



Fully Funded SEAHA Studentship:

Mary Rose: Assessment of Environmental Risks during Display

Henry VIII's Mary Rose gives us a unique insight into Tudor maritime life. After sinking in 1545, the warship was preserved under protective layers of silt and it was salvaged together with many artifacts in 1982. The new Mary Rose Museum displays the remaining hull and artifacts together for the first time. Inorganic and organic materials are displayed in the same cases and under the same environmental conditions. Understanding the environments that the artifacts are displayed/stored in and the impact this could have on their degradation is essential for successful preservation. This includes parameters such as temperature, humidity, light and pollutants such as NO₂, H₂S, O₃ and organic acids, which represent unknown risks to archaeological wood. These gases may be generated outdoors or indoors and could be emitted by the artifacts themselves as they or their conservation treatments degrade. The effect these gases have on the neighboring wooden artifacts is unknown. In addition, robust analytical methods of acceptable accuracy and repeatability do not currently exist. This project will focus on measurement and quantification of pollutants in the Mary Rose display environments and their impact on stability of the artifacts.

Aims and methodology: The main objectives of the project are to develop cost effective analytical traceable techniques to monitor gasses in the museum environment and assess the effect they have on the artifacts. Specific research questions include;

1. What are the major gaseous pollutants within the Mary Rose museum environments?
2. What sensors are required for the Mary Rose museum environment and how can calibration and validation be ensured in-situ?
3. What are the deleterious effects of these pollutants on archaeological wood
4. Can environmental risks due to temperature, humidity and pollutants be prioritised?

The research will involve many analytical methods: Experimental methods will be developed and used to monitor acetic and formic acid using ion chromatography as well as other VOCs using gas chromatography. Additionally, pollutant loggers (NO_x, O₃, SO₂, total volatile organic compounds –tVOCs, formaldehyde) will be used to monitor concentrations of these compounds. Suitable pollutant sensors will be calibrated and deployed in the Mary Rose display environments in order to obtain long-term continuous monitoring data. In parallel, tests will be carried out on artificially degraded and archaeological wood in pollutant exposure chambers to monitor the long-term effect of pollutants on wood. Exposure to gases will be teamed with mechanical stability tests, micro-structural analysis, and chemical analysis to fully the implications for the archaeological wood. The student will be supported by a heritage supervisor (Dr Eleanor Schofield from Mary Rose Trust) in understanding the practical problems of preserving and displaying artefacts from the ship, two industrial supervisors (Nick Martin from the National Physical Laboratory and Jas Mahey from TA Instruments) who will provide support in good analytical practice and instrument design, and two academic supervisors (Dr Simon Gaisford and Dr Josep Grau-Bove, University College London) who will take overall responsibility for the project and provide training in necessary scientific skills including environmental monitoring and testing methods.



SEAHA

CENTRE FOR DOCTORAL TRAINING IN
SCIENCE AND ENGINEERING IN
ARTS HERITAGE AND ARCHAEOLOGY

Academic entry criteria: We welcome students with any good science or engineering undergraduate qualifications, including the scientific side of geography, earth or environmental science, or those with a strong conservation or archaeological background. Please contact the principal academic supervisor Dr Simon Gaisford (s.gaisford@ucl.ac.uk) if you have any queries about the project and your suitability for it.

Further information: The project is part of the EPSRC Centre for Doctoral Training in Science and Engineering in Arts, Heritage and Archaeology (www.seaha-cdt.ac.uk). SEAHA students are involved in activities ranging from residential events and group projects, to conferences and careers events. The SEAHA Studentship will cover home fees and a stipend of up to £16,726 per year (current rate) for eligible applicants (<http://www.seaha-cdt.ac.uk/opportunities/eligibility-criteria/>) and a substantial budget for research, travel, and cohort activities. The student will pursue the MRes SEAHA at UCL in year 1 and then be registered at the University of Oxford for years 2-4 of the SEAHA scholarship. Specialist training will be provided in the generation and analysis of environmental data, GIS and the use of NDT methods.

How to apply:

Your application should include:

- A covering letter clearly stating:
 - Your motivation and how the course will contribute to your career development
 - Your residency status and eligibility for funding according to the information provided <http://www.seaha-cdt.ac.uk/opportunities/eligibility-criteria/>, or how you intend to sponsor your studies if not eligible for funding
 - Your academic eligibility
- Names of two academic referees (or one academic and one professional if applicable)
- Proof of meeting the UCL English language proficiency requirements where necessary. For SEAHA candidates, an advanced level certificate is normally required (details of English language proficiency requirements can be found at <http://www.ucl.ac.uk/prospective-students/graduate/apply/english-language/index>)
- A short research proposal (max. 2000 words) written by taking into consideration the above research questions

The award will be subject to Grant Agreement between UCL, the National Physics Laboratory and the Mary Rose Trust.

Applications should be sent by email directly to:

SEAHA Centre Manager

manager@seaha-cdt.ac.uk

UCL Institute for Sustainable Heritage

Application deadline: open until filled.

UCL Taking Action For Equality

