2016 YCCSA SUMMER SCHOLARSHIP PROJECT SUBMISSION

This form is for prospective project supervisors to submit their projects to be included in the YCCSA Summer Scholarships Programme for 2016.

It is the purpose of the Summer School that any projects submitted are interdisciplinary in nature.

Date	
Supervisors' Names and Departments	*Andreas Heinemeyer (Env/SEI-Y)* *Kirsty Penkman (Chemistry)*
Project Title	*Where has all the (peat) carbon gone – up in smoke? A UK comparison of potential versus actual peat accumulation*
Project Description	*As part of a Defra project on peatland management (http://peatland-es-uk.york.ac.uk/) we have developed a peatland model, MILLENNIA (Heinemeyer et al., 2010), which can be used to predict potential peat accumulation during the Holocene (ie after the ice receded). This relies on past climate data which drive a dynamic water table and together regulate carbon input from vegetation (NPP) and decomposition of organic matter, the balance of which is net peat accumulation. Crucially, peat stores vast amounts of water and is important in regulating river flows (flooding) and drinking water provision (water quality). However, potential peat accumulation rates were and still are interfered with by human activity leading to a considerable loss of accumulated peat and thus a difference between potential and actual accumulation. This discrepancy is important to predict as it impacts on the potential future net accumulation rates of peat, but also water storage, and therefore ecosystem services such as carbon storage potential and water provisioning, both are of national importance.* *The model has already been applied at the landscape scale (Carroll et al., 2015) and the student will use this approach to predict potential and actual peat depth and carbon stocks across the UK. However, this requires linking up various larger scale model drivers such as bedrock drainage maps (available) but also formulation of processes so far not included in the model. Main processes to be explored are related to human activity (with population changes over time) such as cultivation (agriculture), grazing (animals) and cutting (burning) for energy provisioning at household and industry scale. Preliminary data are available and the supervisor team will advise on consulting further information sources.* *The student(s) will be able to use climate data from a previous YCCSA project. The challenge is to adapt existing model processes to include the additional peat loss over time and to allow a comparison between potential carbon stocks and actual ones (also in relation to available peat map data). There is a considerable interest in this work from Defra and also Natural England as it relates to national targets and EU frameworks on habitat restoration.* *The project will be part of a fun team of researchers and could be tackled in a team of 2 people but could be done by 1 (by limiting literature consultation). For more information on the project, please contact: andreas.heinemeyer@york.ac.uk*

Required Skills	*In addition to good coding skills (the model is in C++) and an interested in modelling an important ecological issue (peat development), the student(s) would benefit from database skills such as using R and visual tools such as Matlab (for example) as well as GIS skills.* *Knowledge in ecology/natural history would be beneficial, but necessary information will be provided.* *The student will have the opportunity to join researchers on their field trips to actual peatlands.*
Project Dates	*Start dates are flexible but ideally students will work over a similar period, starting ideally around Monday, 11 July 2016 and finishing around Friday, 9 September 2016.*
Other Information	*This project is a unique opportunity to gain insight into evidence based science as part of a large UK government funded project.*
References	*Heinemeyer, S. Croft, M.H. Garnett, M. Gloor, J. Holden, M.R. Lomas & P. Ineson (2010) The MILLENNIA peat cohort model, predicting past, present and future soil carbon budgets and fluxes under changing climates in peatlands. Climate Research (Special Issue: Climate Change and the British Uplands) 45: 207–226.* *M. Carroll, A. Heinemeyer, J. Pearce-Higgins, P. Dennis, C. West, J. Holden, Z. Wallage & C. Thomas (2015) Hydrologically-driven ecosystem processes determine the distribution and persistence of ecosystem-specialist predators under climate change. Nature Communication, 6:7851.*

When complete, please email the form to sarah.christmas@york.ac.uk