

## Dr Carl Stevenson

Lecturer in Geology

**[School of Geography, Earth and Environmental Sciences \(/schools/gees/index.aspx\)](/schools/gees/index.aspx)**

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### About

Dr Carl Stevenson is a structural geologist with a focus on the emplacement and subsurface distribution of igneous and volcanic rocks. His research uses rock magnetism, geophysics and petrology to determine the large-scale geometry and internal architecture of intrusions and has led to breakthroughs in understanding magma transport and accommodation in the Earth's crust. This work has earned three academic awards including two best publications and the Geological Society President's Award.

### Qualifications

BSc in Geology, Queens University Belfast  
PhD in Earth Sciences, University of Birmingham

### Biography

Dr Stevenson was born in Northern Ireland and studied geology in Belfast before moving to Birmingham to study for PhD on granite emplacement with Professor Donny Hutton. He was appointed lecturer in Geology at Birmingham in 2007.

2007-current Lecturer in Geology, GEES, University of Birmingham  
2005-2007 Teaching fellow in Earth Sciences, University of Birmingham  
2001-2005 PhD Earth Sciences (Birmingham)  
1998-2001 BSc Geology (Belfast)

### Teaching

Dr Stevenson teaches structural geology, geological mapping, field geology and ore geology. He has also been involved in integrating digital technologies into teaching and is part of an international initiative developed by Midland Valley Exploration, Glasgow ([www.mve.com](http://www.mve.com)). Involving 14 geoscience departments and schools in universities from the UK, USA, Netherlands, Italy and Australia, the initiative aims to enhance 3D visualisation, interpretation and geological mapping in geoscience undergraduates.

Continental Deformation (Semester 1)

Field Skills II (Semester 1)

Deformation processes and maps (geological map interpretation, Semester 2)

Research methods and project planning for geological mapping project (Semester 2)

Geological Mapping project (coordinator)

#### Contribution to:

- Topics in Geology (essay)
- Advances in Earth Sciences (essay)
- Mapping supervision (Ireland and Spain)
- Field Skills I
- Mineral deposits: formation, environmental impact and restoration
- Advanced projects

#### Field courses:

- Assynt
- Bude
- Pembrokeshire

### Postgraduate supervision

#### Current students:

Paul Anderson – The structure and emplacement of the Newry Granodiorite Complex, NI

## Completed students:

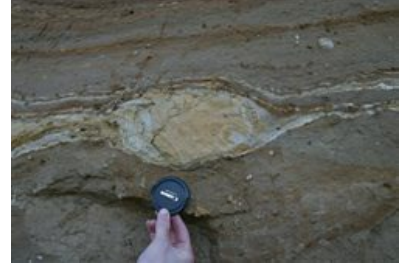
Dr Nick Schofield - Linking sill morphology to emplacement mechanism  
Dr Craig Magee – The emplacement of cone sheets on Ardnamurchan, NW Scotland

## Research

Dr Stevenson's principal research uses rock magnetic techniques to measure very weak or subtle mineral alignment fabrics in igneous rocks. He is specialist in anisotropy of magnetic susceptibility (AMS) analysis. This technique can be employed in a number of different settings and Dr Stevenson uses it to detect 'frozen in' evidence for magma flow in igneous intrusions from granite plutons to dykes and sills that form the roots of deeply eroded ancient volcanoes. This data can then be used to test theories about how magma travels through the crust and how large igneous intrusions (or fossil magma chambers) are constructed – essentially assessing the volcano plumbing.

Recently Dr Stevenson has been involved in developing the application of AMS to study the fabrics of glacial sediments. As a glacier moves toward the sea, it can deform the till and sediment that it passes over depending on the conditions at the base of the glacier. If the sediment and till is frozen to the base of the glacier they will deform much less than if they are not frozen and behave like soft mud. Sometimes evidence of subglacial shearing is obvious, but when it is not, AMS can provide a wealth of information including the direction of ice flow and the conditions at the base of the glacier.

This research is in conjunction with the [GAINS project \(/research/activity/geosystems/projects/gains2010/index.aspx\)](http://www.gainsproject.org/research/activity/geosystems/projects/gains2010/index.aspx) which is investigating evidence for Neoproterozoic global glaciations, 'Snowball Earth events', in Northern Svalbard.



