

Curriculum Vitae – Dr. Thomas M Mitchell

Employer

Work Address

Department of Earth Sciences, University College London, Gower Street, London, WC1E 6BT, UK. Office: +44 (0)20 7679 7361

Email: tom.mitchell@ucl.ac.uk

History of employment

Sept 2020 - present	Professor of Earthquake Geology and Rock Physics. UCL, UK
Oct. 2016 – Sept 2020	Associate professor of Earthquake Geology and Rock Physics. UCL, UK
Sept 2013–Sept 2016	Assistant Professor (Lecturer), University College London, UK
June - August 2013.	Visiting research Professor (invited), Departamento de Ingeniería Estructural y Geotécnica. Pontificia Universidad Católica de Chile. Santiago, Chile.
Dec. 2011 – May 2013	Post-Doctoral Researcher Istituto Nazionale di Geofisica e Vulcanologia (INGV), Rome, Italy
March 2012 – present.	External lecturer (invited) (Maître de conférence invite), Ecole et Observatoire des Sciences de la Terre, University of Strasbourg, France.
September 2011	Visiting researcher (invited), Department of Geology, University of Otago, Dunedin, New Zealand.
July 2011 – Sept 2011	Visiting researcher, Rock Deformation Laboratory, Brown University, Providence, RI, USA.
Nov 2009 – Nov 2011	Post-Doctoral Research Associate, Experimental Geophysics Laboratory, Ruhr-University Bochum, Bochum, Germany.
Sept 2007 – Oct 2009	JSPS Postdoctoral Research Fellow Department of Earth & Planetary Systems Science, Hiroshima University, Japan

Degrees

2003 –2007	PhD	Ph.D. The Fluid Flow Properties of Fault Damage Zones, University of Liverpool, UK
1999-2003.	BSc	Bachelor of Science with Honours in Geology, 1 st Class, University of Liverpool, UK

Narrative of research experience

I am a geophysicist and earthquake geologist using a unique and innovative combination of **laboratory, fieldwork** and **theoretical** approaches in the Rock and Ice Physics Laboratory and UCL Seismolab in order to understand how rock and ice fractures, deforms and slides by friction at a wide range of slip/strain rates. I have established an international reputation in developing and utilizing specialist state-of-the-art, world-unique equipment to address specific and fundamental problems in rock physics. Fractured rocks and fluids in the Earth's crust control a wide range of important natural phenomena, which is reflected in my research; they host and control the slip characteristics of earthquakes [1-5], record damage and co-seismic high strain rate stress signals of dynamic ruptures [6-9], provide pathways to channel deep sourced geo-fluids [10, 11] upwards that control the location and amount of precious metals, minerals [12] (e.g. gold, copper, lithium) and hydrocarbons [13, 14] (e.g. oil and gas), determine the location of volcanic hotspots and geothermal energy [15], control rate and location of induced anthropogenic earthquakes during fracking and fluid injection [16], and control the mechanics of huge landslides [17, 18].

Since gaining my PhD in 2007, I have published 56 papers in international journals (https://scholar.google.com/citations?user=ZVyA_gAAAAJ&hl=en), including Nature, Nature Comms., Geology, EPSL & GRL, have published an AGU Monograph book as editor and a special edition of Journal of Structural Geology. I have convened and led 13 major topical sessions at major conferences in my field, published over 150 conference abstracts at 45 scientific meetings. I am internationally recognised for this work, having given 65 invited talks at international conferences and University seminars. I was awarded the prestigious Bullerwell Lectureship of the British Geophysical Association in 2018 for excellence in Geophysics, bestowed on an individual for significant contribution to the field of geophysics. I have been Associate Editor for the Journal of Geophysical Research (Solid Earth) since 2017. I have a sustained record of significant funding with a total research grant income of >£2.5 million as either PI or Co-I, from NERC, EU and industry sources.

These grants have supported 11 postdoctoral researchers and 2 engineer/research technicians. I currently supervise / co-supervise 8 PhD students and 2 postdoctoral researchers who are working on various exciting aspects of both laboratory and field studies of earthquake and rock physics related problems. To date I have supervised or co-supervised 12 PhD students to completion.

