: seth.kruckenberg@bc.edu

Education

Ph.D. Geology, University of Minnesota – Twin Cities (2009)

B.S. Geology (Honors Program), University of Wyoming (2000)

B.S. Environmental Geology / Geohydrology, University of Wyoming (2000)

Professional Appointments

Associate Professor, Boston College

Department of Earth and Environmental Sciences (2018–present)

Assistant Professor, Boston College

Department of Earth and Environmental Sciences (2012–2018)

Visiting Instructor, University of Wisconsin – Milwaukee

Department of Geosciences (2012)

Postdoctoral Research Associate, University of Wisconsin – Madison

Department of Geoscience (2011–2012)

National Science Foundation Postdoctoral Research Fellow, University of Wisconsin – Madison

Department of Geoscience (2009–2011)

Research Interests

My research aims to understand the grain- to orogen-scale processes that give rise to dynamic strain localization, with an emphasis on feedbacks between deformation and partial melting in the mid-crust through upper mantle. As a quantitative, field-based geologist I integrate structural analysis with a variety of analytical methods - particularly electron backscatter diffraction (EBSD) analysis - to investigate how intrinsic rock properties (e.g., composition, melt fraction, grain size, crystallographic texture) and extrinsic conditions (e.g., pressure-temperature conditions) affect the rheology and deformation history of the lithosphere.

Funded Research Support (*all dollar amounts shown are funds coming to SCK at his home institution*)

- Boston College Research Incentive Grant (RIG): *Investigating the tempo and timescales of deformation processes along a paleo-tectonic margin in eastern Massachusetts*. PI: Kruckenberg, awarded \$15,000 (May 2019 – May 2020)
- National Science Foundation, EAR-Tectonics: *Field and microstructural investigation of strain localization processes, texture development, and the rheology of naturally deformed lower crust (NSF EAR-1808117)*, PI: Kruckenberg, awarded \$312,566 (June 2018 – May 2021)
- National Science Foundation, Antarctic Earth Sciences: *Integrated evaluation of mantle xenoliths from the Fosdick Mountains, Antarctica (NSF OPP-1246320)*, PI: Kruckenberg, awarded \$219,645 (Jan 2013 – Dec 2015)
- National Science Foundation, EAR-Tectonics: *Collaborative Research: Effects of structural and compositional heterogeneity on upper mantle deformation and rheology (NSF EAR-1050041)*, PI: Tikoff; Co-PIs: Kruckenberg, Newman, Lamb, awarded \$255,222 (Mar 2011 – Feb 2015)
- National Science Foundation, Division of Earth Sciences Postdoctoral Fellowship: *Evaluating Strain localization, melt localization, and mantle rheology in Twin Sisters Ultramafic Body, Washington: A multi-scale approach (EAR-PF 0816245)*, PI: Kruckenberg, awarded \$160,000 (Jun 2009 – May 2011)
- Geological Society of America, Graduate Student Research Grant: *Partial melting, crustal flow and the interaction with upper crustal extensional processes*, PI: Kruckenberg, awarded \$3400 (Jun 2004)

Invited Lectures

- University of Tennessee, Knoxville, Department of Earth and Planetary Sciences, Mar 2020 (*upcoming*)
- Geological Society of America Fall Meeting, “New perspectives on integrating fault zone behavior through the full thickness of the continental lithosphere” (Topical Session), Sep 2019
- University of Maine, School of Earth and Climate Sciences, Feb 2018
- Microanalysis Society Electron Backscatter Diffraction 2016 Conference (Keynote Speaker), University of Alabama, May 2016

- Massachusetts Institute of Technology, Department of Earth, Atmospheric & Planetary Sciences, Apr 2016
- University of Vermont, Department of Geology, Nov 2015
- Geological Society of America Fall Meeting, “A lower crustal perspective on magmatic arc processes” (Topical Session), Nov 2015
- University of Massachusetts – Amherst, Department of Geosciences, Feb 2013
- American Geophysical Union Fall Meeting, “Melt extraction through the lithosphere: Interactions among melt evolution, deformation, and migration II” (Topical Session), Dec 2012
- Brown University, Geological Sciences, Sept 2012
- University of Wisconsin-Milwaukee, Department of Geosciences, Mar 2012
- Southern Methodist University, Department of Earth Sciences, Feb 2012
- Colorado School of Mines, Department of Geology and Geological Engineering, Feb 2011
- Southern Illinois University at Carbondale, Department of Geology, Feb 2010
- University of Wisconsin-Milwaukee, Department of Geosciences, Nov 2009
- Carleton College, Department of Geology, Jan 2007

Awards and Honors

Professional:

- Most-Read GSA Journal Article in Jan 2019: “*From intracrystalline distortion to plate motion: unifying structural, kinematic, and textural analysis in heterogeneous shear zones through crystallographic orientation-dispersion methods*” by Kruckenberg et al., published in the Journal *Geosphere*
- Exceptional Reviewer for the Journal *Lithosphere*, 2012

Postdoctoral:

- Postdoctoral Research Fellowship, National Science Foundation (EAR-PF 0816245), 2009

Graduate:

- University of Minnesota Graduate School Fellowship, Univ. Minnesota, 2002
- GAANN (Graduate Assistance in Areas of National Needs) Fellowship, Univ. Minnesota, 2003
- Dennis Fellowship, Dept. Geology & Geophysics, Univ. Minnesota, 2004
- Samuel Goldich Footstep Award, Dept. Geology & Geophysics, Univ. Minnesota, 2005
- William H. Emmons Fellowship, Dept. Geology & Geophysics, Univ. Minnesota, 2005
- Doctoral Dissertation Fellowship, Univ. Minnesota, 2007
- Outstanding Teaching Assistant Award, Dept. Geology & Geophysics, Univ. Minnesota, 2007

Undergraduate:

