



SEAHA

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

SEAHA Studentship: “Retrofitting space heating systems for historic churches: meeting the needs of conservation, community and environmental sustainability”

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, in collaboration with Diocese of Chichester and SOENECS Ltd are seeking applications for a fully funded four-year doctoral research studentship on the topic ‘Retrofitting space heating systems for historic churches: meeting the needs of conservation, community and environmental sustainability’.

Heritage buildings, particularly those traditionally seen as connected to a specific use - such as historic churches (>150 years old) - are facing significant challenges in recent years in meeting increasingly demanding “quality of life” standards whilst they are used in broadening and hosting social engagements within the community. To put this in context, the Church of England owns over 15,000 churches. Of these, 78% are listed (45% of the Grade I listed buildings in England), of which over half actively host some form of community activity. The environmental thermal requirements of modern activities in historic churches are often in conflict with the original nature of these buildings, their historic connotation, the building materials, and in meeting user comfort while at the same time presenting and aligning to the concepts of a sustainable society. The demand for solutions becomes even more critical when such buildings are faced with renovating their building services, usually due to a need to either preserve the building or achieve required comfort conditions to continue to sustain its occupation. This research proposal aims to address this challenge by generating new knowledge to enable the evaluation and implementation of space heating technologies in historic churches, thereby increasing the environmental and social sustainability of the building while taking into consideration relevant constraints such as the preservation of the structure and artefacts as well the anticipated community activities. This doctoral project will aim to address the following research questions:

1. What are the desirable thermal and hygrothermal criteria for a historic church to protect its structure, artefacts and finishes, as well as providing thermal comfort to the users? How can we define these criteria?
2. What are the existing and emerging technologies in space heating, and how can they be applied to meet the thermal and hygrothermal criteria in historic churches?
3. What are the constraints in implementing the desirable thermal retrofit?
4. How can we evaluate and optimise design options within the identified constraints?

The research will be developed in close collaboration with the Diocese of Chichester and build on the knowledge base and expertise already exists. Suitable sets of historic churches in south-east England, with their characteristic building features, will be identified and categorised. The research will commence by identifying and establishing desirable seasonal and functional thermal and hygrothermal criteria through literature research, access to the Church resources, contact with experts, and a review of existing case studies. Current and advances in space heating technologies



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will be critically reviewed in consultation with academics, professionals and experts in the field. Performance of individual or combinations of system configurations in the context of historic churches and their identified features will be evaluated through the use of computer modelling and simulation and, where possible, validation through data gathered from case studies. The key constraints that can prevent the implementation of desirable thermal retrofit will be identified through site visits, interviews, field measurements, existing literature and access to the knowledge base of the Diocese. It is envisaged an optimisation strategy and assessment procedure will be developed enabling the evaluation of the overall sustainability of different solutions. This iterative decision-making process will be tested with at least two case studies – one in the rural community and one in the urban community.

As a SEAHA student, you will have unparalleled access to research infrastructure and expertise across three universities and 60+ heritage, research and industrial partners. In addition to the university doctoral training requirements, SEAHA students take part in an exciting range of cohort activities, ranging from residential events and group projects, to conferences and careers events. Please visit the [SEAHA website](#) for details.

Academic entry criteria: The successful candidate must have a minimum of a 2:1 undergraduate degree and/or excellent grades in a Master's degree in a relevant discipline such as engineering, architecture, science or physics. Previous knowledge in building performance, building services engineering or environmental modelling will be an advantage.

Training path: The student will be part of the EPSRC Centre for Doctoral Training SEAHA (Science and Engineering for Arts, Heritage and Archaeology). Students will register for the one year MRes SEAHA at UCL in year 1 and then continue to PhD studies for years 2-4 of the studentship. The student will be encouraged to spend time working with Diocese of Chichester and the industrial partner SOENECS Ltd.

Enquiries: Please contact the academic supervisor for further information, Dr Kenneth Ip (k.ip@brighton.ac.uk).

Funding: The SEAHA Studentship will cover home fees and a stipend of up to a maximum of £18,172 per year (current rate) for eligible applicants and a substantial budget for research, travel, and cohort activities. Non-EU applicants are not eligible for funding. The award will be subject to a Grant Agreement between UCL, and University of Brighton.

Application deadline: 5pm, Tuesday 29th August 2017



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How to apply:

To apply you must:

1. Submit an application to the UCL SEAHA Manager: manager@seaha.cdt.ac.uk **The deadline for this application is 29th August and must include:**
 - A substantial covering letter (2-3 pages) including:
 - a clear explanation of your motivation for applying for this project
 - a statement of your understanding of your eligibility according to criteria specified by [SEAHA](#) and the [EPSRC](#).
 - A short research proposal (max. 2000 words) taking into consideration the project research questions
 - A full CV
 - Contact details for two academic references (names, postal and email addresses)
 - Proof of meeting the UCL English language proficiency requirements where necessary.
2. Submit an application to the [MRes programme via the UCL online system](#) (link at bottom of page). Note that the deadline for this application is **1st September 3PM GMT. It is vital you submit this on time as we will not be able to offer you a place without this application.**

Interviews are likely to take place in Brighton the week commencing 4 September 2017. Please mention in your covering letter if you will not be available at this time. Remote interviews (e.g. via skype) are possible if necessary.