

## SPITFIRE Doctoral Training Partnership (DTP)

### Research Experience Placement Project 2019

Lead Supervisor:	Ivan Haigh
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University/Research Organisation:	University of Southampton
Department:	Ocean and Earth Science
Project Title:	Historic Changes in Coastal Flooding around the UK

Total Student Support Costs: £	Student will receive an hourly pay of £8.44 p.h. and is required to work for 30 hours a week over an 8 week period.
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Proposed Start Date: 17 June 2019	Proposed End Date: 9 August 2019
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*Projects should run over the summer vacation and we recommend that projects will have terminated by 25 September 2019.*

#### Brief Summary

*This should include:*

- *Project outline;*
- *Links to staff/School/Centre activity as appropriate;*
- *Supervisory arrangement;*
- *How space/equipment/supporting resource demands will be met;*
- *Elements of the project that will incorporate elements other than computer/modelling e.g. fieldwork and data collection;*
- *How the project will enhance the skills of the appointed student;*
- *Any intellectual property rights concerns that may arise from the work.*

Coastal floods, driven by extreme sea levels, are a major hazard both nationally and globally. In the UK it is estimated that £150 billion of assets and 4 million people are currently at risk from coastal flooding. Coastal flooding is rated as the second highest risk for causing civil emergency in the UK. Combined with fluvial flooding, it is responsible for at least £0.25bn in annual economic damages. Coastal flooding is a growing threat due to accelerating mean sea-level rise and changes in storminess associated with climate change as well as continued population growth and development in flood-exposed areas.

Motivated by the absence of a national framework for documenting coastal floods and their impacts, we have developed a coastal flood database called SurgeWatch ([www.surgewatch.org](http://www.surgewatch.org)). This provides a systematic record of coastal flood events around the UK from 1915 to present. Using the database, we have carried out a detailed assessment of the coastal flood events and their consequences over the last century. The aim of this Research Experience Placement Project will be to extend the database back before 1915 (as far back as 250 AD) and to use this updated dataset to investigate longer-term century scale changes in storminess and coastal flooding. This will involve undertaking a data archaeology exercise to collect evidence of coastal flooding from a verity of 'soft'

data sources (e.g. newspapers, weather reports). The dates and severity of the events will then be assessed along-side meteorological records, to investigate long-term changes in storminess and coastal flooding.

The student will be based at the National Oceanography Centre, under the supervision of Dr Ivan Haigh. The student will gain new skills in historic data collection and enhance their data analysis skills, using Matlab. There are no intellectual property rights concerned that arise from this work.

**Please give an indicative timescale for the student's work over the length of the project:**

*This should include:*

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

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The student will undertake the following three main tasks:

**Weeks 1 – 5, data archaeology exercise:** Following the well establish approach we have developed in SurgeWatch Version 1 and 2, the student will compile a list of coastal flooding events prior to 1915, using a wide range of sources (e.g. newspapers, weather reports). For each event identified, they will write a systematic event description based on the Source-Pathway-Receptor-Consequence framework.

**Weeks 6 – 7, trend analysis:** The student will undertake a data analysis to assess long-term trends in the data, i.e. whether there is evidence that the frequency of coastal flooding has increased. They will correlate trends in coastal flooding to regional weather patterns, such as the North Atlantic Oscillation.

**Week 8, Synthesis:** The student will spend the final week REP Final Report.

**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.*

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This project is open to students from a broad array of different subjects. The key requirement is that they have an interest in coastal flooding and climate change. It would be useful if the student had some experience in using Matlab.