



# THE UNIVERSITY OF THE WEST INDIES

ST. AUGUSTINE, TRINIDAD AND TOBAGO, WEST INDIES  
SEISMIC RESEARCH CENTRE

## Modelling of Eastern Caribbean geothermal systems

The UWI-SRC is seeking interested applicants for an MPhil/PhD project on modelling of geothermal systems in the Eastern Caribbean.

### Project description

Geothermal energy promises to become a significant contributor to the energy needs of the Caribbean region in the near future but the region is lacking in people with technical knowledge in this area. Geothermal wells tap heat energy in the form of high temperature brines from the shallow crust. The wells needed to tap these resources cost several millions of dollars each. The financial risk associated with each well acts as a strong inhibitor on the development of geothermal resources. The purpose of this project is to reduce the risk associated with drilling wells by developing models of geothermal reservoirs to guide drilling and increase the success rate of geothermal wells and increase per-well productivity. The Caribbean is currently undergoing a geothermal energy revolution and several countries are at various stages of geothermal development.

This project builds on the work of Dr Graham Ryan et al. [Ryan et al. (2009); Ryan et al. (2013); Ryan and Shalev (2014)] in which multi-parameter geophysical data sets were combined to develop models of the geothermal system in Montserrat which is currently being developed.

The main aims of this project are:

- Investigate the novel use of seismic tomography in imaging geothermal reservoirs
- Utilise appropriate multi-parameter data sets both geophysical (magnetotellurics, seismic tomography, gravity, natural seismicity) and geological and geochemical to construct a robust model of the geothermal reservoir
- Incorporate data from existing wells including well log data and drill cuttings to improve the reservoir model.
- Develop a three-dimensional model of the geothermal system which estimates thermal structure and likely fluid flow pathways through the system.

The successful candidate will receive highly relevant training in the field of geothermal technology an area whose regional and global significance is rapidly increasing. Candidates will also be encouraged to apply for scholarships to attend the one semester course in Geothermal Technology at the University of Auckland in New Zealand.

### **Who should apply?**

Bright, creative and independent students with a strong interest in computer assisted data analysis and numerical and mathematical modelling of earth systems. Applicants should have a minimum of upper 2<sup>nd</sup> class honours in a scientific discipline such as Physics, Computer Science or Geology/Earth Science.

### **Financial assistance**

The successful applicant will be considered for a funded Research assistant position. Depending on performance and funding the successful applicant may be offered the opportunity to upgrade to a PhD programme after completion of the MPhil degree.

### **References**

- Ryan, G. A., S. A. Onacha, E. Shalev, and P. E. Malin (2009), Imaging the Montserrat geothermal prospect using Magnetotelluric (MT) and Time Domain Electromagnetic induction (TDEM) measurements, *Rep. 16366.00-2009.01*, 77 pp, Institute of Earth Science and Engineering, Auckland, New Zealand.
- Ryan, G. A., J. R. Peacock, E. Shalev, and J. Rugis (2013), Montserrat geothermal system: a 3D conceptual model, *Geophys. Res. Lett.*, *40*, 1-6, doi: 10.1002/grl.50489.
- Ryan, G. A., and E. Shalev (2014), Seismic Velocity/Temperature Correlations and a Possible New Geothermometer: Insights from Exploration of a High-Temperature Geothermal System on Montserrat, West Indies, *Energies*, *7*(10), 6689-6720.

### **Contact Info**

Interested applicants are asked to send completed CV and other relevant documents via email with following subject: Geothermal Student Application

Dr Graham Ryan – [graham.ryan@sta.uwi.edu](mailto:graham.ryan@sta.uwi.edu)

cc Clevon Ash – [clevon.ash@uwiseismic.com](mailto:clevon.ash@uwiseismic.com)