



ANNUAL REVIEW 2014-2015

Director's report

2014-2015 proved to be a very successful inaugural year for UCL ISH. We recruited five new members of staff including the appointment of two Honorary Professors and two Visiting Professors (pg 16). We welcomed back 15 PhD students and 42 new Masters students from 15 different disciplines (pg 8) and our international reach has extended to 15 countries worldwide.

Key cornerstones of our success were the launch of the EPSRC Centre for Doctoral Training in Science and Engineering in Arts, Heritage and Archaeology (CDT SEAHA) during which we welcomed the first cohort of doctoral students and the celebration of the 10th anniversary of our MSc programme in Sustainable Heritage (pg 4).

Alongside the launch of the CDT SEAHA, we were fortunate, together with our partners the University of Oxford and the University of Brighton, to win funding competitively for the procurement of a bespoke vehicle – the SEAHA Mobile Heritage Lab (MHL) – the first heritage science infrastructure of its kind in the United Kingdom (pg 4).

The MHL has been designed for on site research and for public engagement by our students and researchers. Within days of receipt of the Lab, it was engaged in the UCL/Wellcome Trust 'On Light' event in May 2015 (pg 4).

The 10th anniversary of the MSc programme in Sustainable Heritage will also coincide with the 10th anniversary of our learning partnership with Heritage Malta, the National Agency for Cultural Heritage in Malta.

The partnership provides an entirely unique experience for our students for whom an important part of the course is carried out in Malta on a field trip whose unique focus in November 2015 will be the establishment of a new Museum for Gozo, the sister island of Malta.

2014-2015 was also marked by meetings with international partners, the Smithsonian Institution and Heritage Malta, as well as deepening collaboration with our established national partners, such as Historic England and Historic Royal Palaces (more on pg 17).

We have also developed strategic links with the UCL Public and Cultural Engagement colleagues. Ambitious plans for expansion on the Queen Elizabeth Olympic Park at Here East, the new digital quarter for east London, the former Press and Broadcast Centres for the London 2012 Olympic and Paralympic Games were approved in July. UCL ISH will locate the SEAHA MHL to Here East with supporting research and teaching laboratory facilities (pg 15).

UCL ISH saw the publication of two special edited editions by academic staff. Professor May Cassar and Dr Kalliopi Fouseki edited the issue 'Energy Efficiency and Heritage Values in Heritage Buildings' for the peer-reviewed journal *The Historic Environment: Policy and Practice*. Two MSc ISH Alumni students contributed their own seminal research to this issue. Professor Matija Strlic and Dr Katherine Curran edited the issue 'Polymers in Art and History' for the highly acclaimed journal *Polymer Degradation and Stability*, which attracted 21 peer-reviewed papers from this emerging field of research.

UCL ISH has a track record in developing new areas of research inquiry. In 2015, preliminary research for a new cross-disciplinary project concerned with identifying relationships between heritage science and sport science, and investigating how these disciplines contribute to the wellbeing of individuals was started.



Professor May Cassar

Director, UCL Institute for Sustainable Heritage
Professor of Sustainable Heritage

Highlights

FIRST INTERNATIONAL SEAHA CONFERENCE

On July 14, 2015, almost 180 delegates came together at UCL for the first international SEAHA Conference. Two-days of presentations, posters and discussions were held on heritage science research, innovation and best practice in the interpretation, conservation, management and digitization of cultural heritage.

Delegates gathered from 20 countries representing scientists, researchers, engineers, professionals, practitioners, entrepreneurs, and policy-makers engaging globally with the emerging trends in the field. The programme included 24 talks, 75 posters, and a round table discussion on The Future of Heritage Science.

Panellists represented academia, heritage institutions and industry. The presentations and posters covered a breadth of topics and disciplines representing the very nature of the emerging field of Heritage Science.

THE ESTABLISHMENT OF THE HERITAGE SCIENCE RESEARCH NETWORK (HSRN) PLATFORM

The HSRN is a Science and Engineering in Arts Heritage and Archaeology (SEAHA) student initiative. The network aims to be

a resource for the field of Heritage Science in the form of a blog with contributions coming from students, researchers, scientists within academia, heritage and industrial sectors.

Recent blog posts cover reviews of heritage science conferences, heritage science in action and stimulating dialogue on common debates within the field.

SEAHA Director, Professor May Cassar observed, *"The prosperity of heritage science lies in the hands of the next generation of heritage scientists. HSRN, conceived by the first cohort of SEAHA students, will succeed because of their energy and enthusiasm for heritage science which is evidenced by the creation of this network."*

MOBILE HERITAGE LAB

In August 2014 UCL ISH announced it had won funds to acquire a Mobile Heritage Lab (MHL), a unique research infrastructure that will enable scientific research as well as engagement with the public and professionals in museums, heritage and archaeological sites across the UK.

It is a joint venture of University College London, the University of Oxford and the University of Brighton, and it is funded by EPSRC.

In April 2015 UCL ISH officially received the 'Lab-on-Wheels' and its inaugural outing was the UCL/ Wellcome Trust 'On Light' event in May.

Illuminating through our students' research and expertly supported by Dr David Saunders of The British Museum, the relationship of cultural artefacts with light in an extended weekend of performance, discussion, activity and art.

In the following months, the Lab participated in events at Hampton Court Palace with Historic Royal Palaces, our SEAHA partner; at the Brighton Pavilion with the University of Brighton and at UCL where we welcomed the Board of Trustees of the National Heritage Science Forum and eminent professionals from across the heritage sector.

The MHL is the first of its kind in Europe and users will have access to scientific equipment from leading laboratories that participate in SEAHA including UCL, Oxford and Brighton.

The equipment covers different areas of heritage science interest, such as environmental monitoring, imaging and chemical analysis and is available to any institution or organisation that wishes to propose a project.

