Curriculum Vitae – Dr Rellie M. Goddard

Postdoctoral Investigator at Woods Hole Oceanographic Institution
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Education

2016-2021: Oxford University, Department of Earth Sciences, NERC Doctoral Training Programme

- Thesis: Subgrain-size piezometry as a tool for measuring stress in polymineralic rocks
- Supervisors: Professor Lars Hansen, Dr. David Wallis & Dr. Kathryn Kumamoto

2015-2016: Durham University Department of Earth Sciences, Masters by Research

- Thesis: Earthquakes, elevations and continental plateaux: An investigation into the absence of large thrust earthquakes at high elevations within fold-and-thrust belts.
- Supervisors: Professor Mark Allen, Professor Stefan Nielsen & Dr Nicola De Paola

2012-2015: Durham University Department of Earth Sciences, 1st Class (80%) BSc Geology Hons

- Thesis: The geology of the western Alps.

Funding and awards

Microanalysis Society EBSD conference	Best Talk (2022)
The Keith Prout Crystallography Fund	Dpt Mineral Sciences, University of Oxford (2018)
Mike Coward Fund	The Geological Society of London (2018)
NERC DTP extraordinary funding call	Environmental Sciences DTP, University of Oxford (2018, 2019)
Old Members' Trust	University College, University of Oxford (2017, 2018)
Burdett-Coutts Fund	Dpt Earth Sciences, University of Oxford (2017, 2020)
Dave Johnston Undergraduate Mapping Prize (nomination)	Tectonics Studies Group (2016)
John W. Most Fieldwork Prize	Dpt Earth Sciences, University of Durham (2015)
Highest grade in the faculty of Science	University College, University of Durham (2014 & 2015)

Publications

Goddard, R. M., Hansen, L.N., Wallis, D., Stipp, M., Holyoke III, C., Kumamoto., K.M. and Kohlstedt, D (2020) A subgrain-size piezometer calibrated for EBSD. *Geophysical Research Letters*. https://doi.org/10.1002/essoar.10503878.1

Dyck, B., **Goddard, R. M.,** Wallis, D., Hansen, L.N. and Martel, E. (2020) Metamorphic evolution of the Great Slave Lake shear zone. *Journal of Metamorphic Geology, JMG-20-0025*

Bidgood, A., Parsons, A., Lloyd, G., Waters, D., and **Goddard, R. M.** (2020) EBSD analysis of palisade quartz textures: A new criterion for identifying UHP metamorphism in continental terranes. *Journal of Metamorphic Geology*, https://doi.org/10.1111/jmg.12566

Wallis, D., Hansen, L.N., Kumamoto., K.M., Thom, C., Plümper, O., Ohl, M., Durham, W.B., Goldsby, D.L., Armstrong, D.E.J., Meyers, C.D., **Goddard, R.M.,** Warren, J.M., Breithaupt, T., Drury, M.R. and Wilkinson, A.J. (2020) Dislocation interactions during low-temperature plasticity of olivine strengthen the lithospheric mantle. *Earth and Planetary Science Letter*, https://doi.org/10.1016/j.epsl.2020.116349

First author publications in prep.

Goddard, R.M., Kumamoto., K.M., Hansen, L.N., Wallis, D., Cross, A.J., and Thom, C. *Subgrain-size piezometry as a tool for measuring stress partitioning in polymineralic rocks*

Goddard, R.M., Wallis, D., Kumamoto., K.M., Dyck, B., Martel, E., and Hansen, L.N. *Measuring stress in polymineralic mylonites from the lower-crustal Great Slave Lake shear zone*

Goddard, R.M., Kumamoto., K.M., Cross, A.J., Bidgood, A.K., Parsons, A.J., Lloyd, G.E., Waters, D.J., and Hansen, L.N. *Microstructural Signatures of the Coesite-Quartz transformation: New Insights from High-pressure Experiments and EBSD Analysis*

Invited presentations

Goddard, R.M., Cross, A.J., Wallis, D., Goldsby D.L., Le Roux, V., Kumamoto, K.M., Hansen, L.N., and Hein, D. (2022) Transient weakening and microstructures across the quartz-coesite phase transition. *American Geophysical Union Fall Meeting*

