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11/6/2020

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EDUCATION

2011–2015 **Ph.D.**, Geology
University of Otago, New Zealand

2007–2011 **M.E.Sci. (with First Class Honours)**, Geophysics with Geology
University of Liverpool, UK

APPOINTMENTS

2019–present **Assistant Scientist,** *Woods Hole Oceanographic Institution, USA*
2018–2019 **Visiting Investigator,** *Woods Hole Oceanographic Institution, USA*
2018–2019 **Postdoctoral Researcher,** *University of Pennsylvania, USA*
2015–2018 **Postdoctoral Researcher,** *Washington University in St. Louis, USA*
2013–2014 **Visiting Researcher,** *Brown University, USA*
2011–2015 **Graduate Student,** *University of Otago, New Zealand*

PEER-REVIEWED PUBLICATIONS

Cross, A. J., Goldsby, D. L., Hager, T. F., Smith, I. B. (accepted). The rheological behavior of CO_2 ice: application to glacial flow on Mars, *Geophysical Research Letters,* 10.1029/2020GL090431

Fan, S., Hager, T. F., Prior, D. J., **Cross, A. J.**, Goldsby, D. L., Qi, C., Negrini, M., Wheeler, J. (accepted), Temperature and strain controls on ice deformation mechanisms: insights from the microstructures of samples deformed to progressively higher strains at −10, −20 and −30°C, *The Cryosphere*, 10.5194/tc-2020-2

Cross, A. J., Olree, E., Couvy, H., Skemer, P. A. (2020). How does viscosity contrast influence phase mixing and strain localization? *Journal of Geophysical Research: Solid Earth*, 125(8) 10.1029/2020JB020323

Cross, A. J., Skemer, P. (2019), Rates of dynamic recrystallization in geologic materials. *Journal of Geophysical Research: Solid Earth*, 124(2), 1324-1342, 10.1029/2018JB016201

Cross, A. J., Hirth. G., Prior, D. J. (2017), Effects of secondary phases on crystallographic preferred orientations in mylonites. *Geology*, 45(10), 955-958, 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, 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, 10.1002/2016JB013801

Cross, A. J., Ellis, S., Prior, D. J. (2015), A phenomenological numerical approach for investigating grain size evolution in ductiley deforming rocks. *Journal of Structural Geology*, 76, 22-34, 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, 10.1016/j.jsg.2015.02.012

Wheeler, J., **Cross, A.**, Drury, M., Hough, R. M., Mariani, E., Piazolo, 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, 10.1016/j.scriptamat.2011.06.035

RESEARCH FUNDING

09/2020–08/2023: NSF Geophysics (EAR-2023128), *Collaborative Research: Transformation Plasticity as a Transient Creep Mechanism in Earth's Crust and Mantle*
PI: A. J. Cross; co-PIs: D. L. Goldsby, L. N. Hansen
$542,320 total ($389,328 to Cross)

07/2020–06/2021: NSF Instrumentation & Facilities (EAR-2003389), *Upgrade of an Electron Backscatter Diffraction System to Establish a Center for State-of-the-Art Microstructural Analyses*
PI: A. J. Cross
$165,527 total

1/2020–6/2020: WHOI Independent Research and Development (IR&D #26476), *An Experimental Study of Ice Bicrystal Deformation to Illuminate the Mechanisms of Glacial Flow*
PI: A. J. Cross
$70,611

INVITED TALKS

2020 MIT Experimental Rock Deformation group seminar
2020 GSA 2020 (Session T27: Approaches for Extracting Shear Zone History from the Ductile Rock Record: Probing Their Initiation, Evolution, and Reactivation)
2020 MIT Glaciology group seminar
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

PROFESSIONAL SERVICE AND ACTIVITIES

Co-lead organizer, Electron Backscatter Diffraction 2020 (EBSD 2020), Ann Arbor, MI (postponed)
Panelist, "Important Issues Facing Early Career Researchers", Gordon Research Seminar on Rock Deformation, 2018
Organizing committee, Electron Backscatter Diffraction 2018 (EBSD 2018), Ann Arbor, MI
AGU Fall Meeting session convener:
"Recent Advances in Understanding Deformation Microstructures", 2017
"The Microphysics of Plate Boundary Deformation", 2017
Proposal reviewer:
National Science Foundation (EAR-Tectonics), European Research Council
Manuscript reviewer:
Geodinamica Acta; Geological Journal; Geology; Geosphere; Journal of Geophysical Research: Solid Earth; Journal of Glaciology; Journal of Metamorphic Petrology; Journal of Structural Geology; Nature Geoscience; Science Advances; Solid Earth; Tectonics