2014-15 DIARY OF KEY EVENTS

10 YEARS OF SUSTAINABLE HERITAGE MSc

In March 2015, UCL ISH hosted a 10th anniversary celebration for the Sustainable Heritage MSc at The Society of Antiquaries, London.

Over 100 attendees enjoyed 14 talks, networking sessions and a chance for prospective students to hear about the key achievements of our alumni since graduating and highlights of the course.

A particular highlight was a talk from keynote speaker Kenneth Gambin, Chief Executive of Heritage Malta. During his keynote, Kenneth discussed the profound impact that 10 years of UCL ISH student research has had on Heritage Malta.

UCL ISH Director May Cassar said:
"I am proud of the novel pedagogy in which the MSc in Sustainable Heritage brings together practical hands-on experience with theoretical explanations of what heritage is, whom it is for and why it is conserved."

In addition, our holistic approach to heritage as an assembly, comprising objects, buildings, landscapes and intangible meanings from a social, cultural, environmental and economic perspective is something of which I am really proud."

October 2014: Meeting of the UK European Strategy Forum for Research Infrastructures Group to aid the development of the UK proposal for a heritage science infrastructure

October 2014: UCL ISH Director and Deputy Director meet representative of Netherlands Cultural Heritage Agency with a view to developing a partnership

November 2014: UCL ISH-Heritage Malta MSc students field trip to study the conservation and presentation needs of a fleet of traditional Maltese public transport buses

December 2014: UCL ISH Director attends UCL Parliamentary Reception at the House of Lords

January 2015: UCL ISH Director's Arts and Humanities Research Council Impact Fellowship commences at the Department for Business Innovation and Skills examining the public benefit, cultural and economic impact and growth prospects of heritage science research.

March 2015: MSc programme in Sustainable Heritage 10th anniversary celebration takes place

April 2015: Dr Josep Grau-Bove is appointed Lecturer at UCL ISH

May 2015: New research on heritage science, sport science and well being commences with the appointment of Shaun McKinnar as Research Assistant

May 2015: UCL ISH Director attends first meeting of the Department for Culture, Media and Sport Science Advisory Council

May 2015: SEAHA Mobile Heritage Lab participates in UCL/Wellcome Trust 'On Light' event

May 2015: UCL ISH Director delivers talk on Cultural Heritage Innovation to officials at the Department for Business Innovation and Skills

July 2015: First SEAHA International Students Conference takes place at UCL

July 2015: Approval of ambitious plans for expansion on the Here East site at the Queen Elizabeth Olympic Park, Stratford

Research

It is clear what characterises research at UCL ISH. We identify new fields of research with stakeholders. We are challenged by the complexity of cross-disciplinary research and the tantalising potential of solving 'real world' problems.

We believe that our commitment to working with heritage and industry partners is essential for effective cultural heritage research.

Most of UCL ISH's research spans subjects in the arts and humanities and the hard sciences, which means expertise is drawn from across many disciplines, not just within UCL ISH, but also from the UCL Cultural Heritage Network, a community of experts in departments across UCL with an interest in cultural heritage work.

NANORESTART

Nanorestart is a major new Horizon 2020 heritage science project researching novel nanotechnology-based approaches to conservation of modern and contemporary heritage. UCL is one of the key research partners in this project, launched in June 2015, with both UCL Institute for Sustainable Heritage and Eastman Dental Institute taking part.

At the Institute, we will be researching degradation and conservation of painting canvases and rapid prototyping materials, as

well as develop new techniques to study emissions of volatile organic compounds from plastics.

In total, the project has almost 30 partners, among which are Tate, the Rijksmuseum, the National Museum of Denmark, Art Institute of Chicago, and it is coordinated by the Centre for Colloid Science at the University of Florence.

BIS IMPACT FELLOWSHIP

Consultation workshops were held to bring together business and industry innovators with heritage science researchers in June 2015.

Participants explored wider applications for the knowledge and technologies developed by the Science and Heritage Programme.

Findings will form part of the project's report to the government's Business, Innovation and Skills department on the role of heritage science in supporting UK economic growth.

SCIENCE AND HERITAGE PROGRAMME

The Arts and Humanities Research Council/Engineering and Physical Sciences Research Council, Science and Heritage Programme closed in August 2014 following its very successful conference – Sustaining the Impact of UK Science and Heritage Research.

During the successful seven-year run of the AHRC/EPSRC Science and Heritage programme, the



Temporary cover to protect the UNESCO World Heritage Sites of Hagam Qim and Mnajdra, Malta from environmental degradation (c) Katherine Curran, UCL ISH

£8.1 million, multi-disciplinary, collaborative Programme funded 48 projects through five competitions, directly benefitting some 180 academics and early career researchers who were funded by the Programme as principal investigators, co-investigators, postdoctoral fellows, PhDs and research associates.

In addition, 50 industry partners and an estimated 300 researchers and heritage practitioners from 234 separate institutions in the UK and overseas, were also involved in the research. A further 15 new research projects involving Programme researchers have subsequently received funding from outside the Programme.

HERITAGE SCIENCE, SPORT SCIENCE AND WELL-BEING PROJECT

In May, UCL ISH embarked on a new research project that will explore the synergies between heritage science and sport science, and their impact on wellbeing.

The research aims to bring to the fore the important role historic parklands play as the setting for the equestrian sport of eventing. Using Department for Culture, Media and Sport's Culture and Sport Evidence (CASE) Programme, we will peel back the layers of evidence in an

attempt to explore what it might hold for heritage science and sport science policy.

IMPACT FELLOWSHIP: PUBLIC BENEFIT, CULTURAL & ECONOMIC IMPACT & GROWTH PROSPECTS OF HERITAGE SCIENCE RESEARCH: CREATING A HERITAGE SCIENCE INNOVATION SYSTEMS FRAMEWORK

This AHRC-funded fellowship, supported by the Department of Business, Innovation and Skills, explores the dissemination of research activities supported by the Science and Heritage Programme.