- Richardson Family Trust Scholarship, Univ. Wyoming, 1997-2000
- Wyoming Student Leader Scholarship, Univ. Wyoming, 1997-2000
- Outstanding Junior Student Award, Dept. Geology & Geophysics, Univ. Wyoming, 1998-99
- Schlumberger Collegiate Award, Dept. Geology & Geophysics, Univ. Wyoming, 1999
- Paul Stock Foundation Honors Program Scholarship, Univ. Wyoming, 2000
- S.H. Knight Science Camp Award, Dept. Geology & Geophysics, Univ. Wyoming, 2000.
- Wyoming Geological Association S.H. Knight Scholarship, Dept. Geology & Geophysics, Univ. Wyoming, 2000
- Michael H. Walsh Memorial Scholarship Fund, Dept. Geology & Geophysics, Univ. Wyoming, 2000
- E.I. Dupont-Conoco Geophysics Scholarship, Dept. Geology & Geophysics, Univ. Wyoming, 2001
- Phi Beta Kappa Honor Society, Alpha Association of Wyoming, inducted 2000
- Outstanding Undergraduate Award, Dept. Geology & Geophysics, Univ. Wyoming, 2001
- Top 20 outstanding graduates, College of Arts & Sciences, Univ. Wyoming, 2000-01

Teaching Experience

Associate Professor, Boston College:

- **Earth Materials** (EESC 2220), Spring 2019
- **Structural Geology** (EESC 3385), Fall 2018
- **Earth Systems Seminar** (EESC 6691), Fall 2018
- **Graduate Reading and Research in Geology** (EESC 7796), Spring 2019

Assistant Professor, Boston College:

- **Exploring the Earth** (EESC 1132), Fall 2012, Fall 2015, Fall 2016, Fall 2017
- **Earth Materials** (EESC 2220), Spring 2014, Spring 2015, Spring 2017
- **Introduction to Structural Geology** (EESC 2285; as of 2017: EESC 3385), Spring 2013, Fall 2014
- **Geological Field Mapping Methods** (EESC 2288), Spring 2014
- **Structural Geology** (EESC 3385; formerly EESC 2285), Spring 2017
- **Tectonics** (EESC 5543), Fall 2013, Fall 2015, Fall 2017
- **Advanced Structural Geology** (EESC 6685; formerly EESC 4485), Spring 2015, Spring 2018
- **Earth Systems Seminar** (EESC 6691), Fall 2012
- **Graduate Reading and Research in Geology** (EESC 7799), Spring 2018

Course Instructor / Ad hoc lecturer, University of Wisconsin-Milwaukee:

- **Structural Geology** (Geosci 414), Spring 2012

Course Instructor, University of Minnesota-Twin Cities:

- **Field Workshop: The Geology of Scotland** (Geol 3890), Spring-Summer 2007
- **Advanced Field Geology** (Geol 4911), Summer 2007

Teaching Assistant, University of Minnesota-Twin Cities:

- **Structural Geology**, 2006
- **Introductory Field Geology**, 2003
- **Igneous and Metamorphic Petrology**, 2007
- **Earth and Its Environments**, 2008

Teaching Assistant, University of Wyoming:

- **Geology Field Course**, 2001
- **Physical Geology**, 1999

Academic Mentoring and Advising at Boston College

Postdoctoral Researchers:

- Dr. Vasileios Chatzaras (Jan-Dec 2013)

Graduate (M.S.) Students Advised:

- Miranda Wiebe (Aug 2018-present)
- Lauren Shea (Aug 2017-July 2019)
- Martha Parsons (Sep 2013-May 2017)
- William Montz (Jan 2014-May 2016)
- Shaina Cohen (Sep 2013-May 2016)

M.S. Thesis Committees (Member):

- Anna Gerrits (2017), Thomas Farrell (2017), Hannah Chambless (2016), Eric Fisher (2015-2016), Jamie Kendall (2015-2016), Siyu Liu (2016), Oluwaseun Fadugba (2014), Stephen Hilfiker (2014), Caleb Lucy (2014), Tyler Cox (2013), Steven Fischer (2013), Vanessa Napoli (2013), Christopher Soeller (2013), Jacqueline Cinella (2012), Brendan Hildum (2012)

Undergraduate Research Theses Advised:

- Catherine Goldberg (2016), Brendan Hayward (2016), Kellie Corwin (2015)

Service Activities at Boston College

** Note: I am currently on leave for a one-year faculty sabbatical so my service duties will resume in July 2020.*

University:

- Core Facility Advisory Committee (Apr 2019 – June 2019)
- Faculty Grievance Committee (Jul 2018 – June 2019)

College of Arts and Sciences:

- Strategic Planning for the Natural Sciences Committee, Jan 2014 – Jul 2015
- Interdisciplinary Science for Society Sub-Committee: Curriculum Planning, Jan 2015 – Jul 2015

Department of Earth and Environmental Sciences:

** Note: I am currently on leave for a one-year faculty sabbatical so my service duties will resume in July 2020.*

- Assistant Chair, Aug 2017 – June 2019

- Graduate Studies Committee, Jun 2013 – Aug 2014; Jul 2016 – June 2019
- Shared Facilities Committee, Oct 2013 – June 2019
- Library Committee/Liaison, Sep 2013 – June 2019
- Geophysics Visiting Assistant Professor Search Committee, Mar 2017 – Aug 2017
- Graduate Program Development Subcommittee, Sep 2016 – Dec 2016
- Graduate Program Director, Aug 2014 – Jul 2015
- Petrology Faculty Search Committee, Jul 2013 – Sep 2014
- Graduate Studies Committee, Jun 2013 – Aug 2014
- Undergraduate Studies Committee, Sep 2012 – May 2013
- Sedimentary Processes Faculty Search Committee, Oct 2012 – Apr 2013

Professional Service and Synergistic Activities

Ph.D. Thesis Committees (External Reviewer):

- Thomas Czertowicz, University of Otago, New Zealand, 2016

Peer-Reviewer (Each journal or funding agency is listed only once for multiple reviews):

American Journal of Science, *Cambridge University Press* (pre-publication textbook review), *Contributions to Mineralogy and Petrology*, *Geological Society of America Bulletin*, *GSA Today*, *International Geology Review*, *Journal of Metamorphic Geology*, *Journal of Structural Geology*, *Lithosphere*, National Science Foundation (EAR Tectonics), National Science Foundation (Division of Polar Programs), *Precambrian Research*, *Tectonics*, *Tectonophysics*

