CALUM CHAMBERLAIN

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My main academic interests lie in the study of geodynamics and tectonics through the use of seismology and remote sensing techniques. My current research focuses on the detection and analysis of microseismicity, tremor and low-frequency earthquakes (LFEs) associated with the Alpine Fault in the South Island of New Zealand.

EDUCATION

Victoria University of Wellington September 2012–Present
PhD Student *Supervised by John Townend and Tim Stern*

Provisional thesis title: Improved earthquake detection as a probe for active fault structures in New Zealand's Central Southern Alps. This research involves the collection, analysis and archiving of passive-source seismic data, for both standard seismic detection and the detection of more esoteric seismic events such as low-frequency earthquakes and glacial seismicity. This research has garnered interest from both within the scientific community and within the media, with newspaper and radio coverage of the publication of the first LFE catalogue for the Southern Alps (Chamberlain et al. 2014).

Contributions to related projects:

- *Deep Fault Drilling Project (DFDP) - Phase 2:* Drill and study Alpine Fault to 1.3 km Depth;
- *WIZARD:* Imaging the Alpine Fault of New Zealand through passive source seismic tomography. NSF award: 1114228.

University of Leeds 2008–2012
BSc & MGeophys *1st Class Honours*

I conducted my masters research project on the relation between geodetically determined strain rate orientations and stress orientations near the San Andreas Fault under the supervision of Dr. Nicolas Houlié.

Victoria University of Wellington June 2010–June 2011
Undergraduate year abroad *New Zealand*

Forest School and College 2001–2008
4 A-grades at A-level - final exams *Deputy Head boy 2007–2008*

AWARDS

Jim Ansell Geophysics Scholarship: awarded in 2014 by the Geoscience Society of New Zealand to the applicant 'whose subsequent career, in the opinion of the Committee, is the most likely to advance geophysics in New Zealand'.

Victoria Doctoral Scholarship: held 2012–2015, value $80,000 (NZD).

Shell Technical Scholarship, held 2008–2012, value £10,000 (GBP).

FIELD EXPERIENCE

Seismic network deployment and maintenance: Led the maintenance of three seismic networks throughout 2012–2015, totalling 22 sites. Of these networks eight sites were deployed by me with surface sensors and four sites were borehole seismometers installed alongside IESE, Auckland. Service and installation work required the use of helicopters in high alpine conditions (up to 1500 m) in challenging terrain and weather. I have also assisted in the maintenance of a further three seismic networks in conditions ranging from bush to high alpine terrain.

Real-time seismic monitoring: During and prior to the drilling of the DFDP-2 borehole I led the seismic monitoring subteam. This included the installation and maintenance of a telemetered seismic network, deployment of open-source real-time monitoring software (RtQuake) on multiple computer systems for redundancy, and management of an international team of 15–20 seismologists operating 24/7. This also included time on the drillsite working alongside geologists and drillers.

Geophysical surveying: Undergraduate field classes in magnetic, gravity, resistivity and active-source seismic experiments at the University of Leeds and Victoria University of Wellington, and subsequent tutoring of these classes at Victoria University of Wellington.

TEACHING EXPERIENCE

Exploration Geophysics, ESCI305, Victoria University of Wellington, 2013–2015

Third-year undergraduate lab classes on gravity modelling, refraction and reflection seismic processing and interpretation, and field classes on active-source seismic acquisition and gravity acquisition.

Field Geophysics, ESCI344, Victoria University of Wellington, 2013

Third-year undergraduate week long field class on active-source seismic acquisition, magnetic, gravity and resitivity data collection and interpretation.

TECHNICAL EXPERTISE

- **Earthquake detection:** Using energy based methods, beamforming and correlation techniques.
- **Software development:** Detection software developed in Matlab and Python for open-source collaboration and distribution on github and pypi (EQcorrscan). Optimized for parallel work-flows.
- **Software adaptation:** Fortran and C expertise in developing and adding functionality to existing detection software.
- **Programming languages:** Fortan, C, Python, Matlab, GMT, bash.

PUBLICATIONS

- H.J. Horgan, B. Anderson, R.B. Alley, C.J. Chamberlain, R. Dykes, L.M. Kehrl, J. Townend (2015): *Earth & Planetary Science Letters*, Glacier velocity variability due to rain induced sliding and cavity formation, doi:10.1016/j.epsl.2015.10.016.
- C.J. Chamberlain, D.R. Shelly, J. Townend, T. A. Stern (2014): *Geochemistry, Geophysics, Geosystems*, Low-frequency earthquakes reveal punctuated slow slip on the deep extent of the Alpine Fault, New Zealand, doi: 10.1002/2014GC005436.
- S.C. Cox, C.D. Menzies, R. Sutherland, P. Denys, C.J. Chamberlain, D. Teagle (2014): *Geofluids*, Transient permeability changes in the Alpine Fault hanging wall, New Zealand, induced by South Island earthquakes, doi: 10.1111/gfl.12093
- C.J. Chamberlain, N. Houlié, T. Stern, H. Bentham (2014): *Earth & Planetary Science Letters*, Lithosphere strain and stress fields near the San Andreas Fault doi: 10.1016/j.epsl.2014.04.048.

SELECTED CONFERENCE ABSTRACTS

- C.J. Chamberlain, D.R. Shelly, J. Townend, T. Stern: Poster, *AGU Fall Meeting 2013*, Low-frequency earthquakes of the Southern Alps, South Island, New Zealand.
- C.J. Chamberlain, et al., Poster: *Geoscience Society of New Zealand annual meeting 2014*, Seismological Charecterization of the DFDP-2 drill-site and surroundings, Whataroa Valley, Central Alpine Fault, New Zealand.
- C.J. Chamberlain, D.R. Shelly, J. Townend, T.A. Stern, Talk: *Geoscience Society of New Zealand annual meeting 2014*, Low-frequency earthquakes reveal punctuated slow slip on the deep extent of the Alpine Fault, New Zealand.

REFEREES

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