The fellowship focusses on developing relationships between

CONTRIBUTING TO THE RESEARCH EXCELLENCE FRAMEWORK

UCL ISH is proud to have contributed to The Bartlett and UCL's excellent results in the REF2014. The Bartlett has the most world-leading research in its field in the UK, according to the Government's Research Excellence Framework (REF2014).

Research by UCL ISH provided the vital evidence to occasion a culture change in how heritage professionals nationally and internationally approach adaptation to climate change for historic properties.

heritage science researchers and industry to promote adoption of heritage science innovation.

Two workshops bringing together industry representatives, heritage practitioners and academic researchers were held in May and June 2015, followed by face-to-face interviews that explored issues from the workshops and allowed interviewees to reflect on their experiences of innovation.

The feedback enables examination of impacts and growth opportunities produced by heritage science research and innovation, and will enable researchers to develop the skills to target their research to specific industry sectors.

This has been instrumental in ensuring that climate change effects are an intrinsic part of management plans for historic sites, commissioned training and research, and improved the advice provided by commercial organisations in the heritage sector

As one of UCL's ten faculties, The Bartlett's performance directly contributed to the institution's overall success and its confirmation as the top-rated university in the UK for research strength, calculated by a measure of average research score multiplied by staff numbers submitted.

International Partners

BELGIUM
Brussels
ACT Lighting Design
EU Framework Programmes for Research
European Commission
European Parliament
Leuven
Catholic University Leuven

BRAZIL
Porto Alegre
Universidade Federal do Rio Grande do Sul
Rio de Janeiro
Universidade Federal do Rio de Janeiro

CANADA
Ottawa
Canadian Conservation Institute

CHINA
Hong Kong
City University Hong Kong

CZECH REPUBLIC
Prague
Academy of Sciences of the Czech Republic

DENMARK
Copenhagen
National Museum of Denmark

EGYPT
Alexandria
Biblioteca Alexandrina
Fayoum
University of Fayoum
Giza
Grand Egyptian Museum

FRANCE
Colombes
Arkema
Paris
C2RMF – Louvre
Centre de recherche sur la conservation
Google Cultural Institute

GERMANY
Berlin
OSRAM
Darmstadt
Fraunhofer IGD
Dresden
Lichtblau e.K.
Leipzig
Zentrum für Bucherhaltung GmbH

IRELAND
Cork
Tyndall National Institute

ITALY
Florence
University of Florence - Center for
Colloids and Surface Science
Milan
Accademia Brera
Rome
ICCROM
Italian National Research Council (CNR)
University of Rome Tor Vergata
Venice
Ca' Foscari University of Venice
Peggy Guggenheim Collection

JAPAN
Tokyo
Japan International Co-operation Agency

MALTA
Kalkara
Heritage Malta
Msida
University of Malta

NETHERLANDS
Amersfoort
Rijksdienst voor het Cultureel Erfgoed
Amsterdam
Philips
Rijksmuseum
University of Amsterdam
The Hague
Dutch National Archives

POLAND
Kraków
Polish Academy of Sciences

SLOVENIA
Ljubljana
National Institute of Chemistry
University of Ljubljana

SPAIN
Barcelona
University of Barcelona
National Museum of Catalan Art
Figueres
Dalí Theatre and Museum
Madrid
Spanish Institute of Cultural Heritage
Santiago de Compostela
University of Santiago de Compostela

SWEDEN
Gothenburg
Chalmers University of Technology
University of Gothenburg

UNITED KINGDOM
Birmingham
Birmingham Museum Trust
Brighton
University of Brighton
Cambridge
Owlstone Inc
QI3
TeraView Ltd
Cardiff
Cadw
Derby
Analytik Ltd
East Molesey
Historic Royal Palaces
Edinburgh
Historic Scotland
National Museum of Scotland
National Records of Scotland

Glasgow
Gilden Photonics Ltd
University of Strathclyde
Gloucester
Ecclesiastical
Harwell
Diamond Light Source
ISIS pulsed neutron and muon source
Kew
The National Archives
Lindfield
Hutton+Rostron Ltd





London
British Library
British Museum
Department of Culture,
Media and Sport
Department for Business,
Innovation and Skills
Historic England
House of Lords Select Committee on
Science and Technology
ICON Heritage Science Group
National Gallery
National Heritage Science Forum
National Maritime Museum
Natural History Museum
Plowden & Smith Ltd
Senceive Ltd
Tate
V&A
Malmesbury
Dyson
Oxford
LaVision UK Ltd
University of Oxford

Portsmouth
Mary Rose Trust
Swindon
Arts and Humanities Research Council
Electronics, Sensors and Photonics
Knowledge Transfer Network
Engineering and Physical Sciences Research
Council
Teddington
English Heritage
Museum, Libraries and Archives Council
National Trust
Science and Technology Facilities Council
Technology Strategy Board (now
Innovate UK)
Telford
National Physical Laboratory
EURAC Conservation

UNITED STATES
Baltimore
Johns Hopkins University
Chicago
Art Institute of Chicago
Los Angeles
The Getty
New York
Metropolitan Museum of Art
Museum of Modern Art
Washington D.C.
Library of Congress
The Smithsonian Institution

Learning

We use innovative teaching techniques that encourage students to develop their own strong voice in areas where opinions are often divided and debate can be fierce.

We encourage our students to take risks and think independently, while recognising the perspectives of their colleagues.

Teaching is led by our highly accomplished academic staff with support from practising professionals, to give a strong grounding in real-world issues.

Our teaching involves discussion and debate for which students are encouraged to prepare in advance.

Group work and role plays also feature strongly in order to help develop negotiation and leadership skills. Individually, students are encouraged to present their work to the class and to receive comment.