## Rock Magnetism Laboratory

Dr Stevenson leads a [rock magnetism laboratory \(http://www.gees.bham.ac.uk/research/facilities\\_rockmagnetics.shtml\)](http://www.gees.bham.ac.uk/research/facilities_rockmagnetics.shtml) which is equipped to study palaeomagnetism, anisotropy of magnetic susceptibility or bulk susceptibility.

## Other activities

### Admin responsibilities

Geology Programme Leader  
Deputy Chair Earth Sciences student-staff committee  
Geosystems representative on School Web advisory committee

### Other activity

Associate editor, Journal of the Geological Society London  
Volcanic and Magmatic Studies Group committee  
Mineralogical Society Birmingham rep

## Affiliations

Geological Society London (Fellow)  
American Geophysical Union

## Publications

Magee, C., **Stevenson, C.T.E.**, O'Driscoll, B., and Petronis, M.S. Local and regional controls on the lateral emplacement of the Ben Hiant dolerite intrusion, Ardnamurchan (NW Scotland). *Journal of Structural Geology*, 39, 66-82.

Petronis, MS., O'Driscoll, B., **Stevenson, C.T.E.** & Reavy, R.J. (2012) Controls on emplacement of the Caledonian Ross of Mull Granite, NW Scotland: Anisotropy of magnetic susceptibility and magmatic and regional structures. *Geological Society of America Bulletin*. doi:10.1130/B30362.1

**Stevenson, C.T.E.** and Bennett, N. (2011) The emplacement of the Palaeogene Mourne Granite Centres, Northern Ireland: New results from the Western Mourne Centre. *Journal of the Geological Society*, v168, p831-6.

Schofield, N.J., **Stevenson, C.T.E.** and Reston T.J., (2010) Magma Fingers and Host Rock Fluidization in the Emplacement of Sills, *Geology* v38, p63-66.

**Stevenson, C.T.E.** (2009) The relationship between forceful and passive emplacement: the interplay between tectonic strain and magma supply in the Rosses Granitic Complex, NW Ireland. *Journal of Structural Geology*, v31, p270-287.

Holford, SP., Green, PF., Hillis, RR, Turner, JP. and **Stevenson, C.T.E.** (2009) Mesozoic-Cenozoic exhumation and volcanism in Northern Ireland constrained by AFTA and compaction data from the Larne No. 2 borehole. *Petroleum Geoscience*, v15, p239-257.

**Stevenson, C.T.E.**, O'Driscoll, B., Holohan, E., Couchman, R. and Reavy, R.J. (2008) The structure, fabrics and AMS of the Slieve Gullion ring-complex, N. Ireland: testing the ring-dyke emplacement model. *Geological Society Special Publication* No 302, p159-184

**Stevenson, C.T.E.**, Hutton, DWH. and Price, AR., (2008) The emplacement of the Trawenagh Bay Granite and a new model for the emplacement of the Donegal Batholith, *Transactions of the Royal Society of Edinburgh: Earth Sciences*, v97, p455-477.

O'Driscoll, B., **Stevenson, C.T.E.** and Troll, VR. (2008) Mechanisms of fabric acquisition in some Tertiary layered gabbros: a combined AMS, textural and geochemical study. *Journal of Petrology*, v49, p1187-1221.

**Stevenson, C.T.E.** (2008) A revised intrusion sequence for the Donegal batholith: evidence from its aureole in Lettermacaward, *Irish Journal of Earth Sciences*, v26, p33-43

**Stevenson, C.T.E.**, Owens, WH., Hutton, DWH., Hood, DN. and Meighan, IG., (2007) Laccolithic, as opposed to cauldron subsidence, emplacement of the Eastern Mourne Pluton, N. Ireland: evidence from anisotropy of magnetic susceptibility. *Journal of the Geological Society, London*, v164. p99-110. (Journal of the Geological Society Young Author Award 2007)

**Stevenson, C.T.E.**, Owens, WH. and Hutton, DWH., (2007) Flow lobes in granite: the determination of magma flow direction in the Trawenagh Bay Granite, N. W. Ireland, using anisotropy of magnetic susceptibility. *Geological Society of America Bulletin*, v119, p1368-1386. (Ramsay Medal 2008)

