

Andrew J. Cross

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EDUCATION

2011 – 2015 **Ph.D.**, Geology, University of Otago, New Zealand
2007 – 2011 **M.E.Sci. First Class**, Geophysics with Geology, University of Liverpool, UK

ACADEMIC EXPERIENCE

2015 – present **Postdoctoral Research Associate**
Washington University in St. Louis, USA
Department of Earth and Planetary Sciences

May – Aug 2013 **Visiting Researcher**
Apr – Jul 2014 *Brown University, USA*
Department of Geological Sciences

2011 – 2015 **Graduate Student**
University of Otago, New Zealand
Department of Geology

PROFESSIONAL SERVICE AND ACTIVITIES

Conference organizing committee
2018 – *Electron Backscatter Diffraction (EBSD) 2018*

AGU Fall Meeting session convener
2017 – *Recent Advances in Understanding Deformation Microstructures*
2017 – *The Microphysics of Plate Boundary Deformation*

Peer reviewer for: *Nature Geoscience; Geology; Tectonics; Journal of Geophysical Research: Solid Earth; Journal of Structural Geology; Geodinamica Acta; Geological Journal*

INVITED TALKS

2018 Lamont-Doherty Earth Observatory; Seismology, Geology, and Tectonophysics Seminar
2018 Woods Hole Oceanographic Institution; Geophysics and Geochemistry Seminar
2016 Gordon Research Conference on Rock Deformation
2016 Electron Backscatter Diffraction (EBSD) 2016 conference
2015 Missouri University of Science and Technology; Department of Geosciences and Geological and Petroleum Engineering Seminar
2014 Brown University; Rock Deformation Laboratory Brown Bag

AWARDS AND GRANTS

2015	University of Otago Exceptional Thesis Award
2011-2014	University of Otago doctoral scholarship (\$75,000 NZD)
2013	University of Otago international conference travel grant (\$2,000 NZD)
2008-2011	University of Liverpool Attainment Scholarship (£4,500 GBP)
2009	University of Liverpool Morris Ranger Scholarship (£75 GBP)

TEACHING EXPERIENCE

Undergraduate research co-supervisor

2016 – Lauren Tooley (*BSc Honours project, University of Otago*)

Workshop co-organizer and instructor

2015 – *EBSD data processing workshop (University of Otago)*

2014 – *EBSD data processing workshop (University of Otago)*

Lab and field-class teaching assistant

2011-2014 – *Advanced Field Studies; Geophysics of the Earth; Structural Geology; Rock Deformation; Tectonics (University of Otago)*

PEER-REVIEWED PUBLICATIONS

Cross, A. J., Hirth, G., Prior, D. J. (2017). Effects of secondary phases on crystallographic preferred orientations in mylonites, *Geology*, 45(10), 955-958, doi:10.1130/G38936.1

Cross, A. J., Prior, D. J., Stipp, M., Kidder, S. (2017). The recrystallized grain size piezometer for quartz: an EBSD-based calibration. *Geophysical Research Letters*, 44(13), 6667-6674, doi:10.1002/2017GL073836

Cross, A. J., Skemer, P. (2017) Ultramylonite generation via phase mixing in high-strain experiments. *Journal of Geophysical Research: Solid Earth*, 122(3), 1744-1759, doi:10.1002/2016JB013801

Cross, A. J., Ellis, S., Prior, D. J. (2015) A phenomenological numerical approach for investigating grain size evolution in ductilely deforming rocks. *Journal of Structural Geology*, 76, 22-34, doi:10.1016/j.jsg.2015.04.001

Cross, A. J., Kidder, S., Prior, D. J. (2015) Using microstructures and TitaniQ thermobarometry of quartz sheared around garnet porphyroclasts to evaluate microstructural evolution and constrain an Alpine Fault geotherm. *Journal of Structural Geology*, 75, 17-31, doi:10.1016/j.jsg.2015.02.012

Wheeler, J., Cross, A., Drury, M., Hough, R. M., Mariani, E., Piazzolo, S., Prior, D. J. (2011) Time-lapse misorientation maps for the analysis of electron backscatter diffraction data from evolving microstructures. *Scripta Materialia*, 65(7), 600-603, doi:10.1016/j.scriptamat.2011.06.035

MANUSCRIPTS IN PREPARATION

Cross, A. J., Skemer, P. (in prep. for *Earth and Planetary Science Letters*). Rates of dynamic recrystallization in crystalline materials.

Prior, D. J., Cross, A. J., Ellis, S., Hirth, G., Kidder, S., Little, T., Toy, V. (in prep. for *New Zealand Journal of Geology and Geophysics*). Microstructural and rheological evolution of the mylonites beneath the Alpine Fault's seismogenic zone over the last 300 years.

Cross, A. J., Hirth, G., Meyers, C., Prior, D. J. (in prep. for *Journal of Geophysical Research: Solid Earth*). Investigating co-seismic loading of the ductile crust through strain-rate stepping experiments on anorthite.