Scientific Outreach and Mentoring:

- Geological Society of America Campus Representative, Boston College, Sept 2013 – present
- Participated in the RoBOT: Rocks Beneath Our Toes” High School Outreach Program with Prof. Ethan Baxter, Fall 2017
- Materials Research Society ‘Lunch and Learn’ presentation (sponsored by Tescan USA), entitled: *Electron Backscatter Diffraction Analysis: Principles and Considerations*, Dec 2013

Professional Community Committee Service

- Evaluating Data Standards and Vocabulary for Structural Geology, Microstructures, and Experimental Deformation, Pre-AGU NSF Sponsored Workshop, December 2018
- Geological Society of America Structural Geology and Tectonics Division Outstanding Publication Award Committee, Member: May 2016 – Oct 2017; Chair: Oct 2017 – April 2018
- STRABO Data System for Structural Geology and Tectonics subcommittee for migmatites and fabrics in plutons, Sep 2016-December 2017
- Subcommittee for Grand Challenge #2: Rheology of the lithosphere, for the “Future Directions in Tectonics” community White Paper, supported by NSF-EAR-1542001, Oct 2016 – Apr 2017

Sessions Chaired:

- “Challenges in Tectonics 2: Beyond Steady State: New Developments in Understanding Strain Localization Processes and the Rheology of the Lithosphere” (co-conveners Jamie Levine and Elena Miranda): *Geological Society of America* Fall Meeting (Seattle, WA), 2017
- “Deformation Processes: Microstructure, Rheology, and the Effects of Fluids III-V”, 1 oral and 2 poster sessions (co-conveners Lars Hansen, Haemyeong Jung, Veronique Le Roux, Katsuyoshi Michibayashi, Jessica Warren, and Junfeng Zhang): *American Geophysical Union* National Meeting (San Francisco, CA), 2013
- “Constraints on strain rates, stresses, and deformation processes during shear zone localization at different lithospheric levels” (co-conveners Julie Newman, David Kohlstedt, and Basil Tikoff): *Geological Society of America* Fall Meeting (Minneapolis, MN), 2011
- “Deformation of the lithosphere: field observations, experimental investigations and numerical studies” (co-conveners Patrice Rey and Eric Goergen): *Geological Society of America* Fall Meeting (Minneapolis, MN), 2011
- “Melt-present deformation in the lithosphere” (co-conveners Eric Ferré, Benoit Ildefonse, Roberto Weinberg and Aaron Yoshinobu): *American Geophysical Union* National Meeting (San Francisco, CA), 2010
- “Evaluating Channel Flow in Orogens” (co-conveners Rory McFadden and Christine Siddoway): *Geological Society of America* Fall Meeting (Portland, OR), 2009

Professional Development - Workshops and Symposia Attended:

- On the Cutting Edge – Professional Development for Geoscience Faculty Workshop: “Teaching Structural Geology, Geophysics, and Tectonics in the 21st Century”, University of Tennessee, Knoxville, 2012
- On the Cutting Edge – Professional Development for Geoscience Faculty Workshop: “Early Career Geoscience Faculty: Teaching, Research, and Managing Your Career”, College of William and Mary, Williamsburg, VA, 2012
- Penrose Conference: “Deformation Localization in Rocks: New Advances”, Cadaqués & Cap de Creus Peninsula, Catalonia, Spain, 2011
- “Advanced EBSD Workshop for Geoscientists”, Oxford Instruments, Concord, MA, 2010
- DELTA Program: “Creating a cooperative learning environment”, University of Wisconsin-Madison, 2009-2010
- Participant and co-organizer of field excursions and associated field guide for the 2007 Penrose Conference: “*Extending a Continent: Architecture, Rheological Coupling, and Heat Budget*”, the results of which were published in: Vanderhaeghe et al., 2007 (complete reference in peer-reviewed publications).
- Integrated Solid Earth Sciences (ISES) Summer School in Rheology, Colorado College, 2006

Other:

- Collaborated with Basil Tikoff (Univ. of Wisconsin), Maria Chang (Ph.D. candidate, Northwestern University), and other cognitive psychologists as part of the NSF-funded Spatial Intelligence & Learning Center (SILC) to develop tools and teaching modules for introductory geology courses using the program Cogsketch (2010-2011). Cogsketch is a software program capable of providing real-time tutoring to students based on features they identify on images and diagrams.
- Participated in nine weeks of Antarctic field research (2005-06) as part of NSF-OPP award 0338279 to C.S. Siddoway that had a principal focus on evaluating felsic melt influences on crustal rheology in the Fosdick Mountains.

Peer-Reviewed Publications

*denotes work conducted as Kruckenberg advised BC student or postdoc; †denotes SEM Facility user

Near submission:

- *†Shea, L. and **Kruckenberg, S.C.** Microstructural and textural analysis of naturally deformed granulites in the Mount Hay block of central Australia: implications for the rheology of polyphase lower crustal materials. To be submitted to *Earth and Planetary Science Letters* in Jan 2020.
- †Chatzaras, V. and **Kruckenberg, S.C.** Crystallographic preferred orientation and seismic anisotropy of the lithospheric mantle beneath Marie Byrd Land, Antarctica: Constraints from peridotite xenoliths. To be submitted (Jan 2020 deadline) to a special volume on the Antarctica mantle in the *Geological Society of London*.

Accepted:

- †Chatzaras, V., Tikoff, B., **Kruckenberg, S.C.**, Titus, S.J., Teyssier, C., and Drury, M.R. (*Accepted*) Stress variations in space and time within the mantle section of an oceanic transform zone: Effects of the seismic cycle. Submitted on Oct 29th, 2019 to *Geology*.

