RELLIE M GODDARD

Postdoctoral Research Fellow

Legal name: Catherine Goddard

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Self-motivated physical scientist looking to pivot to work in industry on more society-relevant problems. Over 9 years' experience researching the behaviour of specific minerals using detailed quantitative studies. Designed, funded, and executed numerous independent research projects to understand fundamental processes within the Earth and mantle. Extensive experience in micromechanics, crystallography, and analytical techniques. Dual national—British and French— with the right to work in the UK and Europe, as well as conversational (B2 level) French.

EDUCATION AND TRAINING

PhD in Rock Mechanics (fully funded), University of Oxford, Department of Earth Sciences, UK (2021)
- Designed and carried out experimental procedure to better understand mineral physics
- Expert in MATLAB, PowerPoint, Word, with experience in Excel and numerical analysis
- Planned, funded, and organised remote fieldwork in the Northwest Territories, Canada
- Editor and writer for outreach blog 'Evidently Scientifical'

Durham University, Department of Earth Sciences, Masters by Research (2016)

Durham University, Department of Earth Sciences, 1st Class (80%) BSc (Hons) Geology
- John W. Most Fieldwork Prize and highest grade in the Faculty of Science, University College, Durham

ANALYTICAL EXPERTISE & TECHNIQUES

Expert in:

Scanning Electron Microscope (SEM), Multi-anvil Deformation-DIA (D-DIA) apparatus, Modified piston-cylinder apparatus (Griggs), Electron backscatter diffraction (EBSD), high-pressure experimental mineral physics, X-ray diffraction, MATLAB, AZTEC

Experienced in:

Transmission Electron Microscopy (TEM), Fourier transform infrared spectroscopy (FTIR), gas-medium apparatus (Paterson), 1-atmosphere apparatus, *in-situ* deformation stage, Micro-computed tomography (micro-CT), focused ion beam (FIB), Electron microprobe analysis (EPMA), secondary-ion mass spectrometry (SIMS), High-angular resolution EBSD

EMPLOYMENT HISTORY

Postdoctoral Research Fellow, Lakehead University, Canada (2023–present)
- Project: Gold distribution in deformed quartzites

Postdoctoral Research Fellow, University of British Columbia, Okanagan, Canada (2023–2023)
- Project: Metal distributions in deformed sulphides and oxides

Postdoctoral Investigator, Woods Hole Oceanographic Institution, United States (2021–2023)
- Project: Transformation plasticity as a transient creep mechanism

Internship – 3Keel & Innocent (Summer 2019)
- A three-month internship in environmental consultancy working jointly with 3Keel (an Oxford-based sustainability consultancy) and Innocent (a soft drink company)

PROFESSIONAL EXPERIENCE

Authorship of peer-reviewed scientific publications (2021–present)
- Nine peer-reviewed research articles (three first author, three second author, full publication list below)

Dissemination of results through oral presentations (2021–present)
- Sixteen seminar or conference talks (twelve as an invited speaker)

Scientific evaluation
- Scientific reviewer for the Journal of Structural Geology and Progress in Earth and Planetary Science

AWARDED FUNDING

Total of ca. $650k of awards secured between 2017 and 2022 from the Keith Prout Crystallography Fund, Old Members' Trust, Burdett-Couttes Fund (all Oxford University), European EXCITE Network, Mike Coward Fund (Geological Society of London), and the National Science Foundation.

MANAGEMENT EXPERIENCE

- Led in-person training of users on scientific apparatus, both in Universities and National Laboratories
- Instructor, Canadian Tectonics Group short course on crystallography (2024)
- Mentored Master students at Oxford University and interns at Woods Hole Oceanographic Institution
- Held a management role during research visits to Argonne National Laboratory, USA, which included optimising the scientific needs of research groups across multiple institutions
- Co-convened conference sessions at Geological Association of Canada & the Mineralogical Association of Canada joint meeting (2024) and American Geophysical Union (2021). Session chair and panel member at the Gordon Research Seminar, Rock Deformation (2022, 2024)

PUBLICATION LIST

Goddard, R.M., Cross, A.J., Lloyd, G.E., Breithaupt, T., Kumamoto, K.M., V.Dyck, B., Chen, H., Parson, A., and Bidgood, A. (*accepted*). A microstructural signature of the coesite-quartz transformation: New insights from high-pressure experiments and EBSD. *Earth and Planetary Science Letters*. https://doi.org/10.31219/osf.io/czpx5_v1

V.Dyck, **Goddard, R.M.,** Osinchuk, A., and Vanderkam. (*submitted*). Epitaxy governs the location and orientation of nucleation in crystalline systems. *Science Advances*. https://doi.org/10.31219/osf.io/3htzu_v1

Hein, D., Hansen, L.N., Kumamoto, K.M., Chen, H., Nehring M.A., **Goddard, R.M.,** Breithaupt, T., Cross, A.J., Thom, C.A., and Seyler, C. (2025), The role of dislocations in the anelasticity of the upper mantle. *Journal of Geophysical Research: Solid Earth.* https://doi.org/10.1029/2025JB031674

Cross, A. J., **Goddard, R. M.,** Kumamoto, K. M., Goldsby, D. L., Hansen, L. N., Chen, H., Thom, C. A., Hein, D., and Nehring, A. (2025) Synchrotron radiation reveals transient weakening during mineral phase transformations. *Nature Geoscience.* https://doi.org/10.1038/s41561-025-01703-6

Goddard, R. M., Kumamoto., K. M., Hansen, L. N., Wallis, D., Cross., A. J., and Thom, C. A. (*in revision*). Subgrain-size piezometry as a tool for measuring stress in polymineralic rocks. *Journal of Geophysical Research: Solid Earth.* https://doi.org/10.22541/essoar.169755254.46171679/v1

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/10.1029/2020GL090056

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.* https://doi.org/10.1111/jmg.12576

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

INTERESTS: Travel, Running (races in Canada, UK), Hiking (British Columbia, Himalayas), Swimming (Oxford University Second Team), Art, Literature