CONFERENCE ABSTRACTS

- Cross, A. J.**, Skemer, P. (2017) On transient microstructures and the long path to steady-state creep in the lithosphere. *AGU Fall Meeting*.
- Ellis, S., Williams, C., Van Dissen, R., Langridge, R., Prior, D., **Cross, A.**, Hamling, I. (2017) The effect of lower crustal structure on stress loading around faults, *Paleoseismology, Active Tectonics and Archeoseismology (PATA)*.
- Cross, A. J.**, Skemer, P. (2017) Ultramylonite generation via phase mixing in high-strain experiments. *Deformation mechanisms, Rheology and Tectonics (DRT)*.
- Cross, A. J.**, Skemer, P. (2016) Microstructural damage during high-strain torsion experiments on calcite-anhydrite aggregates. *AGU Fall Meeting*.
- Skemer, P., **Cross, A. J.**, Bercovici, D. (2016) Experimental constraints and theoretical bases for microstructural damage in plate boundary shear zones, *AGU Fall Meeting*.
- Cross, A. J.** (2016) Microstructural controls on the rheology of lithospheric ductile shear zones. *Gordon Research Conference on Rock Deformation*.
- Cross, A. J.** (2016) Post-processing of EBSD data in MTEX. *Electron Backscatter Diffraction (EBSD) 2016*.
- Cross, A. J.**, Prior, D. J., Stipp, M., Kidder, S. (2016) Using electron backscatter diffraction to separate recrystallized grains: application to quartz paleopiezometry. *Electron Backscatter Diffraction (EBSD) 2016*.
- Cross, A. J.**, Couvy, H., Skemer, P. (2015) Preliminary results from the Large Volume Torsion (LVT) deformation apparatus. *AGU Fall Meeting*.
- Couvy, H., **Cross, A.**, Skemer, P. (2015) Large Volume Torsion (LVT) apparatus: Development and preliminary experiments, *COMPRES*.
- Prior, D. J., Seidemann, M., Vaughan, M., Becroft, L., **Cross, A. J.**, Durham, W. B., Ellis, S., Golding, N., Goldsby, D. J. (2015) A new look at ice flow mechanics. *Antarctic Science Conference*.
- Cross, A. J.**, Kidder, S., Prior, D. J. (2014) Microstructural and thermobarometric constraints on Alpine Fault Zone deformation at mid-crustal depths. *Geoscience Society of New Zealand (GSNZ) annual meeting*.
- Cross, A. J.**, Hirth, G., Li, K.-C., Proctor, B., Prior, D. J. (2014) Observing microstructural evolution in Griggs apparatus experiments. *Gordon Research Conference on Rock Deformation*.
- Cross, A. J.**, Prior, D. J. (2014) Large area EBSD mapping of quartz layers sheared around rigid porphyroclasts. *Electron Backscatter Diffraction (EBSD) 2014*.
- Meyers, C., Hirth, G., **Cross, A. J.**, Prior, D. J. (2013) The effect of dynamic recrystallization and LPO formation on deformation mechanisms in experimentally deformed plagioclase aggregates, *AGU Fall Meeting*.
- Cross, A. J.**, Hirth, G., Meyers, C., Prior, D. J. (2013) Transient weakening of fine-grained plagioclase aggregates during strain rate cycling experiments. *AGU Fall Meeting*.
- Little, T., Gillam, B., Prior, D., Kidder, S., **Cross, A.**, Ellis, S., Al'bot, O., Toy, V. (2013) Foliation fanning in the hangingwall of the Alpine Fault, Central Southern Alps, *Geoscience Society of New Zealand (GSNZ) annual meeting*.

- Cross, A. J., Hirth, G., Meyers, C., Prior, D. J. (2013)** Transient weakening and grain size sensitive creep in strain-rate stepping experiments on fine-grained plagioclase aggregates. *Deformation mechanisms, Rheology and Tectonics (DRT)*.
- Cross, A. J., Prior, D. J., Ellis, S. (2012)** Investigating feedback between stress and grain size in viscous flows around rigid porphyroclasts. *AGU Fall Meeting*.
- Cross, A. J., Prior, D. J., Ellis, S. (2012)** Investigating feedback between stress and grain size: preliminary findings from finite-element modelling. *Gordon Research Conference on Rock Deformation*.
- Cross, A. J., Kuszniir, N. J., Alvey, A. (2011)** Structure and origin of the Crozet Plateau and Conrad Rise, SW Indian Ocean: Insights from crustal thickness mapping using 3-D satellite gravity inversion. *AGU Fall Meeting*.

OTHER SCIENCE COMMUNICATION

- Minds over Methods: Making Ultramylonites (2017) *European Geophysical Union (EGU) Blogs: Tectonics and Structural Geology section*,
<http://blogs.egu.eu/divisions/ts/2017/09/08/minds-over-methods-making-ultramylonites/>
- The Alpine Fault with Andrew Cross (2015) *Travelling Geologist*,
<http://www.travelinggeologist.com/2015/06/the-alpine-fault-with-andrew-cross/>
- PhD Candidate, Structural Geology, Andrew Cross (2014) *A Day in the Geo-life series*,
<http://rockheadsciences.com/phd-candidate-structural-geology-andrew-cross/>