Published Manuscripts:

22. †Zhao, N., †Hirth, G., †Cooper, R.F., **Kruckenberg, S.C.**, and Cukjati, J. (2019) Low viscosity of mantle rocks linked to phase boundary sliding. *Earth and Planetary Science Letters*, 517, p. 83-94, doi: 10.1016/j.epsl.2019.04.019
21. Stewart, E., Newman, J., Tikoff, B., †Donnelly, S., †German, L., †Chatzaras, V., Lamb, W.M, Miller, B., and **Kruckenberg, S.C.** (2019) Coupled deformation and melt-migration events recording subduction initiation, Dun Mountain Ophiolite, New Zealand. *Geological Society, London, Memoirs January 2019*, 49 (1), p. 93-117, doi: 10.1144/M49.5.
20. **Kruckenberg, S.C.**, †Michels, Z.D. and *†Parsons, M. (2019) From intracrystalline distortion to plate motion: unifying structural, kinematic, and textural analysis in heterogeneous shear zones through crystallographic orientation-dispersion methods. *Geosphere*, special themed issue honoring Arthur W. Snoke: “Active Margins in Transition”; 15 (2), p. 357-381, doi: 10.1130/GES01585.1

19. †Xypolias, P., Gerogiannis, N., Chatzaras, V., Papapavlou, K., **Kruckenberg, S.C.**, Aravadinou, E., and Michels, Z. (2018) Using incremental elongation and shearing to unravel the kinematics of a complex transpressional zone. *Journal of Structural Geology*; doi: 10.1016/j.jsg.2018.07.004
18. Vanderhaeghe, O., **Kruckenberg, S.C.**, Gerbault, M., Martin, L., Duchêne, S., and Deloule, E. (2018) Crustal-scale convection and diapiric upwelling of a partially molten orogenic root (Naxos dome, Greece). *Tectonophysics*; doi: 10.1016/j.tecto.2018.03.007
17. Tikoff, B., Kahn, M.J., Gaschnig, R.M., Michels, Z.D., Davenport, K., Hole, J.A., Stanciu, C.A., Fayon, A.K., and **Kruckenberg, S.C.** (2017) Exploring the western Idaho shear zone using the StraboSpot data system, *in* Haugerud, R.A., and Kelsey, H.M., eds., From the Puget Lowland to East of the Cascade Range: Geologic Excursions in the Pacific Northwest: Geological Society of America Field Guide 49, p. 229-254, doi:10.1130/2017.0049(09)
16. *†Montz, W.J. and **Kruckenberg, S.C.** (2017) Cretaceous partial melting, deformation, and exhumation of the Potters Pond migmatite domain, west-central Idaho. *Lithosphere*; 9 (2): 205-222. doi: 10.1130/L555.1
15. Frost, C.D., McLaughlin, J.F., Frost, B.R., Fanning, C.M., Swapp, S.M., **Kruckenberg, S.C.**, and Gonzales, J. (2017) Hadean origins of Paleoproterozoic continental crust in the central Wyoming Province. *Geological Society of America Bulletin*; 129 (3-4):259-280. doi: 10.1130/B31555.1
14. *†Chatzaras, V., **Kruckenberg, S.C.**, *†Cohen, S., Medaris Jr., L.G., Withers, A.C., and Bagley, B. (2016) Axial-type olivine crystallographic preferred orientations: the effect of strain geometry on mantle texture. *Journal of Geophysical Research: Solid Earth*; 121 (7): 4895-4922. doi: 10.1002/2015JB012628
13. †Chin, E.J., †Soustelle, V., †Hirth, G., Saal, A., **Kruckenberg, S.C.**, and Eiler, J. (2016) Microstructural and geochemical constraints on the evolution of deep arc lithosphere. *Geochemistry, Geophysics, Geosystems*; 17 (7): 2497-2521. doi: 10.1002/2015GC006156
12. †Michels, Z.D., **Kruckenberg, S.C.**, Davis, J.R., and Tikoff, B. (2015) Determining vorticity axes from grain-scale dispersion of crystallographic orientations. *Geology*; 43 (9): 803-806. doi: 10.1130/G36868.1
11. Tikoff, B., Blenkinsop, T., **Kruckenberg, S.C.**, Morgan, S., Newman, J., and Wojtal, S. (2013) A perspective on the emergence of modern structural geology: Celebrating the feedbacks between historically based and process-based approaches. *In*: Bickford, M.E., ed., *The Web of Geological Sciences: Advances, Impacts, and Interactions*: Geological Society of America Special Paper no. 500, 65-119. doi: 10.1130/2013.2500(03)
10. **Kruckenberg, S.C.**, Tikoff, B., Toy, V.G., Newman, J., and Young, L. (2013) Strain localization associated with channelized melt migration in upper mantle lithosphere: insights from the Twin Sisters ultramafic complex, Washington, USA. *Journal of Structural Geology*; 50: 133-147. doi: 10.1016/j.jsg.2012.10.009
9. Rey, P.F., Teyssier, C., **Kruckenberg, S.C.**, and Whitney, D.L. (2012) Viscous collision in channel explains double domes in metamorphic core complexes: REPLY. *Geology*; 40(10): e280. doi: 10.1130/G33202Y.1
8. **Kruckenberg, S.C.**, Vanderhaeghe, O., Ferré, E.C., Teyssier, C., and Whitney, D.L. (2011) Flow of partially molten crust and the internal dynamics of a migmatite dome, Naxos, Greece. *Tectonics*; 30: TC3001. doi: 10.1029/2010TC002751
7. **Kruckenberg, S.C.** and Whitney, D.L. (2011) Metamorphic evolution of sapphirine- and orthoamphibole-cordierite-bearing gneiss, Okanogan dome, Washington, USA. *Journal of Metamorphic Geology*; 29 (4): 425-449. doi: 10.1111/j.1525-1314.2010.00926.x
6. Rey, P.F., Teyssier, C., **Kruckenberg, S.C.**, and Whitney, D.L. (2011) Viscous collision in channel explains double domes in metamorphic core complexes. *Geology*; 39(4): 387-390. doi: 10.1130/G31587.1
5. **Kruckenberg, S.C.**, Ferré, E.C., Teyssier, C., Vanderhaeghe, O., Whitney, D.L., Seaton, N.C.A., and Skord, J.A. (2010) Viscoplastic flow in migmatites deduced from fabric anisotropy: an example from the Naxos dome, Greece. *Journal of Geophysical Research - Solid Earth*; 115: B09401. doi: 10.1029/2009JB007012
4. **Kruckenberg, S.C.**, Whitney, D.L., Teyssier, C., Fanning, C.M., and Dunlap, W.J. (2008) Paleocene-Eocene migmatite crystallization, extension, and exhumation in the hinterland of the Northern Cordillera: Okanogan dome, Washington, USA. *Geological Society of America Bulletin*; 120: 912-929. doi: 10.1130/B26153.1
3. Whitney, D.L., Teyssier, C., **Kruckenberg, S.C.**, Morgan, V.L., and Iredale, L.J. (2008) High-pressure-low-temperature metamorphism of metasedimentary rocks, southern Menderes Massif, western Turkey. *Lithos*; 101: 218-232. doi: 10.1016/j.lithos.2007.07.001

