



SEAHA

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

SEAHA Studentship:

Improving the evaluation of conservation treatments for deteriorating sandstone in built heritage.

Justification: Deterioration of sandstone through natural processes, sometimes accelerated by human activities, threatens many monuments and built heritage sites around the world. Many different types of conservation treatment, including consolidants, water repellents and anti-graffiti coatings, have been developed, tested and applied around the world. New developments in nanotechnology, biomimetics and other cross-disciplinary areas of science and technology, are leading to a rapid increase in the types of treatment. However, there is still no generally accepted set of methods and approaches for testing the performance of these treatments, and there is an urgent need to develop a standardized set of experimental methods (lab- and field-based) which have direct relevance to real-world conditions. Many current test methods are also highly complex and expensive and, whilst these give essential insights, there is also a need for cost-effective and simple methods to monitor performance *in situ* whose results can be compared with the more high tech methods.

Research questions: The overall aim of the project is to develop an integrated laboratory- and field-based evaluation methodology to compare the performance of sandstone treatments. There are three main research questions:

1. Which combination of test methods provides the best assessment of the performance of conservation treatments for deteriorating sandstone?
2. To what extent can cost-effective and simple field-portable test methods be used as alternatives to more complex and expensive methods to provide reliable data on the performance of conservation treatments for deteriorating sandstone?
3. How should lab experiments and *in situ* exposure trials be designed in order to provide a robust assessment of the performance of conservation treatments for deteriorating sandstone?

Research methodology: The project will be based on a combination of laboratory and *in situ* experimentation and divide into three stages. A limited number of conservation treatments will be evaluated – with a view to providing guidelines for best practice testing, rather than endorsing any specific products. Stage 1: Initial evaluation of the number, size, shape and deterioration status of samples needed, and the best statistical methods required, to provide a robust evaluation of conservation treatments. This will be entirely laboratory based. Stage 2: Comparison of the performance of complex, expensive, lab-based methods (e.g. micro XRay CT, mercury porosimetry, compressive strength testing, SEM) vs low cost and simple, field-portable test methods (e.g. Equotip, DRMS, field microscopy) to evaluate the effectiveness of conservation treatments – looking at the ways in which conservation treatments modify the chemical and physical characteristics of the test samples. This will be entirely laboratory based. Stage 3: Integrating results from laboratory testing and *in situ* testing through designing exposure trials with low cost, simple, field-portable test methods at the University of Oxford's Wytham Woods test site. The student will benefit from the long-term experience of studying stone deterioration and conservation provided by the primary academic supervisor, as well as from the distinguished track record of the heritage partner (Getty Conservation Institute) in stone conservation and consolidation science and practice, and the expertise of the industrial partner (TQC) in methods to evaluate the performance of coatings in a wide range of settings.





SEAHA

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

Supervision:

Academic supervisors – Professor Heather Viles, University of Oxford

Heritage supervisor – Dr Tom Learner, Getty Conservation Institute

Industrial supervisor – Alistair Kerrigan, TQC

Academic entry criteria: This is an exciting cross-disciplinary opportunity for someone with a good science or engineering undergraduate degree, including geography, earth or environmental science, conservation science or archaeology.

Training path: The first year of this four-year studentship constitutes an MRes degree at UCL. Following successful completion of the MRes, the student will be registered for doctoral research at the University of Oxford for years 2-4 of the SEAHA scholarship and will be part of the environment stream. Specialist training will be required in experimental design, handling and statistical analysis of large datasets, non-destructive test methods.

Funding: The SEAHA Studentship will cover home fees plus an enhanced stipend of up to £17,690 per year (to be confirmed at point of offer) for eligible applicants (<http://www.seaha-cdt.ac.uk/opportunities/eligibility-criteria/>), and a substantial budget for research, travel, and cohort activities. The award will be subject to a Grant Agreement between University College London, University of Oxford, Getty Conservation Institute and TQC.

How to apply:

Your application should include:

- A substantial covering letter (2-3 pages) including:
 - a clear explanation of your motivation for applying for this project
 - a description of your residency status and eligibility for funding according to the information provided at: <http://www.seaha-cdt.ac.uk/opportunities/eligibility-criteria/>, or how you intend to sponsor your studies if not eligible for funding
- A short research proposal (max. 2000 words) based on the information provided above
- A full CV
- Two academic references (names, postal and email addresses)
- 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/life/international/>).

Applications should be sent by email directly to the Centre Manager: manager@seaha-cdt.ac.uk.

Application deadline: Thursday 30th June 2016.

UCL Taking Action For Equality.