Goddard, R.M., Cross, A.J., Kumamoto., K.M., Bidgood, A.K., Parsons, A.J., Lloyd, G.E., Waters, D.J. (2022) Microstructural Signatures of Quartz-after-Coesite: New Insights from High-Pressure Experiments. *Gordon Research Conference*

Oral presentations

Goddard, R.M., Cross, A.J., Kumamoto, K.M., Bidgood, A.K., Parsons, A.J., Lloyd, G.E., and Waters, D.J. (2022) Microstructural Signatures of the Coesite-Quartz Transformation: New Insights from High-Pressure Experiments and EBSD Analyses. *Microanalysis Society EBSD conference*

Goddard, R.M., Wallis, D., Hansen, L.N., Kumamoto., K. M., Dyck, B., Ohl, M., Cross, A.J., and Martel, E. (2022) Tools for unpicking complex stress histories in continental and oceanic shear zones. *Tectonics Studies Group AGM.*

Goddard, R.M., Hansen, L.N., Wallis, D., Dyck, B. and Kumamoto., K.M. (2020) Measuring stress in ductile polyphase rocks. *University of Minnesota*

Goddard, R.M., Hansen, L.N., Wallis, D., Dyck, B. and Kumamoto., K.M. (2020) The rheology of polyphase rocks. *Utrecht University*

Goddard, R.M., Hansen, L.N., Wallis, D., Dyck, B. and Kumamoto., K.M. (2019) Measuring stresses in polymineralic mylonites from the lower-crustal Great Slave Lake shear zone. *The 2019 Njord Seminar: Earthquakes in the Lower Crust*

Bidgood, A.K., Parsons, A.J., Lloyd, G.E., Waters, D.J., **Goddard, R.M.** (2019) EBSD analysis of palisade quartz textures: implications for coesite-quartz transformation, Tso Morari dome, Himalaya. *International Eclogite Conference*

Bidgood, A.K., Parsons, A.J., Lloyd, G.E., Waters, D.J., **Goddard, R.M.** (2019) EBSD analysis of palisade quartz textures: implications for coesite-quartz transformation, Tso Morari dome, Himalaya. *Metamorphic Studies Group Conference*

Goddard, R.M., Hansen, L.N., Wallis, D., Stipp, M., Holyoke III, C., Kohlstedt, D, Goldsby, D., Durham, W., Kumamoto., K. and Thom, C. (2018) Comparing in-situ and ex-situ stress measurements in polymineralic rocks. *American Geophysical Union Fall Meeting*

Hansen, L.N., Unwin, H., **Goddard, R.M.** and Wallis, D. (2018) Microstructural evolution investigated with equal channel angular pressing. *American Geophysical Union Fall Meeting*

Goddard, R.M., Hansen, L.N., Wallis, D., Stipp, M., Holyoke III, C., Kohlstedt, D, Goldsby, D., Durham, W., Kumamoto., K. and Thom, C. (2018) Investigating stress partitioning in polymineralic rocks constrained by subgrain-size piezometry and D-DIA experiments. *Gordon Research Seminar*

Goddard, R.M., Hansen, L.N., Wallis, D., Stipp, M., Holyoke III, C., Kohlstedt, D, Goldsby, D., Durham, W., Kumamoto., K. and Thom, C. (2018) Comparing in-situ and ex-situ stress measurements in polymineralic rocks. *University of British Columbia*

Goddard, R.M., Hansen, L.N., Wallis, D., Stipp, M., Holyoke III, C. and Kohlstedt., D. (2018) Piezometers for characterising stress distribution in polymineralic rocks. *Durham University, Structural Group*

Goddard, R.M., Hansen, L.N., Wallis, D., Stipp, M., Holyoke III, C. and Kohlstedt., D. (2018) Piezometers for characterising stress distribution in polymineralic rocks. *Tectonic Studies Group AGM*