2. McFadden, R., Siddoway, C.S., Teyssier, C., Fanning, C.M., and **Kruckenberg, S.C.** (2007) Cretaceous oblique detachment tectonics in the Fosdick Mountains, Marie Byrd Land, Antarctica. *in: Antarctica: A Keystone in a Changing World-Online Proceedings of the 10th ISAES*, edited by AK Cooper and CR Raymond et al. USGS Open-File Report 2007-1047; Short Research Paper 046P: 6 p. doi: 10.3133/of2007-1047.srp046
1. Vanderhaeghe, O., Hibsich, C., Siebenaller, L., Duchêne, S., de St Blanquat, M., **Kruckenberg, S.C.**, Fotiadis, A., and Martin, L. (2007) Penrose Conference – Extending a Continent – Naxos Field Guide. *in: (Eds.) G. Lister, M. Forster, and U. Ring, Inside the Aegean Metamorphic Core Complexes. Journal of the Virtual Explorer; 27(4).* doi: 10.3809/jvirtex.2007.00175

Other Publications

- Huntington, K.W., and Klepeis, K.A., with 66 community contributors (2018) Challenges and opportunities for research in tectonics: Understanding deformation and the processes that link Earth systems, from geologic time to human time. A community vision document submitted to the U.S. National Science Foundation. University of Washington, 84 pp., <https://doi.org/10.6069/H52R3PQ5>
- **Kruckenberg, S.C.** (2009), The dynamics of migmatite domes in extending orogens, Ph.D. thesis, 401 pp., University of Minnesota-Twin Cities.

Abstracts and Conference Proceedings

*denotes work conducted as Kruckenberg advised BC student or postdoc; †denotes SEM Facility user

65. †Chatzaras, V., Tikoff, B., **Kruckenberg, S.C.**, Titus, S.J., Teyssier, C., and Drury, M.R. (2019) Seismic cycle recorded by microstructural and stress variations in the mantle section of an oceanic transform zone. AGU, Fall Meet. Suppl., Abstract T43C-0450.
64. **Kruckenberg, S.C.** and †Michels, Z.D. (2019) Linking grain- to plate-scale deformation and kinematics through analysis of micro-rotations in polyphase shear zones (Invited). Abstracts with Programs – Geological Society of America, v. 51 (5), doi: 10.1130/abs/2019AM-335532.
63. †McFadden, R.R., **Kruckenberg, S.C.**, Senjem, A., and Taylor, J.M. (2019) Microstructural analysis and kinematics of quartzofeldspathic migmatitic gneisses within the Wildhorse Detachment, Pioneer Mountains, Idaho. IODP/ICDP New Caledonia Peridotite Amphibious Drilling Workshop. Montpellier, France (January 22-24, 2019). Abstracts with Programs – Geological Society of America, v. 51 (5), doi: 10.1130/abs/2019AM-339368.
62. †Nagurney, A.B., Ross, N.L., Caddick, M.J., Law, R.D., and **Kruckenberg, S.C.** (2019) Crystallographically controlled void space at grain boundaries in exhumed metamorphic rocks. Abstracts with Programs – Geological Society of America, v. 51 (5), doi: 10.1130/abs/2019AM-336575.
61. †Chatzaras, V., Tikoff, B., **Kruckenberg, S.C.**, Titus, S.J., Teyssier, C., and Drury, M.R. (2019) Stress variations in the mantle section of an oceanic transform fault: Bogota Peninsula Shear Zone, New Caledonia. IODP/ICDP New Caledonia Peridotite Amphibious Drilling Workshop. Montpellier, France (January 22-24, 2019).
60. **Kruckenberg, S.C.**, †Michels, Z.D., and *†Parsons, M.M. (2018) From intracrystalline distortion to tectonic motion: Unifying field, microstructural, and textural analyses in heterogeneous shear zones through orientation-dispersion methods. *Eos Trans. AGU, Fall Meet. Suppl.*
59. *†Shea, L. and **Kruckenberg, S.C.** (2018) Investigating deformation processes and the rheology of polyphase lower crust: Integrated structural and textural analysis of naturally deformed granulites from the Mount Hay block of central Australia. *Eos Trans. AGU, Fall Meet. Suppl.*
58. †Zhao, N., †Hirth, G., †Cooper, R.F., **Kruckenberg, S.C.**, and Cukjati, J. (2018) Strain weakening of olivine-rich rocks linked to microstructural evolution during diffusion creep. *Eos Trans. AGU, Fall Meet. Suppl.*
57. †Meyers, C.D., Kohlstedt, D.L., Zimmerman, M.E., and **Kruckenberg, S.C.** (2018) Microstructural recovery of experimentally deformed olivine rocks. *Eos Trans. AGU, Fall Meet. Suppl.*
56. Withers, A., **Kruckenberg, S.C.**, and Chatzaras, V. (2018) The hydration state of the west Antarctic lithospheric mantle. *Goldschmidt Abstracts, 2018.*
55. †Zhao, N., †Hirth, G., †Cooper, R.F., and **Kruckenberg, S.C.** (2017) Grain boundary sliding in olivine + clinopyroxene aggregates: weakening mechanism and microstructure. *Eos Trans. AGU, Fall Meet. Suppl. MR41D-0424.*

