

# **Dr. CHRISTOPHER JAMES ROWAN**

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## **Research Interests**

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My research focuses on understanding the deformation of the Earth's crust, at both the global scale of plate motions and the regional scale of plate boundaries. The paleomagnetic and rock magnetic techniques I specialise in provide unique and valuable information on these processes, but only when informed by an understanding of the complex mechanisms by which rocks record and preserve magnetic signals - and are sometimes reset. A large subset of my research is therefore also motivated by the need to investigate and understand the recorder in order to be sure about the meaning of the signal, particularly in rocks with complex magnetic mineralogy. I am also interested in how gaps in the naturally patchy spatial and temporal records provided by field data can be filled in by combining them with the results of analogue and computer modelling.

## **Current Position**

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### **Assistant Professor (NTT), Kent State University**

**Jan 2013 – Present**

- Teaching upper level courses in Geophysics, Tectonics and Orogeny, Natural Hazards and Paleomagnetism, and an intro-level course in Physical Geology (How the Earth Works)
- Currently advising one graduate student (Chenjian Fu)
- Undergraduate advisor.
- Chair of Departmental Curriculum Committee from Fall 2014.
- Environmental Policies Council representative for the College of Arts and Sciences from Fall 2018.

## **Previous Positions**

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### **CIFAR Postdoctoral Fellow, University of Chicago**

**Nov 2010 – Nov 2012**

Funded by the Canadian Institute For Advanced Research; research on coupling between mantle convection and global plate motions.

### **Marie Curie Fellow, University of Edinburgh**

**Nov 2008 – Nov 2010**

Funded as part of EC Marie Curie Excellence Grant awarded to investigate late Neoproterozoic low-latitude glaciations. Taught lectures in Geomagnetism, introductory geology field trips.

### **Postdoctoral Researcher, University of Johannesburg**

**Feb 2007 – Nov 2008**

Working in the Paleoproterozoic Mineralization Research Group; research on Neoproterozoic sequences on the Kaapvaal Craton. Partially supported by an NRF Postdoctoral Fellowship. Taught on field trips to Barberton Greenstone belt and Western Cape/Namibia.

**Research Technician, NOCS**

**Oct 2005 –Feb 2007**

Ran paleomagnetic laboratory at National Oceanography Centre, Southampton and provided teaching cover for Head of School; lectures in Kinematics, Exploration Geophysics (2006-7) and Formation & Evolution of the Ocean Crust, and supervision of undergraduate mapping dissertations (including field supervision in NW Spain, marking and oral examinations).

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**Qualifications**

**Phd in Geology, University of Southampton, UK**

**2006**

Dissertation: Neogene paleomagnetism & geodynamics of the Hikurangi Margin, New Zealand. Teaching assistant in Earth Materials and Structural Geology labs, field trips to Spain, Anglesea, South Wales, Dorset Coast.

**MSci (1<sup>st</sup> class) & MA (1<sup>st</sup> class), University of Cambridge, UK**

**2001**

Dissertation on Palaeozoic reconstructions of peri-Gondwanan terranes; independent mapping project in Paleozoic of North Wales. Awarded Dr Stoneley's Prize for Geology/Geophysics, a Foundation scholarship, and a College Prize for exam performance.

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**Graduated Students**

Matthew Harding (MS, 2017) - A Geophysical Study of the Upper Silurian Sailina Group in Northeastern Pennsylvania