Poster presentations

Kumar, N., Cross., A. Le Roux, V., **Goddard, R.M.** (2022) Determining the strength of oceanic lower crust: an geochemical, microstructural, and rheological investigation of ODP hole 735B, Southwest Indian Ridge. *American Geophysical Union Fall Meeting*

Hein, D., Hansen, L.N., Cross, A.J., **Goddard, R.M.,** Kumamoto, K.M., Thom, C., Chen, H., Nehring, A., Seyler, C., and Goldsby, D.L. (2022) Viscoelasticity and Transient creep of the Upper Mantle in Response to Large Stress Changes. *American Geophysical Union Fall Meeting*

Cross, A.J., **Goddard, R.M.**, Kumamoto, K.M., Chen, H., Goldsby, D.L., Hansen, L.N., Thom, C.A., Hein, D. (2022) There and back again: Transient Weakening Across the Quartz-Coesite Phase Transition Revealed in Synchrotron D-DIA Experiments. *Gordon Research Conference*

Hein, D., Hansen, L.N., Kumamoto, K.M., Thom, C., **Goddard, R.M.,** Cross, A.J., Chen, H., and Goldsby, D.L. (2022) Microstructural evolution in olivine aggregates undergoing high-stress forced oscillation. *Gordon Research Conference*

Cross A., Kumamoto, K.M., **Goddard, R.M.,** Chen, H., Thom, C., Goldsby, D.L., and Hansen, N. (2021) There and Back Again: Transformation Plasticity across the Quartz-Coesite and Fayalite-Ringwoodite Phase Transitions Revealed in Beamline D-DIA Experiments. *American Geophysical Union Fall Meeting*

Phillips, C., Seyler E., Lusk, A. D., and **Goddard, R.M.** (2021) How Stressed Out is it Really? Mapping Stress Heterogeneity at the Thin Section Scale. *American Geophysical Union Fall Meeting*

Bidgood, A.K., Parsons, A.J., Lloyd, G.E., Waters, D.J., and **Goddard, R.M.** (2021) EBSD-based criteria for the identification of the former presence of coesite: application to a metagranite from the Tso Morari dome, Himalaya. *Tectonic Studies Group Annual Meeting*

Male, J.E., Parsons, A., **Goddard, R.M.,** Gopon, P. and Waters, D.J. (2020) Spatial variations of deformation in the Wester Gneiss Region: implications on UHP exhumation. *Metamorphic Studies Group virtual research in progress meeting*

Goddard, R.M., Hansen, L.N., Wallis, D., Dyck, B. and Kumamoto., K.M. (2020) The Great Slave Lake shear zone: A test of models of stress distributions in continental shear zones. *The Royal Society meeting: Understanding earthquakes using the geological record*

Goddard, R.M., Hansen, L.N., Wallis, D., Dyck, B. and Kumamoto., K.M. (2019) Using subgrain-size piezometry to measure stress in polymineralic mylonites of the Great Slake Lake shear zone. *American Geophysical Union Fall Meeting*

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

DePaola, N., Nielsen. S., Monnickendam, M., Dawood, F., **Goddard, R.M.,** Tesei, T. and Allen, M.B. (2019) What is the contribution (if any) of off-fault damage to the earthquake energy budget? *American Geophysical Union Fall Meeting*

Wallis, D., Hansen, L.N., Kumamoto, K.M., Thom, C., Plümper, O., Goldsby, D.L., Durham, W.B., Armstrong, D.E.J., **Goddard, R.M.,** Breithaupt, T., Warren, J.M., Kohlstedt, D.L. and Wilkinson, A.J. (2018) Dislocation interactions control the strength of olivine deforming by low-temperature plasticity. *Gordon Research Conference*

Goddard, R.M., Hansen, L.N., Wallis, D., Stipp, M., Holyoke III, C., Kohlstedt, D, Goldsby, D., Durham, W., Kumamoto., K. and Thom, C. (2018) Stress partitioning in polymineralic rocks constrained by subgrain-size piezometry and D-DIA experiments. *Gordon Research Conference*

Goddard, R.M., Hansen, L.N., and Wallis, D. (2017) Piezometers for stress distribution in polymineralic rocks. *European Geosciences Union Summer School*