This enables students to prepare for their future careers in terms of their intellectual development and the development of their interpersonal skills.

UCL ISH offers two Masters programmes and two PhD strands with specialisms in different aspects of heritage science.

MSC IN SUSTAINABLE HERITAGE
The aim of this novel, interdisciplinary programme is to create the heritage leaders of the future.

The programme provides its students with an overview of the best and latest conservation policies, projects, methodologies and practices in the context of historic buildings, sites, landscapes and collections.

Students are critically approaching heritage as a complex system from a cross-cultural and multidisciplinary perspective within the context of environmental, social and economic global challenges.

The programme employs a block teaching model like an MBA rather than the traditional one or two day per week Master's course.

Modules include: Sustainability and Heritage Value; Heritage Materials and Assemblies; Sustainable Strategies and Project Management, planning and maintenance.

Every year, students spend two weeks in Malta working on a real-life heritage project, in conjunction with Heritage Malta.

OUR ALUMNI

Since its very first cohort in 2005, UCL ISH has 10 years of alumni, working for prestigious organisations in heritage leadership positions. Examples of this include Arup; The National Trust; Historic England; Atkins Global; Envoy Partnership; Local authorities; Museums and UNESCO.

Rob Woodside was one of the first ever students from the 2005 cohort and is now Head of Conservation at the National Trust, London and South East Region. Rob is also teaching as a guest lecturer for the MSc Sustainable Heritage course.

About his appointment, Rob Woodside said,

"I came to UCL ISH having spent almost 10 years working as an archaeologist in the National Trust. I knew I wanted to diversify and broaden my interest in other areas of heritage, which the course certainly gave me.

I left the National Trust half way through the course and worked as a commercial consultant trying to build a business around sustainable heritage, so I did a lot of work around conservation planning and World Heritage Site management, working with multi-disciplinary teams, so the course was spot on. I then went back to the Trust as Head of Conservation for London and South East where everything I do is pretty much rooted in the principles of UCL ISH".



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

The EPSRC Centre for Doctoral Training in Science and Engineering in Arts, Heritage & Archaeology (SEAHA) recently recruited its second cohort of students, bringing the total number of students to 19.

SEAHA has 11 students completing the MREs SEAHA programme (year 1 of the SEAHA programme) and eight undertaking doctoral studies.

The doctoral projects span diverse topics from 3D imaging and spectroscopy to the material science of stone and mortar. The students are highly engaged in SEAHA activities as well as in their research, including the annual, international SEAHA Conference and a series of

public engagement events.

During the first year (2014-15) we also established the management structures and delivery processes of the CDT, including recruitment of the SEAHA Centre Manager, SEAHA Administrators at Brighton and Oxford universities, and we also recruited lecturer in charge of the delivery of SEAHA cohort and public engagement activities and a lab technician were established.

SEAHA is particularly active in public engagement and we have organised a number of events over the last year, most of which involved the SEAHA Mobile Heritage Lab, a vehicle equipped for field research and public engagement.

A process has been developed to access this facility and involves the

students as well as their supervisors.

The number of SEAHA partners has grown during the first year and we now have more than 50 heritage, industrial and research partners. We successfully engaged with around 20 heritage institutions and companies to develop the six initial student projects, including an additional three projects developed during the first year, as well as many more partners in other SEAHA activities.

Since all projects require a heritage as well as an industrial partner, which we believe is quite unique to SEAHA, we also organised a Sandpit event to develop project teams at the Natural History Museum. We also leveraged a significant investment into SEAHA studentships through Horizon 2020, and recruited a strong second cohort of 11 students.

Doctoral Research

Our Institute is a lively and supportive PhD research environment, renowned for its cross-disciplinarity: we welcome science as well as arts and humanities researchers.

Our supervisors offer a wider range of expertise, often in collaboration with other UCL departments as well as with external heritage and industrial partners.

This enables our students not only to respond to the real needs of the heritage sector, but also to develop valuable transferrable skills and personal networks, essential for their future success in the competitive job market.

ALEXANDER DEBONO - VISUALISATION OF IDENTITY - THE MALTA NATIONAL COLLECTION OF PAINTING AND SCULPTURE IN THE MAKING (1903-1974)

Alexander's PhD research focuses on the dialectic between Malta's socio-historical contexts as a British crown colony and the development of a national collection throughout the 20th century.

This runs parallel to the political developments that were soon to promote the island as a nation state in 1964 and subsequent constitutional and political milestones during the 1970s.

CAROLIEN COON - DEGRADATION AND CONSERVATION OF POLYMER-BASED RAPID-PROTOTYPE MATERIALS

3D prints are entering museum collections as artists explore new creative possibilities. Similarly, museums realise the potential of Rapid Prototype (RP) technology for public engagement and conservation.

Some polymeric RP materials have shown to be unstable, presenting an un-researched conservation challenge. The degradation mechanisms of RP polymers are investigated and the effectiveness of novel nanomaterials for plastics conservation assessed.

In addition, a method (microfading) to rapidly identify photosensitive RP objects is being developed.

The research is in collaboration with the National Museum of Denmark, Plowden and Smith Ltd, and University of Florence. Impact will be maximised through stakeholder engagement (designers, curators, conservators) reducing lab-to-market time, and through direct engagement with RP industry.

CECILIA BEMBIBRE - SMELLS OF HERITAGE

Our knowledge of the past is odourless. However, smells have a powerful impact on our everyday

lives and our experience of the world. This project looks at the role of olfaction in heritage, from defining heritage smells to identifying techniques to capture, analyse, reproduce and archive them.

Five historic smells from Knole House in Kent will be a case study for scientific research. Furthermore, olfactory information generated with the public, via panel description and smellwalks, will complement the experimental data.

The partners to this project are the National Trust (heritage), Odournet Group (industry), and UCL (academic).