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**Publications**

- Roberts, A.P., *et al.*, 2018. Signatures of reductive magnetic mineral diagenesis from unmixing of first-order reversal curves. [JGR, Vol. 123, B015706](#)
- Rowley, D.B., and Rowan C.J., 2017. Preserved History of Global Mean Spreading Rate: 83 Ma to Present. [Geophys. J. Int. Vol 208, p1173-1183](#)
- Rowley, D.B., *et al.*, 2016. Kinematics and dynamics of the East Pacific Rise linked to a stable, deep-mantle upwelling. [Science Advances, Vol. 2, e1601107](#)
- Rowan, C.J., and Rowley, D.B., 2014. Spreading behaviour of the Pacific-Farallon ridge system since 83 Ma. [Geophys. J. Int., Vol. 197, p1273-1283.](#)
- Roberts, A.P., *et al.*, 2011. Magnetic properties of sedimentary greigite (Fe<sub>3</sub>S<sub>4</sub>): an update. [Reviews of Geophysics, Vol. 49, RG1002.](#)
- Rowan, C.J. *et al.*, 2009. Reductive diagenesis, magnetite dissolution, greigite growth and paleomagnetic smoothing in marine sediments: A new view. [EPSL, Vol. 227, 223-235.](#)
- Chang, L. *et al.*, 2009. Low-temperature magnetic properties of greigite (Fe<sub>3</sub>S<sub>4</sub>). [Geochem. Geophys. Geosyst., Vol. 10, Q01Y04.](#)
- Rowan, C.J., and Roberts, A.P., 2008. Widespread remagnetizations and a new view of Neogene tectonic rotations within the Australia-Pacific plate boundary zone, New Zealand. [JGR, Vol.113, B03103.](#)
- Chang, L., *et al.*, 2007. Magnetic characteristics of synthetic pseudo-single-domain and multi-domain greigite (Fe<sub>3</sub>S<sub>4</sub>). [GRL, Vol. 34, L24304.](#)
- Roberts, A.P., *et al.*, 2007, High-resolution evidence for dynamic transitional geomagnetic field behaviour from a Miocene reversal, McMurdo Sound, Ross Sea, Antarctica. [Earth Planets Space, Vol. 59, p815-824.](#)

- Rowan, C.J., and Roberts, A.P., 2006. Magnetite dissolution, diachronous greigite formation, and hematite growth from pyrite oxidation: unravelling complex magnetizations in Neogene marine sediments from New Zealand. [EPSL, Vol. 241, p119-137.](#)
- Roberts, A.P., *et al.*, 2006. Characterization of hematite ( $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>), goethite ( $\alpha$ -FeOOH), greigite (Fe<sub>3</sub>S<sub>4</sub>), and pyrrhotite (Fe<sub>7</sub>S<sub>8</sub>) using first-order reversal curve diagrams. [JGR, Vol.111, B12S35.](#)
- Rowan, C.J., and Roberts, A.P., 2005. Tectonic and geochronological implications of variably timed magnetizations carried by authigenic greigite in marine sediments from New Zealand. [Geology, Vol. 33 p553-556.](#)
- Rowan, C.J. et al., 2005. Relocation of the tectonic boundary between the Raukumara and Wairoa domains (East Coast, North Island, New Zealand): implications for the rotation history of the Hikurangi margin. [NZ J. Geol. and Geophys., Vol. 48, p185-196.](#)

## Conference Presentations

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- Wislocki, J. & Rowan, C.J. 2018. Analogue modelling of the formation of the Pennsylvania Salient: do the Appalachians bend around and ancient rift? GSA Fall Meeting, Seattle, Paper No. D41-385-373.
- Wislocki, J. & Rowan, C.J. 2017. Analogue modelling of the formation of the Pennsylvania Salient: do the Appalachians bend around and ancient rift? GSA North-East/North-Central Section Meeting, Pittsburgh, Paper No. 26-21
- Rowan, C.J. & Roberts, A.P., 2015. Constraining the Neogene rotation history of the Hikurangi Margin, New Zealand, using combined magnetic fabric and paleomagnetic data. GSA Fall Meeting, Baltimore, Paper No. 155-12.
- Fu, C. & Rowan, C.J., 2015. Measuring Similarity between Calculated Paleomagnetic APWPs and the Fixed Hotspot Model Predicted APWP. AGU Fall Meeting, San Francisco, Paper No. T13A-2957.
- Rowan, C.J., 2014. Recovering 'fossilised' strain: reconstructing the evolving strain field above the locked Cascadia megathrust over multiple earthquake cycles using Anisotropy of Magnetic Susceptibility. GSA Fall Meeting, Vancouver, Paper No. T7-231-5.
- Harding, M.R., and Rowan, C.J., 2014. Salt Tectonics in the Upper Silurian Salina Group, Appalachian Basin, NE Pennsylvania: Results from 3D Seismic Analysis and Analogue Modeling. AAPG ACE, Houston.
- Harding, M.R., and Rowan, C.J., 2013. The influence of pre-existing basement structures on salt tectonics in the Upper Silurian Salina Group, Appalachian Basin, NE Pennsylvania: results from 3D seismic analysis and analogue modeling. AGU Fall Meeting, San Francisco.
- Rowan, C.J., et al., 2013. Signals of dynamic coupling between mantle and lithosphere beneath the axis of the East Pacific Rise. AGU Fall Meeting, San Francisco.
- Rowan, C.J. & Rowley, D.B., 2012. Spreading behaviour of the Pacific-Farallon ridge system between 83 and 28 Ma. AGU Fall Meeting, San Francisco.
- Rowan, C.J. & Rowley, D.B., 2011. Kinematics of Mid-Ocean Ridge Relative Motions in the Indo-Atlantic Frame of Reference: Passive and Active Spreading Ridges. AGU Fall Meeting, San Francisco.
- Rowan, C.J. & Roberts, A.P., 2011. Widespread remagnetizations associated with sedimentary greigite (Fe<sub>3</sub>S<sub>4</sub>): Implications for Neogene tectonic rotations within the