54. **Kruckenberg, S.C.** and *[†]Montz, W.J. (2017) Rheological transitions and structural overprinting associated with Cretaceous partial melting and strain localization in the Potters Pond migmatite domain, west-central Idaho. Abstracts with Programs – Geological Society of America, v. 49 (6), doi:10.1130/abs/2017AM-306450
53. [†]Chatzaras, V., **Kruckenberg, S.C.**, Titus, S., Tikoff, B., Teyssier, C., and Drury, M. (2017) Strain localization processes in the upper mantle section of an oceanic paleotransform fault (Bogota Peninsula Shear Zone, New Caledonia). Abstracts with Programs – Geological Society of America.
52. [†]Chatzaras, V., **Kruckenberg, S.C.**, Titus, S., Tikoff, B., Teyssier, C., and Drury, M. (2016) Three-dimensional mantle flow near an oceanic paleotransform fault system: geological constraints from the Bogota Peninsula, New Caledonia. Eos Trans. AGU, Fall Meet. Suppl., Abstract T33C-3043.
51. [†]Zhao, N., [†]Hirth, G., [†]Cooper, R.F., and **Kruckenberg, S.C.** (2016) Grain boundary sliding in deforming wehrlite: rheology and microstructure. Eos Trans. AGU, Fall Meet. Suppl., Abstract T21D-2871.
50. **Kruckenberg, S.C.**, [†]Michels, Z.D., Davis, J.R., and Tikoff, B. (2016) Orientation-dispersion analyses: a unifying micro-kinematic framework? (**Invited**) Microanalysis Society Electron Backscatter Diffraction 2016 Conference, University of Alabama, May 2016
49. *[†]Chatzaras, V., **Kruckenberg, S.C.**, *[†]Cohen, S., Medaris, L.G., Withers, A.C., and Bagley, B. (2016) Development of olivine crystallographic preferred orientation in response to strain-induced fabric geometry, *Geophysical Research Abstracts*, v. 18, EGU2016-10946.
48. [†]Chatzaras, V., Tikoff, B., **Kruckenberg, S.C.**, Newman, J., Titus, S.J., Withers, A.C., and Drury, M.R. (2016) Rheological structure of the lithosphere in plate boundary strike-slip fault zones, *Geophysical Research Abstracts*, v. 18, EGU2016-11177.
47. [†]German, L.Y., Newman, J., [†]Chatzaras, V., **Kruckenberg, S.C.**, Stewart, E., and Tikoff, B. (2016) Olivine and spinel fabric development in lineated peridotites, *Geophysical Research Abstracts*, v. 18, EGU2016-10810.
46. [†]Michels, Z.D., **Kruckenberg, S.C.**, Davis, J.R., and Tikoff, B. (2015) Determining grain-scale vorticity axes from crystallographic orientation data, Eos Trans. AGU, Fall Meet. Suppl., Abstract T33H-04.
45. Garapic, G., [†]Faul, U., **Kruckenberg, S.C.**, Wiejaczka, J., and Newton, J. (2015) The origin of olivine-rich troctolites/plagioclase-dunites, Eos Trans. AGU, Fall Meet. Suppl., Abstract V21A-3004.
44. [†]Chin, E., [†]Soustelle, V., [†]Hirth, G., Saal, A., **Kruckenberg, S.C.**, and Eiler, J. (2015) Thick, cold, and dry roots: the key to longevity of continental arc lithosphere? Eos Trans. AGU, Fall Meet. Suppl., Abstract T31F-2907.
43. **Kruckenberg, S.C.** and Tikoff, B. (2015) Spatial and temporal patterns of melt migration and strain localization in the Twin Sisters ultramafic massif, Washington State (**Invited**). Abstracts with Programs – Geological Society of America, v. 47, n. 7, p. 494.
42. [†]Chatzaras, V., Tikoff, B., Titus, S.J., **Kruckenberg, S.C.**, Withers, A.C., Teyssier, C., and Drury, M. (2015) Mantle deformation and strain localization at an oceanic paleotransform fault: The Bogota Peninsula shear zone. Abstracts with Programs – Geological Society of America, v. 47, n. 7, p. 291.
41. Garapic, G., [†]Faul, U., **Kruckenberg, S.C.**, Wiejaczka, J., and Newton, J. (2015) Olivine-rich troctolites: geochemical and microstructural evidence of their mantle origin. Abstracts with Programs – Geological Society of America, v. 47, n. 7, p. 495.
40. *[†]Montz, W.J. and **Kruckenberg, S.C.** (2015) Timing and duration of migmatite crystallization in the Potters Pond migmatite domain, Western Idaho shear zone: relationships between partial melting and deformation during transpression, Abstracts with Programs – Geological Society of America, v. 47, n. 7, p. 373.
39. [†]Chatzaras, V., Tikoff, B., Newman, J., Titus, S.J., Withers, A.C., **Kruckenberg, S.C.**, and Drury, M.R. (2015) Seismic cycle is controlled by stress and displacement loading between crust and mantle: The Lithospheric Feedback model. Deformation Rheology and Tectonics (DRT), RWTH Aachen University, Germany, 7-11 September 2015.
38. [†]Michels, Z.D., **Kruckenberg, S.C.**, Davis, J.R., and Tikoff, B. (2015) A new approach for determination of vorticity axes from orientation maps. Deformation Rheology and Tectonics (DRT), RWTH Aachen University, Germany, 7-11 September 2015.
37. *[†]Cohen, S., **Kruckenberg, S.C.**, *[†]Chatzaras, V., and Medaris, L.G. (2015) Heterogeneity of the lithospheric mantle beneath Marie Byrd Land, West Antarctica. Abstracts with Programs - Geological Society of America, v. 47, n. 3, p. 135.