Researching our olfactory past, and its connections to the present, will help us identify ways understand and protect our multisensory heritage.

DIMITRA KIZLARI - RE-BRANDING GREECE'S NATIONAL IMAGE THROUGH CULTURAL DIPLOMACY

Most countries today invest in their cultural relations to gain leverage. It is not therefore surprising that the concept of "soft power" has dominated the literature the past two decades with scholars arguing that the power of attraction is the optimal way to gain allies in today's globalized world.

The symbolic value of antiquity makes Greece a significant player in

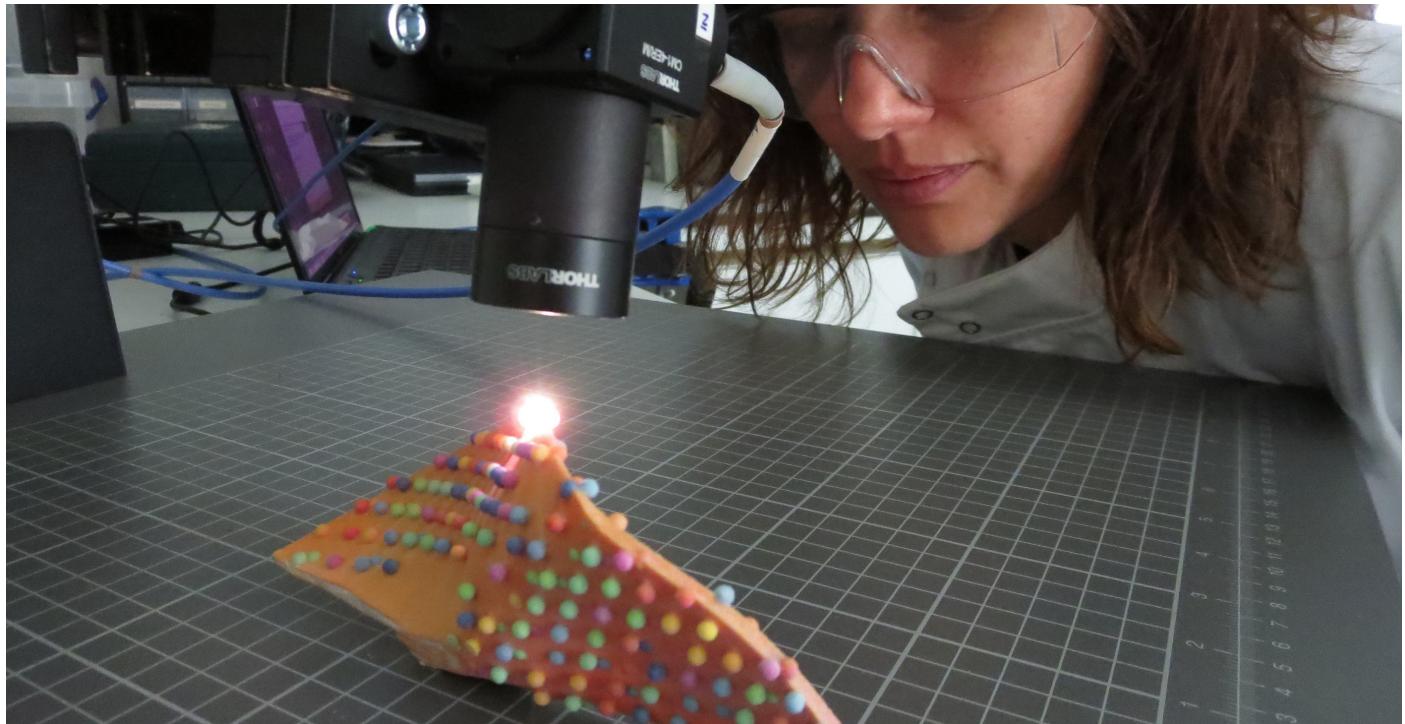


Image (c) Caroien Coon - Nanorestart project

the global cultural arena, however, has Greece taken advantage of the full potential of its cultural capital? How does Greece conduct its cultural diplomacy and what is the logic behind its foreign cultural policy?

Greece has made a remarkable and successful effort so far in branding its ancient relics and in advertising ancient Greek culture as a symbol of democracy. Nonetheless, a re-branding of the country's image is considered necessary since the country fell into recession.

The present PhD project is an attempt towards a new model for Greece's cultural diplomacy.

EIRINI GALLOU - SUSTAINABLE HERITAGE & COMMUNITY DEVELOPMENT ON ISLAND CONTEXT: INVESTIGATION OF RECIPROCAL LINKS

My research aims to focus on the challenges and possibilities lying in peripheral island heritage sites to achieve sustainable management and in parallel contribute to local community development.

In a world facing strong restrictions due to economic crisis, cultural projects face reductions in resources and peripheral monuments are the first to undergo the consequences of it.

This research aims to offer tools

for identifying the strengths and possibilities of community empowerment for safeguarding both monuments and their surrounding communities themselves.

By considering the sites and community as an interdependent whole, the question posed is: how can local communities engage in a sustainable management of the sites (and their surrounding environment) that would ensure the future of both peripheral monuments and their linked communities?

The island context is meant to be studied through comparing case studies, understanding the impact of realized participatory projects on

community cohesion and project's sustainability.

The case studies are meant to define the uniqueness of the management and development schemes and the locality of the sustainability measures in remote places, as well as indicate ways of community empowerment in the process.

HEND MAHGOUB QUANTITATIVE CHEMICAL HYPERSPECTRAL NIR IMAGING OF HISTORIC CELLULOSIC MATERIALS

Spectral imaging has gained importance in the field of heritage

conservation as a non-invasive method to evaluate conservation treatments and characterize materials.

Hend's project aims to demonstrate the benefits and limitations of quantitative chemical imaging of heritage of cellulosic origin, and its analytical robustness.