Dr. Christopher James Rowan

- Australia-Pacific plate boundary zone, New Zealand. AGU Fall Meeting, San Francisco (invited).
- Rowan, C.J. & Tait, J., 2010. Oman's low latitude "Snowball Earth" pole revisited: Late Cretaceous remagnetisation of Late Neoproterozoic carbonates in Northern Oman. AGU Fall Meeting, San Francisco.
- Floyd, J. & Rowan, C.J. 2010. Earth Science, Web 2.0+, and Geospatial Applications. ScienceOnline 2010, North Carolina
- Rowan, C.J. et al., 2008. A palaeomagnetic investigation of the Neoproterozoic Pongola Supergroup, South Africa. AAPG International Conference, Cape Town.
- Rowan, C.J. & Roberts, A.P., 2004. Rotation of the Hikurangi Margin, East Coast, New Zealand: Reconciling Long-Term Deformation Patterns Indicated by Paleomagnetic and Magnetic Fabric Data With the Short-Term Velocity Field. AGU Fall Meeting, San Francisco.
- Rowan, C.J. & Roberts, A.P., 2004. Tectonic rotation of the Hikurangi Margin, East Coast, New Zealand: new constraints from paleomagnetic and magnetic fabric data. Geo<sup>3</sup> Meeting, Taupo, New Zealand.
- Woodcock, N.H. & Rowan, C.J. 2000. Too much clean sand on the Cambro-Ordovician rim of Gondwana? British Sedimentological Research Group Annual Meeting, Loughborough University.

## **Invited Talks**

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*University of North Carolina, Charlotte, Feb 2012.* Deep Mantle Contributions to Global Plate Motions: Insights from the Kinematics and Dynamics of the East Pacific Rise.

*Kent State University, Ohio, Feb 2012.* Rotations, Reversals & Remagnetisations: Paleomagnetic adventures in New Zealand, South Africa and Oman.

*East-West University, Chicago, May 2011.* The Great East Japan Earthquake: a warning for Cascadia?

*University of North Carolina, Charlotte, Jan 2010.* In search of good paleomagnetic data.

*Trinity College, Dublin, Nov 2009.* In search of good paleomagnetic data: the good, the bad, the ugly – and how to tell the difference.

*University of Cape Town, Oct 2008.* Paleomagnetic adventures in the Southern Hemisphere.

## **Other Skills/Achievements**

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Winner, 2009 Ramsay Medal. Awarded annually by the Tectonics Study Group of the Geological Society of London for the best publication to appear within two years of a doctoral award.

Peer-reviewer for Earth and Planetary Science Letters, Geophysical Research Letters, G-Cubed, Geophysical Journal International, Journal of the Royal Society, London, American Journal of Science and Newsletters on Stratigraphy.

Extensive experience of writing scientific software in Python, Perl, Fortran, R and Matlab  
Knowledge of HTML and LaTeX.

I am a firm believer in the value of scientific outreach. I have founded and contribute to the well-regarded geoscience blog Highly Allochthonous (<http://all-geo.org/highlyallochthonous>), which averages >30,000 page views a month, have written articles for Earth Magazine and the Scientific American website, and been involved in National Science week in the UK.