**PhD studentship in Saving the Mary Rose: Determining the structural and material properties of a Tudor shipwreck**

**Department/Faculty:** Department of Materials, Faculty of Engineering,

**Duration:** 42 months to start as soon as possible

**Supervisors:** Dr Finn Giuliani

Applications are invited for a three and half year PhD studentship which has become available for the project ‘Saving the Mary Rose: Determining the structural and material properties of a Tudor shipwreck’ as part of the joint Centre for Doctoral Training in Advanced Characterisation of Materials at Imperial College London starting as soon as possible.

The Mary Rose was a warship built on the orders of the famous King, Henry VIII, when he came to the throne in 1509. After 34 years of active service, the ships life came to a dramatic end during battle in 1545, where it sank off the south coast of England. The ship was salvaged in 1982; its preservation is largely attributable to the layers of sediment which provided protection from typical degradation processes. Despite the remarkable condition of the ancient wood, some degradation had occurred which threatened its stability upon excavation. Therefore, a conservation treatment was devised to ensure that the ship would be stable, which involved consolidation and careful drying. To ensure the authentic nature of the ship, a minimal intervention method has always been adopted which means that some dimensional changes in the timbers was expected. This will affect not only individual elements, but the overall structure as the original connectivity of the ship timbers may be compromised. To aid the development of conservation methods, photogrammetry and laser scans have been completed at key intervals, namely during consolidation and drying. This information is now a unique reference as to the dimensional and structural changes that have occurred throughout the years, and in response to different parts of the conservation process.

This project will focus on understanding the material and structural properties that this shipwreck exhibits post active conservation, with the aim to use this information to explore potential long-term support structures. The material itself is not well understood, and is often incorrectly assumed to behave as wood, whereas it is now a complex mixture of archaeological wood which has undergone degradation, fortified with polyethylene glycol to compensate for this, and additions of other compounds which have migrated in during the burial period. Numerous timbers exist which can be used to determine material properties that would be representative of the shipwreck. Alongside this careful and detailed interrogation of these scans will allow a full picture of the current state of the structure to be determined, highlighting areas which will need further support long-term or additional conservation work to ensure their stability. This is the first time such a study has been possible, enabling the correlation of the conservation to the structure, and the structure to the material properties, giving an unprecedented insight into the conservation of such complex heritage. The outcomes would be beneficial not only for the Mary Rose, but any heritage project seeking to stabilise large wooden structures.

This PhD studentship is funded by the UK's Engineering and Physical Sciences Research Council as part of the joint Centre for Doctoral Training in Advanced Characterisation of Materials with University College London and is open to UK home students or European students who have spent the last three years in the UK. The studentship will cover tuition fees plus the standard maintenance stipend of £16,777 (this year’s rate) per annum.

You will hold, or be expected to achieve, a Master's degree in addition to a Bachelor's degree (or equivalent) at 2:1 level (or above) in a relevant subject (e.g. Materials, Physics, Chemistry, Earth Sciences, Mechanical, Civil, or Chemical Engineering). Students will take taught courses at both universities during a three month period.

To make informal enquires please contact the CDT team on admin@cdt-acm.org

**Applications will be handled in two stages:**

**Stage 1:** Send a full CV, including the marks (%) for all (undergraduate) modules completed to date, the names and contact details of two referees, as well as a covering letter, to the CDT at admin@cdt-acm.org with the project title in the subject line. Applications that do not provide all this information will not be considered.

**Stage 2:** Suitable applicants will be interviewed and, if successful, invited to make a formal application.

**Closing Date:** Ongoing until filled

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