This will provide a better understanding of degradation processes and provide a measure of change in collections through imaging. Moreover, the imaging methodology will be used to evaluate the effect of new de-acidification

treatments as part of the Nanorestart project.

The project is a collaboration between researchers from University College London, the Rijksmuseum, University of Barcelona, ZFB GmbH, and Gilden Photonics Ltd.

The project has an extraordinary potential to visualize the spatial distribution of an object's chemical composition and condition, in addition to the study of the effect of conservation treatments. This will assist in the development of improved management and preservation plans of collections.



MANAL KHALAF - 'CONSERVATION PLANNING IN BAHRAIN: INTEGRATING VISUAL MANAGEMENT INTO THE SPATIAL PLANNING SYSTEM'

My PhD research 'Conservation Planning in Bahrain: Integrating Visual Management into the Spatial Planning System' builds on the findings in my Masters thesis in a different context.

It aims to resolve the co-existence between the historic urban fabric and the adjacent new developments in the capital city of Bahrain: Manama. This is intended to be done by assessing the value of conservation planning in Bahrain and exploring ways in which planning, conservation, development and the city can be better integrated.

MARIA SHEHADE - THE RESOLUTION OF CULTURAL PROPERTY DISPUTES: A WAY FORWARD

My thesis investigates the applicability of Alternative Dispute Resolution (ARD) methods in the heritage management field with emphasis on issues related to the ownership of artefacts and claims for their repatriation.

This constitutes a novel subject as very limited research on integrating ADR methods into heritage management exists.

The thesis will focus its research on cases with claims for the return of antiquities and other cultural objects, in which particular countries are the

claiming parties and museums are on the receiving end of the claims.

The thesis offers an overview of the methods used so far for the resolution of cultural property disputes as well as an investigation of three main case studies: The Metropolitan-Italy case, the Getty-Italy case and the Getty-Greece case.

The analysis is based on an innovative, interdisciplinary approach combining legal, cultural, ethical and political arguments together with negotiation theories and techniques as well as cultural diplomacy practices.

Through the examination of both the presented case studies and more than 100 other case studies that have been studied and included in a database, the basic elements that affect the negotiation and development of such cases will be presented.

MELANIE KEABLE - THE APPLICATION OF WINTER STATUE COVERS TO PRESERVE HISTORIC MARBLE MONUMENTS

Mel investigates the impact of winter statue covers on the preservation of marble statues in the UK climate.

The aim is to assess the success of covers as a strategy in addition to attempting to optimise the design of the covers; using environmental monitoring in conjunction with marble deterioration studies.

The project is AHRC funded and is being undertaken between UCL and English Heritage, with the case studies being trialled at Brodsworth Hall in Doncaster.

A decision making framework for the application of winter statue covers for marble statues of varying states of deterioration will be developed. This decision making framework will be transferrable to other materials.

MINA DRAGOUNI - EMPOWERING COMMUNITIES: PARTICIPATORY HERITAGE MANAGEMENT AND SUSTAINABLE TOURISM IN DEPRIVED DESTINATIONS

Mina's PhD project explores sustainable heritage tourism in emerging destinations. In particular, the study examines how the strategic design of heritage tourism can accommodate the active involvement of destination host communities and their meaningful collaboration with heritage managers and policymakers.

The literature suggests that local communities are heavily affected by tourism activity and their contribution is vital for achieving sustainability goals. However there is little empirical knowledge of the practical implications and a need for a participatory sustainable tourism methodological framework.

This PhD uses Castoria in Greece for case study fieldwork, an isolated crisis-hit peripheral city with one of the most endangered cultural heritage in Europe (according to

Europa Nostra's list for 2014). Natalie Brown - Collection Surveys as Part of Library Document Supply Chain.

Within large libraries, gathering data on a collection 'health' is an important preservation measure; however, it requires surveys that can be resource-intensive, rely on the judgment of experts or semi-destructive tests.

My project aims to integrate non-destructive analytical survey tools into collections care working with the company Lichtblau e.K., the Preservation Directorate of the Library of Congress, and the Conservation Research team of the Bodleian Library.

In doing so, we will develop a strategy to incorporate tailor made near-infrared (NIR) spectroscopy tools into the document supply chain.

Evidence based, sustainable preventive measures can thus be put into place which will decrease the risk of collections becoming 'unfit for use' and optimise the use of resources for preservation.

PUJA BHARADIA - UNCERTAINTY OF DAMAGE FUNCTIONS IN PREVENTIVE CONSERVATION

Damage functions are models that attempt to predict the variables that cause irreversible change (damage).

Using historic paper as case study to obtain a damage function, design

of experiment principles can be used to understand the prediction uncertainty of artificial ageing. Model interaction effects in the explanatory variables (specifically multiple linear regression) can also result in different model outcomes.

The model fit will be explored using different terms and therefore the uncertainty in the output; described by the confidence and prediction levels. Using these methods, the uncertainty of the damage function can aid decision-making in preventive conservation.

The project is funded through the AHRC Collaborative Doctoral Award in partnership with The National Archives, UK.

TIPHAINÉ BARDON - TERAHERTZ TIME-DOMAIN SPECTROSCOPY AND IMAGING OF ARCHIVAL DOCUMENTS

Terahertz time-domain (THz-TD) spectroscopy and spectroscopic imaging is a cutting-edge, potentially non-invasive technology.

THz-TD imaging has successfully been used to uncover drawings or texts from inaccessible layers in some heritage artefacts, yet not all textual, artistic or structural features are systematically revealed with this depth-imaging technology.

In collaboration with the partner company TeraView Ltd, Cambridge, and curators from the Nationaal Archief (Netherlands), this project explores the parameters influencing

contrast in terahertz images of historical documents.

It also explores the potential and limitations of the use of THz-TD spectroscopy for material identification and chemical monitoring of degradation processes in archival collections.

