

Dr. CHRISTOPHER JAMES ROWAN

Assistant Professor (NTT), Department of Geology, Kent State University
221 McGilvrey Hall, Kent OH 44240
crowan5@kent.edu 330-672-7428
http://all-geo.org/chris_rowan/

My teaching responsibilities range from teaching introductory Earth Science to humanities majors taking their first science class since high school, to teaching advanced tectonic concepts to finishing geology majors. In a world where climate change and other planetary impacts of our civilization increasingly dominate, the former is just as important as the latter, and just as challenging. I am constantly innovating new teaching materials and activities to engage and inform all of my students. I am also developing a more formal research program that investigates the development of core geological skills such as spatial reasoning, particularly through the use of models that aid visualization skills.

My other 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 modeling of deformation and plate motions.

Current Position

Assistant Professor (NTT), Kent State University

Jan 2013 – Present

*Teaching responsibilities (courses taught multiple times unless marked by *):*

- Geophysics, Tectonics and Orogeny, Geologic Hazards (upper level electives).
- Structural Geology, Degree and Career Pathways in Geology, Summer Field Camp* (required for major).
- How the Earth Works, Earth and Life Through Time* (Geology CORE).

Graduate advising:

- 1 MS student advised to completion.
- Currently advising 1 MS and 1 PhD student.
- Served/Serving on advisory committees for 4 MS students & 1 PhD student.

Service responsibilities:

- Faculty advisor for Geology majors (most semesters).
- Member of Departmental Recruitment Committee (established Spring 2020).
- Chair of Departmental Curriculum Committee and Geology representative on College of Arts and Sciences Curriculum Committee (since 2014).
- Environmental Policies Council representative for the College of Arts and Sciences representative on Environmental Policies committee, 2018-19 & 2020-21.

Summary Timeline for Past 5 Years

	Teaching	Service	Scholarly Activity
2016	<ul style="list-style-type: none"> • 2 x GEOL CORE classes (190 students) • 2 x GEOL upper level classes (25 students) • 1 x FYE (28 students) 	<ul style="list-style-type: none"> • Faculty Adviser • Curriculum Committee (CC) chair • Geology representative on College Curriculum Committee (CCC) 	<ul style="list-style-type: none"> • 2 publications (Science Advances, Geophysical Journal International)
2017	<ul style="list-style-type: none"> • 2 x GEOL CORE classes (170 students) • 2 x GEOL upper level classes (30 students) • 1 x FYE (30 students) 	<ul style="list-style-type: none"> • Faculty Adviser • CC chair • Geology representative on CCC 	<ul style="list-style-type: none"> • UG student presentation at Geological Society of America (GSA) Annual Meeting • Invited attendee at GSA Thompson Field Forum
2018	<ul style="list-style-type: none"> • 4 x GEOL CORE classes (450 students) • 3 x GEOL upper level classes (60 students) • 1 x FYE (13 students) 	<ul style="list-style-type: none"> • Faculty Adviser • CC chair • Geology representative on CCC • Arts and Science representative on Environmental Policies Council (EPC) 	<ul style="list-style-type: none"> • Publication in Journal of Geophysical Research
2019	<ul style="list-style-type: none"> • 5 x GEOL CORE classes (600 students) • 1 x GEOL upper level class (15 students) 	<ul style="list-style-type: none"> • Faculty Adviser • CC chair • Geology representative on CCC 	<ul style="list-style-type: none"> • Research presented at American Geophysical Union (AGU) Fall Meeting
2020	<ul style="list-style-type: none"> • 4 x GEOL CORE classes (470 students) • 2 x GEOL upper level classes (25 students) • National Association of Geoscience Teachers Working Group on Virtual Geophysical Field Experiences 	<ul style="list-style-type: none"> • Faculty Adviser • Geology Recruitment Committee • CC chair • Geology representative on CCC • Arts and Science representative on EPC 	<ul style="list-style-type: none"> • Manuscript submitted to Journal of Geoscience Education (Jan 2021) • Senior person on funded NSF grant • Graduate student presentation at GSA Annual Meeting • Co-author on presentations at GSA Annual Meeting & AGU Fall Meeting

Previous Positions

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).

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 (1st class) & MA (1st 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.

Graduated Students

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

Publications

(h-index 11)

- Rowan, C.J. and Mulvey, B.K. An Innovative Cycle-Based Learning Approach to Teaching with Analog Sandbox Models, *Journal of Geoscience Education*, submitted Jan 2021
- Roberts, A.P., *et al.*, 2018. Signatures of reductive magnetic mineral diagenesis from unmixing of first-order reversal curves. *JGR*, Vol. 123, B015706
- Rowan, C.J., and Rowley D.B., 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 (Fe₃S₄): 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 (Fe₃S₄). [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 (Fe₃S₄). [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-Fe₂O₃), goethite (alpha-FeOOH), greigite (Fe₃S₄), and pyrrhotite (Fe₇S₈) 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

- Ul Hassan, Z. et al., 2020. Impact of climate change on the flow regime of a Cleveland, Ohio, urban stream: implications for stormwater management. AGU Fall Meeting.
- Dyer, L. & Rowan, C.J., 2020. ALAN: A Learning Algorithm for identifying reversal boundary crossings in marine magnetic data. GSA Annual Meeting.
- Pratt-Sitaula, B. et al., 2020. Tools for Teaching Geophysics Remotely. GSA Annual Meeting.
- Rowan, C.J. & Mulvey B.K. 2019. Do sandbox models help students to visualise geologic structures and deformation? AGU Fall Meeting, San Francisco, Paper No. ED23F-1074.
- Wislocki, J. & Rowan, C.J. 2018. Analogue modelling of the formation of the Pennsylvania Salient: do the Appalachians bend around and ancient rift? GSA Annual 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 Annual 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 Annual 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 (Fe₃S₄): Implications for Neogene tectonic rotations within the 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. Geo³ 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.

Other Products

Getting to know your Smartphone Magnetometer. Activity submitted to National Association of Geoscience Teachers as part of work on Virtual Geophysical Field Experiences Working Group.

Invited Talks

- University of Akron, November 2017.* Rotations, Remagnetisations and Reactivation: the last 20 million years of deformation on the North Island of New Zealand
- 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

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 National Science Foundation, 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
Working 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 as well as more recently science nights at the Kent State Child Development Center.