36. **Kruckenberg, S.C.**, *†Chatzaras, V., Medaris, L.G. Jr., and *†Cohen, S. (2014) Correlations between strain geometry, shape fabric, and crystallographic preferred orientation revealed by microtomography and textural analyses: heterogeneous deformation of mantle xenoliths from Marie Byrd Land, Antarctica, 6th International Orogenic Lherzolite Conference, Marrakech, Morocco (May 4-15, 2014).
35. *†Chatzaras, V. and **Kruckenberg, S.C.** (2013) Structural and thermal characteristics of west Antarctic lithospheric mantle: Constraints from mantle xenoliths from the Fosdick Mountains (Marie Byrd Land), *Eos Trans. AGU, Fall Meet. Suppl.*, Abstract T12A-03.
34. Tikoff, B., Blenkinsop, T., **Kruckenberg, S.C.**, Morgan, S., Newman, J., and Wojtal, S. (2013) Celebrating the feedbacks between historical-based and process-based approaches in the emergence of modern structural geology, *Abstracts with Programs – Geological Society of America*, v. 45, n. 7, p. 35.
33. **Kruckenberg, S.C.**, and Tikoff, B. (2012) Evaluating the effects of stress-driven segregation, strain and reaction history, and intrinsic rock properties on melt transport and rock rheology in the naturally deformed lithosphere (**Invited**), *Eos Trans. AGU, Fall Meet. Suppl.*, Abstract T12D-02.
32. **Kruckenberg, S.C.**, and Siddoway, C.S. (2012) Characterization of lithospheric mantle of West Antarctica using mantle xenoliths from 1.4 Ma basalts of the Fosdick Mountains: Proposed research and preliminary results, *Eos Trans. AGU, Fall Meet. Suppl.*, Abstract T41B-2586.
31. Davis, P., and **Kruckenberg, S.C.** (2012) Integrating field, microstructural, magnetic fabric, and metamorphic studies to establish Yavapai-Mazatzal-aged syntectonic pluton emplacement and strain localization in the Tusas Mountains, New Mexico, *Eos Trans. AGU, Fall Meet. Suppl.*, Abstract T23B-2671.
30. Peterson, D.E., and **Kruckenberg, S.C.** (2012) Strain partitioning and compositional controls on deformation style in the Red Mountain peridotite massif, South Island, New Zealand, *Abstracts with Programs – Geological Society of America*, v. 44, n. 7, p. 557.
29. **Kruckenberg, S.C.**, Tikoff, B., Toy, V.G., and Newman, J. (2011) Relationships between strain, strain localization, and channelized melt flow networks in naturally deformed upper mantle, Twin Sisters ultramafic complex, Washington, USA, *Eos Trans. AGU, Fall Meet. Suppl.*, Abstract T22B-07.
28. Newman, J., Stewart, E.D., Toy, V.G., **Kruckenberg, S.C.**, and Tikoff, B. (2011) Heterogeneous mantle fabrics in the Red Hills ultramafic massif, South Island, New Zealand, *Eos Trans. AGU, Fall Meet. Suppl.*, Abstract T12C-2396.
27. **Kruckenberg, S.C.**, and Toy, V.G. (2011) Strain partitioning and shear zone localization associated with reactive melt migration in mantle peridotites of the Red Hills massif, Dun Mountain Ophiolite Belt, New Zealand, *Abstracts with Programs – Geological Society of America*, v. 43, n. 5, p. 606.
26. Byerly, A., Davis, P., and **Kruckenberg, S.C.** (2011) Metamorphism and strain localization associated with Yavapai-Mazatzal-aged syntectonic pluton emplacement in the Tusas Mountains, New Mexico, *Abstracts with Programs – Geological Society of America*, v. 43, n. 5, p. 365.
25. **Kruckenberg, S.C.** (2011) Mobilization of partially molten crust during extension and the internal dynamics of the Naxos migmatite dome, Greece, *Abstracts with Programs – Geological Society of America*, v. 43, n. 5, p. 492.
24. Toraman, E., Fayon, A., Whitney, D.L., Teyssier, C., Reiners, P.W., Thomson, S.N., and **Kruckenberg, S.C.** (2011) Apatite-Zircon U-Th/He and fission-track dating of the Okanogan dome exhumation (WA, USA), *Abstracts with Programs – Geological Society of America*, v. 43, n. 5, p. 654.
23. **Kruckenberg, S.C.**, Tikoff, B., Toy, V.G., and Newman, J. (2011) Multi-scale strain localization associated with channelized melt flow in the upper mantle lithosphere: insights from the Twin Sisters ultramafic complex, Washington, USA, Presented at the GSA Penrose Conference: “Deformation Localization in Rocks: New Advances”, Cadaqués & Cap de Creus Peninsula, Catalonia, Spain.
22. **Kruckenberg, S.C.**, Ferré, E.C., Vanderhaeghe, O., Teyssier, C., and Whitney, D.L., (2010) High-temperature flow and dynamics of an anatectic migmatite dome: example from Naxos, Greece, *Eos Trans. AGU, Fall Meet. Suppl.*, Abstract T23A-2239.
21. **Kruckenberg, S.C.**, and Whitney, D.L. (2010) Petrologic evolution of Mg-Al-rich gneisses during migmatite dome formation, Okanogan dome, Washington, *Abstracts with Programs – Geological Society of America*, v. 42, n. 5, p. 392.
20. Rey, P.F., Teyssier, C., **Kruckenberg, S.C.**, and Whitney, D.L. (2010) Coeval shallow extension and deep contraction during orogenic collapse: colliding channels and double domes, Tectonic Crossroads: Evolving Orogens of Eurasia-Africa-Arabia, Ankara-Turkey (4-8 October 2010).