The aim is to objectively inform curators when terahertz technologies are a worthy non-invasive alternative to current characterization tools and digitization processes.

TUCHUNG LIU - HERITAGE, CULTURAL GOVERNANCE AND URBAN REGENERATION: A COMPARATIVE STUDY BETWEEN TAIPEI AND TAINAN IN TAIWAN

After starting my PhD studies on 16th November 2015, I have been thinking about the questions of being a PhD student and managing my research project-Heritage, cultural governance and urban regeneration: a comparative study between Taipei and Tainan in Taiwan.

Firstly, besides learning from my supervisor and classmates, I have read some reference books about how to be a PhD, and attended some courses organised by The UCL Doctoral School.

Consequently, this overall understanding will lead me to further the process and difficulties of authoring a PhD, including how to plan, write and finish a doctoral project.

Moreover, in order to explore my research themes, my literature review commence studying some of my research keywords, such as ‘culture’, ‘heritage’, ‘development’ and ‘cultural sustainability’, and the relationships between them.

This initial study helps me focus on my approach, and regard the making of ‘cultural heritage’ as a medium and process towards culturally sustainable development.

In terms of a historico-geographical analysis, this research will re-examine and connect the idea of ‘our common culture’ (Williams,

1961) and ‘our common future’ (WCED, 1987) to form a critical and dialectical perspective.

By doing so, some implications resulted from urban regeneration in the historical areas and indicators for cultural sustainability could be generated.

YUN LIU - ONLINE COLLECTIONS MODELLING TOOL

The project will develop an integrated software platform to facilitate the interpretation of environmental monitoring data and assessment of environmental scenarios in support of heritage

collection management.

Scientific evidence will be obtained through case studies and stakeholder workshops, collaboratively with the National Archives (UK), the Smithsonian’s Museum Conservation Institute (US) and the company Lichtblau e.K. (Germany).

This research will substantially expand the understanding of the preventive conservation needs of heritage materials and promote a widespread use of the knowledge of material degradation to inform environmental guideline.



Surviving traditional Maltese buses studied by the MSc Sustainable Heritage students on their 2014 Malta field trip (see diary entry on page 5)
(c) Katherine Curran UCL ISH

External Outreach

The range of activities in which UCL ISH academic staff and researchers engaged extends well beyond traditional research and teaching.

The sectors with which we engaged particularly intensively during 2015 were the industry and business sectors as a result of the launch of the CDT SEAHA. From SMEs in the UK and Europe to large international enterprises, their contribution have included support for Studentships, research supervision and internships.

Public engagement is at the core of UCL ISH activities. As well as the production of peer-reviewed publications, UCL ISH organise guest lectures, seminars and conferences which are open to other researchers, heritage professionals, professionals from related sectors, policy makers and the public.

The engagement of UCL ISH with heritage organisations and policy entities is deep and strong. The UCL ISH Director is a member of the Department for Culture, Media and Sport's Science Advisory Council and during 2015 co-Chair of the Board of Trustees of the National Heritage Science Forum. The UCL ISH Deputy Director was elected Chairman of the ICON Heritage Science Group in 2015.

Internationally, UCL ISH is regularly consulted on the future needs of

cultural heritage by entities including the Joint Programming Initiative on Cultural Heritage and Global Change of which the UCL ISH Director is a member of the Executive Board and the European Strategy Forum for Research Infrastructures of which the UCL ISH Director and Deputy Directors are members. UCL ISH regularly hosts visiting researchers from overseas institutions and contributes to the research needs of museum, galleries, libraries and archives with advice and consultancy.

UCL ISH GUEST LECTURE SERIES
The UCL ISH Guest Lecture Series, held monthly during term time, has been running for over 10 years,. Previously running under The Centre for Sustainable Heritage, the guest lecture series are produced in memory of Nigel J. Seeley. Guest lecturers are invited to discuss the subject of heritage science in relation to their own profession for an audience of the UCL community, alumni, policy makers, industry and members of the public.

Issues that have been covered in the 2014/15 academic year include: heritage leadership, governance and policy, in addition to conservation practice within the context of sustainable development. The well attended series is audio-recorded and made available via the UCL ISH website.

WHAT OUR PARTNERS SAY:

"Heritage Malta's ten-year partnership with the UCL Institute for Sustainable Heritage has derived mutual benefits and added value to both organisations.

It has not only led to curatorial, conservation, technical and administrative staff development experience, but it also enabled Heritage Malta to leverage European Regional Development Funds for the protection of Malta's cultural heritage".

Kenneth Gambin, CEO, Heritage Malta

"Historic England has been very pleased to work very closely with the Institute over the last year, and as a result we have forged an increasingly powerful partnership.

Of particular benefit to our own mission has been the collaboration on the SEAHA collaborative doctoral training centre, and the increasingly productive partnership to establish wider priorities for research collaboration with both the Institute and the wider UCL community".

Barney Sloane, Head of Strategic Planning and Management Research Group, Historic England

Looking Ahead

UCL ISH will continue to be widely acknowledged as one of the global leaders in cross-disciplinary collaborative heritage research and innovative teaching. The newly re-launched Institute will continue to grow both in numbers and in presence, with particular thanks to a new UCL campus.

HERE EAST

In 2016 UCL will take possession of 3,000 square metres of 10 metre high studio space at Here East, located at the Queen Elizabeth Olympic Park in East London. The space will be used to undertake ground-breaking research in areas including heritage, architecture, infrastructure, transport, robotics, healthcare, manufacturing and environmental measurement. UCL ISH have secured an area at the new site, and the new space will allow UCL ISH staff and students to conduct material analysis and environmental research there, enabling the integration of research and community-based activities.