CONFERENCE ABSTRACTS (PAST TWO YEARS ONLY)

Hager, T. F., Qi, C., Fan, S., Prior, D. J., Thomas, R., **Cross, A. J.**, Goldsby, D. L. (2020). Grain-size-sensitive creep of ice in the "dislocation creep" regime, *AGU Fall Meeting*

Prior, D., J., Bons, P., **Cross, A. J.**, Durham, W. B., Fan, S., Goldsby, D. L., Griera, A., Hager, T., Llorens, M.-G., Qi, C. (2020). Flow laws for ice sheet modeling: what do experiments tell us? *AGU Fall Meeting*

Fan, S., Prior, D. J., Hager, T., **Cross, A. J.**, Goldsby, D. L. (2020). The control of crystallographic preferred orientation (CPO) development and grain size reduction on ice mechanical weakening (enhancement). *AGU Fall Meeting*

Cross, A. J., Skemer, P., Couvy, H., Olree, E. (2020). The importance and origin of ultramylonites: an experimental perspective. *GSA Annual Meeting*

Goddard, R. M., Bidgood, A. K., Parsons, A. J., Kumamoto, K. M., Waters, D. J., Lloyd, G. E., Hansen, L. N., **Cross, A. J.** (2020) EBSD analysis of palisade quartz textures, investigating the implications for coesite-quartz transformation through field and experiments. *GeoConvention 2020*

Skemer, P. A., Bollinger, C., **Cross, A. J.**, Couvy, H. (2020), Experimental constraints on mylonite formation. *EGU General Assembly*

Kumamoto, K. M., Goddard, R., Hansen, L. N., Thom, C., Wallis, D., **Cross, A. J.**, Goldsby, D. L., Durham, W. B., Dillman, A., Kohlstedt, D. L. (2019), Low-temperature plasticity of the upper mantle: olivine, orthopyroxene, and harzburgite. *AGU Fall Meeting*

Skemer, P. A., Bollinger, C., **Cross, A. J.**, Couvy, H. (2019), Microstructural evolution during the deformation of polymineralic rocks. *AGU Fall Meeting*

Cross, A. J., Hager, T. F., Smith, I. B., Goldsby, D. L. (2019), Rheological behavior of CO2 ice with application to glacial flow on Mars, *Lunar and Planetary Science Conference*

Prior, D. J., Bons, P., Craw, L., **Cross, A.**, Durham, W. B., Fan. S., Goldsby, D. L., Griera, A., Hager, T., Kim, D., Llorens, M.-G., Mitchell, T., Platt, J., Qi, C., Seidemann, M., Treverrow, A., Vaughan, M. J., Weikusat, I. (2018), Dynamic recrystallisation and ice sheet dynamics. *Recrystallization and Grain Growth*

Cross, A. J., Couvy, H., Horn, C., Kido, M., Olree, E., Skemer, P. (2018), How does viscosity contrast influence phase mixing? *AGU Fall Meeting*

Skemer, P., **Cross. A.**, Couvy, H., Horn, C., Kido, M., Olree, E. (2018), Mechanisms of phase mixing and the origin of mylonites. *AGU Fall Meeting*

Prior, D. J., Bons, P., Craw, L., **Cross, A.**, Durham, W. B., Eccles, Fan, S., J., Hulbe, C., Goldsby, D. L., Golding, N., Griera, A., Kim, D., Llorens, M.-G., Lutz, F., Mitchell, T., Peternell, M., Platt, J., Qi, C., Seidemann, M., Treverrow, A., Vaughan, M., Wilson, C. (2018), Dynamic recrystallisation and its effect on ice deformation. *TIGeR Conference on Coupling between Metamorphism and Deformation*

Cross, A. J., Skemer, P. (2018), Rates of dynamic recrystallization in rock deformation experiments. *Gordon Research Conference on Rock Deformation*

Fan, S., Peternell, M., Prior, D., **Cross, A.** (2018), A continuous observation of the microstructural evolution of ice with particles. *Gordon Research Conference on Rock Deformation*

Cross, A. J., Olree, E., Skemer, P. (2018), Influence of viscosity contrast on phase mixing in ductile shear zones: insights from high-strain experiments on calcite-fluorite composites. *Electron Backscatter Diffraction 2018*