Short list of key publications

1. Faulkner, D.R., et al., *Stuck in the mud? Earthquake nucleation and propagation through accretionary forearcs*. Geophysical Research Letters, 2011. **38**.
2. Faulkner, D.R., et al., *Slip on 'weak' faults by the rotation of regional stress in the fracture damage zone*. Nature, 2006. **444**(7121): p. 922-925.
3. De Paola, N., et al., *Fault lubrication and earthquake propagation in thermally unstable rocks*. Geology, 2011. **39**(1): p. 35-38.
4. Rowe, C.D., et al., *Earthquake lubrication and healing explained by amorphous nanosilica*. Nature Communications, 2019. **10**.
5. Proctor, B., et al., *Direct evidence for fluid pressure, dilatancy, and compaction affecting slip in isolated faults*. Geophysical Research Letters, in press.
6. Mitchell, T.M., Y. Ben-Zion, and T. Shimamoto, *Pulverized fault rocks and damage asymmetry along the Arima-Takatsuki Tectonic Line, Japan*. Earth and Planetary Science Letters, 2011. **308**(3-4): p. 284-297.
7. Aben, F.M., et al., *Dynamic fracturing by successive coseismic loadings leads to pulverization in active fault zones*. Journal of Geophysical Research-Solid Earth, 2016. **121**(4): p. 2338-2360.
8. Mitchell, T.M., et al., *Fluid Inclusion Evidence of Coseismic Fluid Flow Induced by Dynamic Rupture*, in *Fault Zone Dynamic Processes*. 2017, John Wiley & Sons, Inc. p. 37-45.
9. Aben, F.M., et al., *Rupture Energetics in Crustal Rock From Laboratory-Scale Seismic Tomography*. Geophysical Research Letters, 2019. **46**(13): p. 7337-7344.
10. Mitchell, T.M. and D.R. Faulkner, *The nature and origin of off-fault damage surrounding strike-slip fault zones with a wide range of displacements: A field study from the Atacama fault system, northern Chile*. Journal of Structural Geology, 2009. **31**(8): p. 802-816.
11. Ostermeijer, G.A., et al., *Damage zone heterogeneity on seismogenic faults in crystalline rock; a field study of the Borrego Fault, Baja California*. Journal of Structural Geology, 2020: p. 104016.
12. Jensen, E., et al., *Fault-fluid interaction in porphyry copper hydrothermal systems: Faulted veins in radomiro Tomic, northern Chile*. Journal of Structural Geology, 2019. **126**: p. 301-317.
13. Backeberg, N.R., et al., *Quantifying the anisotropy and tortuosity of permeable pathways in clay-rich mudstones using models based on X-ray tomography (vol 7, 2017)*. Scientific Reports, 2018. **8**.
14. Iacoviello, F., et al., *The Imaging Resolution and Knudsen Effect on the Mass Transport of Shale Gas Assisted by Multi-length Scale X-Ray Computed Tomography*. Scientific Reports, 2019. **9**.
15. Pérez-Flores, P., et al., *The effect of offset on fracture permeability of rocks from the Southern Andes Volcanic Zone, Chile*. Journal of Structural Geology, 2017. **104**: p. 142-158.
16. Passelegue, F.X., N. Brantut, and T.M. Mitchell, *Fault Reactivation by Fluid Injection: Controls From Stress State and Injection Rate*. Geophysical Research Letters, 2018. **45**(23): p. 12837-12846.
17. Magnarini, G., et al., *Longitudinal ridges imparted by high-speed granular flow mechanisms in martian landslides*. Nature Communications, 2019. **10**.
18. Mitchell, T.M., et al., *Catastrophic emplacement of giant landslides aided by thermal decomposition: Heart Mountain, Wyoming*. Earth and Planetary Science Letters, 2015. **411**(0): p. 199-207.

Honors

- Bullerwell Lecturer, 2018 – The Bullerwell Lecture is an annual award from the British Geophysical Association (BGA) bestowed on an individual for significant contribution to the field of geophysics
- Journal of Structural Geology Student Author of the Year Award 2009-2010, for paper entitled The nature and origin of off-fault damage surrounding strike-slip fault zones with a wide range of displacements: A field study from the Atacama fault system, northern Chile.

Professional society memberships

October 2004 - present - Member of the American Geophysical Union

December 2005 - present - Member of the European Geoscience Union