Here East will be the nerve centre for many exciting cross-disciplinary and collaborative research initiatives. Academics and students, both PhD and MRes SEAHA, will move between the sites according to need. The SEAHA Mobile Heritage Lab will be based at Here East, providing a key research facility which will be unmatched in the UK. The site also aims to bring together

large educational organisations and innovative technology companies to create a mecca for innovation and collaboration.

The scale and novelty of the scheme will enable UCL to pursue new and exciting projects to strengthen interdisciplinary research and teaching. The move also signals UCL's commitment to engaging with the local community and the London Legacy Development Corporation in advance of the opening of the new campus, UCL East, on Queen Elizabeth Olympic Park in 2019.

MOBILE HERITAGE LAB

The Mobile Heritage Lab (MHL), a joint venture of University College London, the University of Oxford and the University of Brighton, and funded by EPSRC, was launched in May 2015. A unique research and public engagement vehicle, the MHL is a mobile infrastructure which supports research and public engagement projects. It has already participated in several activities and many more projects are in preparation and will continue to be promoted via our website.



SEAHA Mobile Heritage Lab photographed in Brighton as part of the annual SEAHA Student Residential (c) UCL ISH

Appointments

HONORARY AND VISITING PROFESSORS

We were very honoured to announce this year that the Provost has appointed Professor Heather Viles, University of Oxford, and Professor David Arnold, University of Brighton, as Honorary Professors of UCL. Heather Viles is Professor of Biogeomorphology and Heritage Conservation and a Fellow of Worcester College and David Arnold is currently Director of Research Initiatives and Dean of the Brighton Doctoral College. Dr Christopher Young and Dr Jan Wouters have also been appointed as Visiting Professors at the UCL Institute for Sustainable Heritage. These appointments will add significant value to both UCL ISH programmes, and show our appreciation of the work and dedication of our partners.

DR JOSEP GRAU-BOVE LECTURER IN SUSTAINABLE HERITAGE

Josep joined UCL ISH in April 2015 as Lecturer in SEAHA. In addition, Josep will be the Assistant Director of the SEAHA MRes, managing the operation of the Mobile Heritage Lab, coordinating the cohort activities of the SEAHA CDT and supervising several exciting PhD projects which explore the interactions between the environment, heritage materials and the public. Josep has a PhD in Heritage Science, UCL ISH, 2015, and an MSc in History of Science,

University of Barcelona, 2011. He is an expert in the simulation and monitoring of indoor heritage environments, and has experience in research collaboration with heritage institutions.

SHAUN MCKINNAR RESEARCH ASSISTANT

Shaun joined UCL ISH in May 2015, and took up his research position in September 2015. With over 16 years experience in Sport and Leisure Management he has developed a robust appreciation for the many ways in which sport policy has a profound impact on the lives of everyday people. Shaun is involved in a cross-disciplinary project to identify possible relationships between Heritage science and Sport science, and to what extent these disciplines combined impact could have the wellbeing of individuals and communities.

SELINA MCCARTHY SEAHA CDT CENTRE MANAGER

Selina, as the Centre Manager, is based at UCL and works in support of the Centre for Doctoral Training in Science Engineering Arts Heritage and Archaeology (SEAHA), providing operational and administrative support to a tri-partite partnership including UCL, Oxford and Brighton Universities. Selina is responsible for updating the SEAHA website and social media platforms, student recruitment, marketing,

events organisation and budget management. In addition, the Centre Manager provides a central point of contact for all SEAHA Students and administrative/secretarial support to the Management Team, Steering Committee and Advisory Board. Selina joined SEAHA in May 2014.

LIK-REN TAI MOBILE HERITAGE LAB TECHNICIAN

Lik-Ren provides research and technical support for the Institute while also assuring the Mobile Heritage Laboratory operates effectively at public engagement events and research fieldwork at cultural heritage organisations and sites. His background in Chemistry supports the research projects undertaken at UCL ISH with development and implementation of analytical methods including environmental study and material characterisation aimed towards the conservation of cultural heritage. Lik-Ren joined UCL ISH in June 2015.

RACHEL KEMPSELL INSTITUTE ADMINISTRATOR

At UCL ISH, Rachel has provided administration and communications support to staff and students within the Institute since December 2014. Rachel looks after the UCL ISH website, the social media platforms, the events series, as well as providing Personal Assistant support for the Director of the Institute.

Publications

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- Cassar, M., & Fouseki, K. (2014). My historic environment. *Historic Environment: Policy and Practice*, 5 (2), 226-228
- Curran, K., Mitchell, G., Gibson, L. T., Polymers in Heritage Collections: Categorisation and Stability. In: Lifetimes and Compatibility of High Performance Synthetic Polymers. Accepted April 2015.
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- Grau-Bove, J. (2015) "The effect of particulate matter on paper degradation" to *Heritage Science Journal*;
- Grau-Bove, J. (2015) "Validation of the drift-flux model of aerosol deposition in a historical building and a test tunnel" to *Environmental Science and Technology*
- Grau-Bove, J. (2015). Particulate Matter Deposition in Indoor Heritage (Doctoral dissertation). University College London.
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- Pastorelli, G., Cassar, M., Strli , M., Cucci, C., Garcia, O., Piantanida, G., & Elnaggar, A. (2014). Environmentally induced colour change during natural degradation of selected polymers. *Polymer Degradation and Stability*, 107, 198-209.
- Potthast, A., Henniges, U., Rosenau, T., Schiehser, S., Radosta, S., Vorwerg, W., Strlic M. Strobin, G. (2015). Comparison testing of methods for gel permeation chromatography of cellulose: coming closer to a standard protocol. *Cellulose*.
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- Ruggiero, M. T., Korter, T. M., Bardon, T., Strlic, M., & Taday, P. F. (2014). Assignment of the terahertz spectra of crystalline copper sulfate and its hydrates via solid-state density functional theory. *Journal of Physical Chemistry A*, 118 (43), 10101-10108.

The UCL ISH Team



image (c) UCL

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