

## SPITFIRE Doctoral Training Partnership (DTP)

### Research Experience Placement 2017

#### Project Brief

Applications close at Noon, Friday, 2 June 2017

Lead Supervisor:	Ivo Peters
Email:	<a href="mailto:i.r.peters@soton.ac.uk">i.r.peters@soton.ac.uk</a>
University/Research Organisation:	University of Southampton
Department:	Faculty of Engineering and the Environment
Project Title:	How strong is the ocean floor?

Total Student Support Costs: £	£2500 (10 weeks)
<i>Based on a minimum of £200/week full time for a minimum of 8 weeks and maximum of 10 weeks and a £500 Research and Training Support Grant.</i>	

Proposed Start Date: <b>Monday, 26 June 2017</b>	Proposed End Date: <b>Friday, 1 September 2017</b>
<i>Projects should run over the summer vacation and we recommend that projects will have terminated by 15 September 2017.</i>	

**Brief Summary – please provide a brief summary (maximum 300 words) of the project.**

Giant landslides and sediment avalanches on the seafloor are a demonstrated hazard to seafloor infrastructure (e.g. internet cables and oil pipelines) as well as being the key mechanism by which terrestrial sediment is transported thousands of kilometres before ultimate burial in the deep sea. Our understanding of these landslides and avalanches, from how seafloor slopes fail to how the flows evolve is limited because we know little about the material properties (i.e. the rheology) of the sands, silts and clays that make up the seafloor in the deep sea. Understanding these properties will lead to a better understanding of where and why landslides and avalanches occur, how such flows evolve and therefore enable better modelling capabilities. This will ultimately inform, where to locate and how to protect seafloor infrastructure; how such flows interact with seafloor habitats and how sediment is transported in our oceans.

The lead supervisor for this project will be Ivo Peters, who is a specialist in rheology of complex fluids at the Faculty of Engineering and the Environment. The co-supervisor is Esther Sumner, a specialist in sedimentology within Ocean and Earth Science at the National Oceanography Centre Southampton.

The experiments will be performed at the new Multiphase and Non-Newtonian Fluids Lab (Boldrewood Campus, Southampton), where the student will have access to a state-of-the-art rheometer and related experimental equipment. The student will get trained in rheology, an important and emerging area in the understanding of sediment dynamics. The student will also gain experience in working with and sampling deep sea sediment cores at the British Ocean Sediment Core Research Facility (BOSCORF) at NOCS.

**Please give an indicative timescale for the student's work over the length of the project: (maximum 150 words).**

*This should include:*

- *The broad tasks the student will undertake;*
  - *An indicative timescale for these tasks.*
- 

Week 1-2: general training in rheology, including a training day at TA Instruments in Elstree.

Week 3-4: determine yield stress of bare clay samples, with increasing water content

Week 5-6: exploratory study to the influence of secondary ingredients (e.g. salinity, inclusion of larger sand grains in the clay). The student is expected to be confident in using the rheometer at this point and can take more initiative in exploring ideas that s/he comes up with.

Week 7-8: In-depth measurements in the most promising/surprising part of the exploratory work done in the previous two weeks.

Week 9-10: Finishing up the experiments, write a short report, give a presentation.

**Proposed procedure for appointing students, including selection criteria:**

*Please identify specific criteria that should be considered for the selection of placement students e.g. specific quantitative skills that may be required, subject knowledge etc. If a student has been pre-selected, or the research area has been led by the student, please provide the student's contact details, and a summary of their suitability for the SPITFIRE DTP REP programme.*

---

This project is suitable for students with a background in Engineering, Geology, Oceanography, Geophysical Sciences, or Physical Sciences.

The student should be keen to gain experience in a laboratory environment and use high-precision lab equipment.

The student should be able to take a creative approach to solve practical problems.