



# SEAHA

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

## **SEAHA Studentship: CFD modelling of dust in the built environment: sources, transport and deposition**

The EPSRC Centre for Doctoral Training in Science and Engineering in Arts, Heritage and Archaeology at University College London, University of Oxford and University of Brighton ([www.seaha-cdt.ac.uk](http://www.seaha-cdt.ac.uk)), in collaboration with Dyson Ltd. and the National Trust, are seeking applications for one fully funded studentship on the topic “CFD modelling of dust in the built environment: sources, transport and deposition”. Funded by the Engineering and Physical Sciences Research Council (EPSRC) through the Centre for Doctoral Training and co-funded by Dyson Ltd., the four year doctoral research programme will be supervised jointly by UCL Department of Chemical Engineering (<https://www.ucl.ac.uk/chemeng/>), UCL Centre for Sustainable Heritage (<http://www.bartlett.ucl.ac.uk/graduate/csh/csh-home/>), Dyson Ltd. (<https://www.careers.dyson.com/rdd/default.aspx>) and the National Trust (<http://www.nationaltrust.org.uk/>).

This exciting and challenging project will address the processes of ingress, generation, transport, deposition and resuspension of particulate matter, particularly in domestic and heritage environments. These processes can be affected by numerous factors, from type of building envelope to furnishing, human activity, to heating and ventilation regimes, and the effects of particulate matter can be significant: from aesthetic, chemical, mechanical to biological. The dynamics of particulate matter and its deposition can be studied using computational fluid dynamics (CFD), by building on (or by extending) suitable models that have recently been developed in collaboration between UCL Centre for Sustainable Heritage (CSH) and UCL Department of Chemical Engineering. This represents a suitable basis on which environments of different complexities (heritage, domestic, office) could be compared. This will lead to a better understanding of the dynamics of particulate matter and of the evolution of its concentration in air, as well as its accumulation on surfaces, associated with maintenance costs. The doctoral project will address the following research questions:

- (i) Can an experimental setup be developed, deployable in real indoor environments, as well as sensitive heritage environments, enabling us to monitor particulate matter concentration as well as deposition?
- (ii) Can the collected data be used to develop and validate CFD models of particulate matter in heritage, domestic and office environments?
- (iii) On the basis of case studies in diverse environments, can a comparative assessment of the dynamics of particulate matter be carried out?

The research project will require the use of state-of-the-art modelling and monitoring methods: computational fluid dynamics (Fluent), particulate matter and environmental monitoring will need to be developed and set up in case study environments to experimentally validate the CFD models. Suitable engagement with conservators and historic property managers will be required. This highly cross-disciplinary project will enable you to seek employment in any number of diverse environments: from academia to engineering and industry.

As a SEAHA student, you will have unparalleled access to research infrastructure and expertise across three universities and almost 50 heritage, research and industrial partners. In addition to the university doctoral training requirements, SEAHA students take part in an exciting range of cohort

SEAHA is a Doctoral Training Centre at University College London (UCL), University of Oxford, and University of Brighton. SEAHA is funded by the Engineering and Physical Sciences Research Council (EPSRC).



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activities, ranging from residential events and group projects, to conferences and careers events. Please visit the SEAHA website ([www.seaha-cdt.ac.uk](http://www.seaha-cdt.ac.uk)) for details.

You will have a good first degree in a relevant discipline: preferably chemical engineering, but also other engineering subjects, chemistry or material science. Some pre-existing knowledge of CFD is desirable. For further details contact Dr. Luca Mazzei, [l.mazzei@ucl.ac.uk](mailto:l.mazzei@ucl.ac.uk).

The SEAHA Studentship will cover home fees and a stipend of up to a maximum of £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 application should include:

- A covering letter clearly stating your motivation
- The UCL graduate application form which can be downloaded via UCL's web site: <http://www.ucl.ac.uk/prospective-students/graduate/apply/apply-now/ucl-graduate-application-form.pdf>
- Two academic references
- A copy of your degree certificate(s) and transcript(s) of degree(s),
- 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 Dyson Ltd, the National Trust, and UCL.

The applications should not be submitted by UCL online admissions system. Instead, they should be sent directly to:

SEAHA Manager  
[manager@seaha-cdt.ac.uk](mailto:manager@seaha-cdt.ac.uk)  
UCL Centre for Sustainable Heritage  
Faculty of the Built Environment  
UCL  
14 Upper Woburn Place  
London WC1E 0NN

UCL Taking Action For Equality.

Application deadline: 14 July 2014; Interviews: 21 July 2014

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