



Annual Review 2015/16

# CONTACTS



UCL ISH's Central House building

Cover image:  
Mark Kearney

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# DIRECTOR'S REPORT

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**2015/16 was a busy, successful year for the UCL Institute for Sustainable Heritage, with both our body of work and level of influence continuing to grow.**

We have continued to work on delivering our strategic objectives and maintained a strong presence within the cultural heritage sector as well as developing our relations with industry, demonstrating enterprise within the UK higher education sector.

This edition of our Annual Review recognises the hard work and dedication of the staff, students and partners of UCL ISH, and pays tribute to our collective achievements. Such efforts have been identified this year through promotions, publishing contracts, additional roles within UCL and personal awards. The detail surrounding each of these achievements is covered in the Review, and I want to acknowledge and congratulate all staff.

This year saw UCL ISH continue its commitment to foster greater and deeper international relationships. This included organising a workshop with the Smithsonian Institution in Washington DC for the 10th anniversary of the Arts and Humanities Research Council. The UCL Provost and I also attended the 2016 UN Global Colloquium of University Presidents at Yale University with the theme of the Preservation of Cultural Heritage. Our list of global partners has grown considerably, with Yale University among the significant international partners.

This year we furthered our external outreach and public engagement efforts. Our monthly public lecture series held in memory of Dr Nigel

Seeley, the first Visiting Professor at UCL ISH, are recorded and viewable on YouTube. They continue to grow in both popularity and influence, helping to strengthen our online presence. The SEAHA Mobile Lab has reached thousands of members of the public at schools, conferences and festivals, proving an invaluable tool not only for research itself but for expanding awareness of heritage science.

2016/17 is set to be a defining year for the Institute as we expand into new space at Here East on the Queen Elizabeth Olympic Park. This will provide our staff and students with more space, advanced equipment and better integration with other Departments amplifying the cross-disciplinary work of the Institute.



**Professor May Cassar**

Director, UCL Institute for Sustainable Heritage  
Professor of Sustainable Heritage  
Vice Dean of Public Policy

# KEY HIGHLIGHTS

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## Promoting sustainable heritage internationally

In November 2015, Professor May Cassar, Director of the UCL Institute for Sustainable Heritage, was invited by the Arts and Humanities Research Council (AHRC) to organise a workshop at the Smithsonian Institution, Washington DC, on 'Managing Cultural Heritage in a Climate Change(d) Future'.

The workshop celebrated the tenth anniversary of the AHRC, and Professor Cassar developed the theme and programme of the event.

In April 2016, May accompanied the UCL Provost to the 2016 UN Global Colloquium of University Presidents at Yale University, an event that was attended by the United Nations Secretary-General Ban Ki-moon.

## Director takes on role of Bartlett Vice Dean (Public Policy)

In April 2016, The Bartlett announced that the UCL ISH's Director will take on the role of Vice Dean (Public Policy). Professor Cassar now represents The Bartlett on the new Office of the Vice Provost of Research's Public Policy Board.

Vice Deans perform an increasingly important function at UCL as the roles have evolved to support how UCL delivers its 2034 strategy.

## Deputy Director awarded Ambassador of Science

UCL ISH Deputy Director Professor Matija Strlic was awarded Ambassador of Science of the Republic of Slovenia for his outstanding contribution to heritage science research and education.

The award is the highest national prize of the Republic of Slovenia for expatriate scientists.

## UCL ISH Course Director launches book

The monograph 'Dispute Management in Heritage Conservation: The Case of In Situ Museums' authored by UCL ISH Course Director (MSc) Dr Kalliopi Fouseki was published in January 2016.

The book examines the nature of disputes related to the in situ conservation of archaeological remains within basements of contemporary buildings.

## Dr Kalliopi Fouseki promoted to Senior Lecturer

During the most recent round of Senior Academic, Research and Teaching Fellow Promotions, UCL ISH's Dr Kalliopi Fouseki was promoted to Senior Lecturer in Sustainable Heritage from October 2016.

# DIARY OF KEY EVENTS

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## September 2015

UCL ISH welcomes Shaun McKinnar as Research Assistant for the Heritage Science, Sport Science and Wellbeing research project.

## October 2015

Dr Josep Grau-Bové and Carolien Coon organise the Bartlett MRes Conference to showcase the diversity of MRes courses and research across the Bartlett Faculty.

Professor Matija Strlic elected Chair of the Heritage Science Group Committee of the UK Institute of Conservation (ICON).

## November 2015

UCL ISH Director meets His Highness The Aga Khan at the 50th Anniversary Conference of International Council of Monuments and Sites (ICOMOS).

UCL ISH Director is invited to organise a workshop at the Smithsonian Institution in Washington DC on Managing Cultural Heritage in a Climate Change(d) Future.

UCL ISH organises a research exchange event with over 40 researchers from UCL and Historic England.

## December 2015

Professor Matija Strlic awarded Ambassador of Science of the Republic of Slovenia.

UCL ISH welcomes Carolien Coon as Research Assistant for the Nanorestart project.

A series of papers from the Collections Demography project published by the journal Heritage Science.

## January 2016

Heritage Malta renews agreement that enables the MSc students to study cases in Malta for a fifth triennium up to 2019.

Dr Kalliopi Fouseki has a book published on the nature of disputes related to the in situ conservation of archaeological remains within basements of contemporary buildings.

## March 2016

Professor Matija Strlic to become Fellow of the Royal Society of Arts.

## April 2016

UCL ISH Director accompanies the UCL Provost to the 2016 UN Global Colloquium of University Presidents on the Preservation of Cultural Heritage.

Scientific American magazine writes a major feature article on UCL ISH's work on the deterioration and conservation of plastic materials.