Goddard, R.M., Allen, M.B., DePaola, N., Nielsen. and Saville, C. (2016) Earthquakes, Elevations and the Construction of Continental Plateaux. *European Geosciences Union General Assembly*

Goddard, R.M., Allen, M.B., DePaola, N., Nielsen. and Saville, C. (2016) Earthquakes, Elevations and the Construction of Continental Plateaux. *Tectonics Study Group AGM*

Professional service

Co-convener: American Geophysical Union

- Session T15E: *Zooming In to See the Big Picture: Using Nano- to Microscale Observations to Better Understand Tectonic Processes*. (2021)

Session Chair: Gordon Research Seminar: Rock Deformation

- Session: *Characterizing deformation at the microscale*

Article reviewer for: Journal of Structural Geology, Progress in Earth and Planetary Science.

Media in the public domain

Blog: Female scientists in a world designed for men — Evidently Scientifical (2020)
Blog: Knowing when to let go — Evidently Scientifical (2018)
Article: RMS Electron Backscatter Diffraction Conference Summary — In focus Royal Microscopical Society (2017)
Blog: Nepal - the 'inability to shake it off' — Evidently Scientifical (2017)
Blog: 'San Francisco is going to get hit again…' — Evidently Scientifical (2017)
Blog: The Alpine Fault — it's what's on the inside that counts — Evidently Scientifical (2017)

Teaching Experience

June 2022 – Aug 2022 Summer internship advisor
Namitha Kumar, Project tile: *Determining the strength of the oceanic lower crust: A geochemical and microstructural investigation of the Southwestern Indian Ridge*

Oct 2019 – June 2020 Masters advisor
Joanna Male, Project title: *Changes in Gneiss through a transect of the Western Gneiss Region Norway.*

Oct 2016 – June 2020 Demonstrator – Department of Earth Science (Oxford University)

- Involves aiding professors with teaching both in the field, in practical's and through running tutorials

Oct 2015 – Sep 2016 Demonstrator - Department of Earth Science (Durham University)

- Demonstration involved leading a discussion group of 10 undergraduates, teaching and answering questions on a variety of aspects of geology.

Relevant Employment

July/August 2019 **Internship – 3Keel & Innocent**
A three month internship in environmental consultancy working jointly with 3Keel (an Oxford-based sustainability consultancy) and Innocent (a drinks-based company).

June/July 2013 **Internship - Durham University Department of Earth Sciences**
Four week internship: Two weeks researching geomorphology of fluvial systems of Tibet and the Himalayas utilising GIS software, and two weeks of laboratory work preparing mass spectrometry samples.

Assisting the University

Outreach - Physical Sciences Year 12 Study Day University College, Oxford University (March 2018)
Tour Guide University College, Oxford University (2017-2018)
Outreach - Demonstrating on UNIQ Summer School Dpt Earth Sciences, Oxford University (2017-2018)
Outreach - Oxfordshire Science Festival NERC Environmental Research DTP (2017)
Organisation committee, Grand challenges Seminar Series, University of Oxford (2017)
Involving presidios speakers such as Andy Weir (the author of the Martian) and Ellan Stofan (Ex Chief Scientist at NASA)
MRes representative, Earth Sciences Education Committee Dpt Earth Science, University of Durham (2015)
Sponsorship and advertising Liaison assistant University College, University of Durham (2014-2015)
Outreach - A-Level Maths Tuition University College, University of Durham (2014-2015)

Additional Skills

- 14 weeks fieldwork experience: Great Slave Lake Shear Zone (Northwest Territories, Canada), Vallon du Lauzanier (France), Sorbas Basin (Spain), Cyprus, Tenerife, Assynt (Scotland), Lake District (England).
- Experience with experimental apparatus commonly utilised in rock deformation: a Paterson gas-medium apparatus, a Deformation-DIA apparatus, and an oil-medium triaxial apparatus.
- Proficient IT skills: Microsoft Office, ArcGIS, Global Mapper, Inkscape, MATLAB, AZTEC.
- Equivalent to a CEFR B1 language certificate in French.
- An editor of the outreach blog: Evidently Scientifical.