Benjamin Thomas Phillips

PhD Researcher · DoB: 11/05/1994 · British Citizen · Full UK Driving Licence

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Research interests

My current research interests lie in developing methods to effectively integrate short term, storm driven changes, and long term coastal evolution into more effective flood risk management. I am also interested in the economics of coastal resilience, and developing methods to allow stakeholders to maximize investment in coastal defences.

Academic Qualifications

University of Liverpool and National Oceanography Centre   *Liverpool, UK*

PhD - Future vulnerability of evolving gravel barrier coastlines – the impacts for flood risk management   *October 2016-*

- **Supervisors:** Prof. Andrew J. Plater (University of Liverpool), Dr. Jennifer M. Brown (National Oceanography Centre), Prof. Gerd Masselink (Plymouth University), Dr. Martin D. Hurst (Glasgow University) and Dr. Karyn Morrissey (University of Exeter)
- **Funding:** NERC Liverpool-Manchester-NOC Doctoral Training Program: Understanding the Earth, Atmosphere and Ocean. CASE partner is Cardigan Bay Coastal Group.
- **Description:** This thesis will develop an approach to couple coastline evolution and storm impact models, in order to explore the future vulnerability of engineered gravel nourishments under future wave climates. This coupled approach will be used to inform on resilient design of gravel nourishments, and to explore changes in storm impacts over the lifetime of the nourishment. A real option economic assessment will also be used to identify the most economically optimum nourishment frequency.

University of Liverpool and National Oceanography Centre   *Liverpool, UK*

MPhil - Role of beach morphology in wave overtopping hazard assessment   *October 2015 - September 2016*

- **Supervisors:** Prof. Andrew J. Plater (University of Liverpool) and Dr Jennifer M. Brown (National Oceanography Centre).
- **Funding:** Tuition fee funded by EPSRC through Adaptation and Resilience of Coastal Energy Supply project (ARCoES, EP/1035390/1)
- **Description:** XBeach is used to model wave overtopping volume for a 1:200 year joint probability distribution of waves and water levels with measured, pre- and post-storm beach profiles. The simulation with measured bathymetry is repeated with and without morphological evolution enabled during the modelled storm event. This research assesses the role of morphology in controlling wave overtopping volumes for hazardous events that meet the typical design level of coastal defence structures. Results show that disabling storm-driven morphology under-represents modelled wave overtopping volumes by up to 39% under high H_s conditions and has a greater impact on the wave overtopping rate than the variability applied within the boundary conditions due to the range of wave-water level combinations that meet the 1:200 year joint probability criterion.
- **Note:** Due to being offered a PhD, I did not graduate with an MPhil but the work described above has been published in Journal of Marine Science and Engineering.

University of Liverpool   *Liverpool, UK*

BSc (Hons) Geography, First Class Honours   *September 2012 - May 2015*

Work-Based Dissertation: *Modelling coastal inundation from sea defence breaching using LISFLOOD-FP: A case study of North Wales*

Publications

Peer reviewed journal articles

- **Phillips, B. T.**, Brown, J. M., Bidlot, J.-R. and Plater, A. J. (2017) 'Role of beach morphology in wave overtopping hazard assessment', *Journal of Marine Science and Engineering*, 5(1). doi:10.3390/jmse5010001

Employment

University of Liverpool and National Oceanography Centre *Liverpool, UK*

LISFLOOD-FP MODELLER, ARCoES PROJECT *May - June 2015*

- Created a 50 m resolution flood model for North Wales and North West England
- Generated MATLAB codes to allow the inclusion of river and wave forcing in the model boundary conditions.
- Decreased domain sizes at Sizewell, Hinkley Point, Bradwell and Sellafield whilst maintaining accuracy to allow for shorter computation times.

University of Liverpool *Liverpool, UK*

DEMONSTRATOR *September 2015-*

- **Study Skills and GIS** - I attended the module field trip to Trawsfynydd, North Wales and demonstrated collecting peat bog cores and performing the necessary geochemical analysis. For the GIS component, I provide practical support in sessions, administer the module email account (for student enquiries) and mark assignments
- **Experiments in Physical Geography** - I demonstrate the above laboratory techniques, and have also ran day long practicals looking at factors affecting storm flow generation in a catchment simulator and aeolian processes, as well as performed the assessment.
- **Coastal Environments: Spatial and Temporal Change** - Attended module field trip to West Kirby, Merseyside, to assist with identifying saltmarsh vegetation and flood risk mitigation strategies
- **Climatology** Demonstrating basic optics, statistical techniques to bridge missing rainfall data and basic numerical techniques in climatology.
- **Physical Geography Foreign Field Course (Lorca, SE Spain)** - Assisted students with the design and implementation of their projects.

Technical Skills

COMPUTATIONAL AND MODELLING

- Basic: SWAB (wave overtopping model), Linux.
- Intermediate: LaTeX, IBM SPSS Statistics, QGIS, Microsoft ExpressionWeb, Python.
- Advanced: XBeach-G and XBeach (storm driven morphology models for gravel and sandy beaches, respectively), LISFLOOD-FP (coastal and fluvial flood inundation model), GDAL, MATLAB, ARC GIS, Microsoft Office.

FIELDWORK

- Experienced using field-based Bartington MS2E magnetic susceptibility meter on saltmarsh sediments in California.
- Organised land permissions and logistics for extracting cores in UK and California.
- Geomorphological mapping and Schmidt hammer measurements, peat bog coring, river discharge calculation and hillslope profile surveying – Cumbria, Merseyside and Snowdonia.

LABORATORY

- Extensive experience of using NITON XRF meter on California saltmarsh sediment.
- Wide experience of hydrological, pedological, meteorological and geochemical equipment and techniques.

Research Experience

Unidad Académica UNAM *Puerto Morelos, Mexico*

GLOBAL INNOVATION INITATIVE: SALT INTRUSION INTO ESTUARIES RELATED TO GLOBAL CLIMATE CHANGE *July-November 2016*

This was a joint project between the University of Liverpool, National Oceanography Centre (Liverpool), University of Florida and Universidade Federal de Pernambuco (Brazil). I attended the project's summer school entitled *An introduction to the hydrodynamics of semi-enclosed bodies of water* held in Puerto Morelos, Mexico. This opportunity gave me an invaluable opportunity to work with people from the US and Latin/South America, as well as experience a new field of oceanography and hydrodynamics.

Coastal Engineering UK Ltd. and ARCoES Project, University of Liverpool *Liverpool, UK*

WORK BASED DISSERTATION *July 2014 - January 2015*

I developed a methodology to combine sea defence condition with flood risk to identify vulnerable areas throughout North Wales and North-West England. For this frontage, I modelled floods from sea defence breaches under UKCP09 sea level rise scenarios to provide a long term flood risk assessment for the frontage (Pensarn to Talacre in North Wales). This research gave me an insight into the field of coastal engineering, and the methodologies used to assess the condition of various types of hard and soft sea defence.

Students Supervised

- Amir Mustofa Irwan (2017) MSc 'Expanding floodplain accommodation as a measure to mitigate coastal flooding'

References

- **Prof. Andrew J. Plater**, Professor of Physical Geography, Roxby Building, University of Liverpool. Email: gg07@liv.ac.uk
- **Dr. John F. Boyle**, Reader in Physical Geography, Roxby Building, University of Liverpool. Email: jfb@liv.ac.uk