19. **Kruckenberg, S.C.**, Newman, J., Tikoff, B., and Toy, V.G. (2009) Strain gradients and melt pathways, Twin Sisters complex, Washington State, *Eos Trans. AGU*, 90(52), Fall Meet. Suppl., Abstract V51B-1681.
18. **Kruckenberg, S.C.**, Teyssier, C., Whitney, D.L., Ferré, E., Chapman, A., and Vanderhaeghe, O. (2008) Compatibility of deformation between upper crust and flowing partially molten crust in “hot” orogens, *Geophysical Research Abstracts*, v. 10, EGU2008-A-11363.
17. **Kruckenberg, S.C.**, Tikoff, B., Young, L., and Newman, J. (2008) Relationships between compositional layering, structural fabric, and the formation of melt pathways in the Twin Sisters complex, Washington State, Presented at the AGU Chapman Conference: “Shallow Mantle Composition & Dynamics: 5th International Orogenic Lherzolite Conference”, Mount Shasta, California.
16. **Kruckenberg, S.C.**, Ferré, E.C., Teyssier, C., Gébelin, A., Vanderhaeghe, O., and Whitney, D.L. (2007) Flow of the partially molten continental crust during Miocene orogenic collapse in Naxos, Greece, *Geophysical Research Abstracts*, v. 9, EGU2007-A-05146.
15. **Kruckenberg, S.C.**, and Whitney, D.L. (2007) Petrology of sapphirine-bearing gedrite-cordierite gneiss, Okanogan dome, Washington USA, and implications for gneiss dome tectonics, *Eos Trans. AGU*, 88(52), Fall Meet. Suppl., Abstract T11B-0579.
14. **Kruckenberg, S.C.**, Ferré, E.C., Teyssier, C., Whitney, D.L., Vanderhaeghe, O., Chapman, A., and Gébelin, A. (2007) Deformation in the migmatitic core of the Naxos dome: structural and anisotropy of magnetic susceptibility (AMS) analyses, Presented at the GSA Penrose Conference: “Extending a Continent: Architecture, Rheological Coupling, and Heat Budget”, Naxos, Greece.
13. Siddoway, C.S., Fanning, C., **Kruckenberg, S.C.**, Fadrhonc, S.M. (2006) U-Pb SHRIMP investigation of the timing and duration of melt production and migration in a Pacific margin gneiss dome, Fosdick Mountains, Antarctica, *Eos Trans. AGU*, 87(52), Fall Meet. Suppl., Abstract V23D-0660.
12. Ferré, E.C., **Kruckenberg, S.C.**, Teyssier, C., and Gebelin, A. (2006) Fabric homogeneity of migmatites revealed by anisotropy of magnetic susceptibility: Implications for flow in a partially molten crust, *Abstracts with Programs – Geological Society of America*, v. 38, n. 7, p. 342.
11. Siddoway, C., McFadden, R., Teyssier, C., **Kruckenberg, S.**, and Haywood, J.C. (2006) Structural controls on melt transport paths and duration of deformation-induced melt migration, Fosdick Mountains, Antarctica, *Abstracts with Programs – Geological Society of America*, v. 38, n. 7, p. 342.
10. **Kruckenberg, S.C.**, Fanning, M., Dunlap, W.J., Whitney, D.L., and Teyssier, C. (2006) Paleocene-Eocene migmatite crystallization, extension, and exhumation in the hinterland of the Northern Cordillera: Okanogan dome, Washington, *Abstracts with Programs – Geological Society of America*, v. 38, n. 7, p. 342.
9. Whitney, D.L., Teyssier, C., Iredale, L.J., **Kruckenberg, S.C.**, Fayon, A.K., Gordon, S.M., McFadden, R.R. (2005) Crustal flow and kinematic hinges in metamorphic core complexes from the North American cordillera and the Aegean, *Eos Trans. AGU*, 86(52), Fall Meet. Suppl., Abstract T24C-04.
8. **Kruckenberg, S.C.**, Ferré, E. (2005) Recovering flow fabrics in diatexite: Low-field anisotropy of magnetic susceptibility (AMS) in the Naxos migmatite dome, Greece, *Abstracts with Programs – Geological Society of America*, v. 37, n. 7, p. 73.
7. Teyssier, C., Mulch, A., **Kruckenberg, S.C.**, and Miller, B. (2005) The Cordilleran Orogen: An Andean-type Eocene continental plateau? 1st Earth Scope National Meeting, Tamaya Resort, NM, March 29-31, 2005, Abstracts, p. 201.
6. Teyssier, C., Whitney, D.L., **Kruckenberg, S.C.**, Ferré, E., and Vanderhaeghe, O. (2004) Coupling between crustal flow and detachment tectonics during exhumation of the northern cordilleran metamorphic core complexes, *Abstracts with Programs – Geological Society of America*, v. 36, n. 5, p. 117.
5. Grace, Rashmi L.B., Frost, B. Ronald, Chamberlain, Kevin R., Frost, Carol D., Fruchey, Benjamin L., and **Kruckenberg, Seth C.** (2004) The oldest fragment of the central Wyoming Province: The Sacawee Block, Northern Granite Mountains, Central Wyoming. *Abstracts with Programs – Geological Society of America*, v. 36, n. 5, p. 568.
4. **Kruckenberg, S.C.**, Teyssier, C., Whitney, D.L. (2004) Re-coupling the decoupled partially molten crust: The channel flow-detachment transition. 49th Annual Meeting of the Geological Association – Mineralogical Association of Canada, Joint Annual Meeting, St. Catharines, ON, Canada, v. 29, p. 122.
3. Teyssier, C., **Kruckenberg, S.C.**, and Whitney, D.L. (2004) Eocene flow of partially molten crust in the North American Cordillera, *Abstracts with programs – Geological Society of America*, v. 36, n. 4, p. 72.

2. **Kruckenberg, S.C.**, Chamberlain, K.R., Frost, C.D., and Frost, B.R. (2001) One Billion Years of Archean Crustal Evolution: Black Rock Mountain, Northeastern Granite Mountains, Wyoming. *Abstracts with Programs – Geological Society of America*, v. 33, n. 6, p. 401.
1. **Kruckenberg, S.C.**, Fruchey, B.L., Frost, C.D., and Chamberlain, K.R. (2001) Isotopic Evidence for an Early Archean Core of the Wyoming Province: Northeastern Granite Mountains, Central Wyoming. *Abstracts with Programs – Geological Society of America*, v. 33, n. 5, p. 42.

Other Contributions

- **Kruckenberg, S.C.**, Teyssier, C., Whitney, D.L., Fanning, M., and Dunlap, W.J. (2006) Paleocene-Eocene flow of partially molten crust and coupled extension in the Okanogan Dome, Washington, Presented at the 2006 Integrated Solid Earth Sciences (ISES) Rheology Summer School, Colorado College, Colorado Springs, Colorado.
- **Kruckenberg, S.C.**, McFadden, R.R., Teyssier, C., Whitney, D.L. (2006) Flow and coupling of the Eocene partially molten crust in the North American cordillera: Evidence from the Okanogan and Pioneer migmatite domes, USA. Presented at the 2006 cordilleran tectonics workshop, Vancouver, British Columbia.