Professor May Cassar becomes Honorary Research Fellow of The Natural History Museum, London.

## May 2016

Caroliен Coon publishes a popular science paper in Physics World on the UCL ISH Nanorestart project.

UCL ISH PhD students set up a Doctoral Students Network on 'Culture, Heritage and Beyond', and SEAHA students launch the Heritage Science Podcast.

UCL ISH Director is appointed as Bartlett Vice Dean (Public Policy).

## June 2016

Dr Kalliopi Fouseki participates in the Association for Critical Heritage Studies conference in Montreal.

Dr Kalliopi Fouseki is promoted to Senior Lecturer.

Dr Josep Grau-Bové accompanies CDT SEAHA students to the Cheltenham Science Festival to promote the SEAHA Mobile Heritage Laboratory.

# RESEARCH

In a fast-changing world, the preservation and protection of our cultural heritage matters more than ever before.

UCL ISH's research frequently influences policy-making and has been described by the Smithsonian Institution as 'world-leading'.

## Research themes

UCL ISH's research themes are:

- Heritage Science
- Modern and Contemporary Materials
- Heritage Risk and Resilience
- Future Heritage



Photo credit: Mark Kearney

*"What makes research at UCL ISH stand out? It is intensely cross-disciplinary, collaborative and impactful because it is grounded in stakeholder-informed research questions."*

*"The year was marked by numerous research successes, many of which made their way into the media, increasing impact on policy and intensifying public engagement."*



**Professor Matija Strlic**  
UCL ISH Deputy Director

For further details please visit  
[ucl.ac.uk/bartlett/heritage](http://ucl.ac.uk/bartlett/heritage)

# RESEARCH: HERITAGE SCIENCE

Heritage science is a cross-disciplinary research area of cultural heritage. This research theme, led by Professor Matija Strlic, encompasses research enabling access to cultural heritage, its conservation, interpretation and management.

As such, it defies conventional disciplinary boundaries, which is a challenge but primarily an opportunity because it is still a relatively young field of academic enquiry.

The Heritage Science Laboratory is a state-of-the-art facility equipped with environmental and material science instrumentation, many of which can be deployed on field trips as part of the SEAHA Mobile Heritage Laboratory. The UCL ISH Heritage Imaging Suite is a cutting edge visible and near infrared imaging setup suitable for imaging of small objects as well as buildings, and enables us to visualise the structure and composition of surfaces. Such research takes us into the realm of big data, data mining and modelling, from climate and pollution, to modelling of large collections.

Citizen heritage science research has emerged in this academic year particularly strongly, and in which we increasingly collaborate with the public.

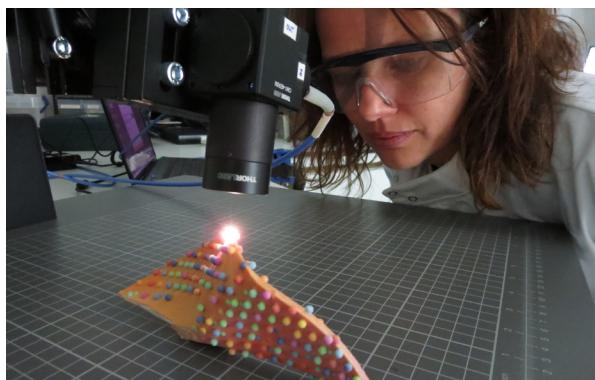


Photo credit: Matija Strlic

## NANORESTART

This EU Horizon 2020-funded project is developing nanotechnology-based solutions for the conservation of contemporary art materials.

ISH's research focuses on the use of sensors for volatile organic compounds to detect evidence of degradation in modern and contemporary materials, on the use of nanomaterials for the consolidation of canvas and the use of coatings for protection, as well as on the development of quantitative hyperspectral imaging techniques to visualize processes of degradation.

## Other live research projects:

- Metrology of Crowdsourced Data in Heritage Science
- Quantitative Chemical Hyperspectral NIR Imaging of Historic Cellulosic Materials
- Terahertz Time-Domain Spectroscopy and Imaging of Archival Documents
- Collection Surveys as Part of Library Document Supply Chain
- Uncertainty of Damage Functions in Preventive Conservation
- Online Collections Modelling Tool
- The Application of Winter Statue Covers to Preserve Historic Marble Documents
- Smells of Heritage

For further project detail  
please contact Carolien Coon  
[carolien.coon.12@ucl.ac.uk](mailto:carolien.coon.12@ucl.ac.uk)

# RESEARCH: CONTEMPORARY AND MODERN MATERIALS

Modern materials – such as plastics – narrate the story of the recent past and are a valuable part of our heritage.

They are found in heritage collections, as modern art and design pieces, as artefacts in 20th century social history collections and as 3D printed objects.

However, these materials challenge curators and collection managers. Challenges include material identification, understanding degradation processes, developing conservation strategies and understanding and communicating the significance of these objects.

It is for this reason that the conservation of modern materials has been identified as a priority need by the UK's National Heritage Science Strategy. UCL ISH is working on this research theme, led by Dr Katherine Curran, with heritage organisations such as the Birmingham Museums Trust, the National Museum of Denmark, Tate and Victoria and Albert Museum to provide solutions to these problems.

By taking a cross-interdisciplinary approach that combines fundamental and applied science with methods adapted from the social sciences, the Institute is exploring mechanisms of polymer degradation, developing new analytical techniques for material identification and for identifying deteriorating objects and advancing our understanding of the ways in which such objects are valued.

Through our core expertise in polymer chemistry and collaborations with prestigious heritage partners, UCL ISH is taking the lead in addressing some of the most intractable issues in conservation and collection care.

For further detail please contact Dr Katherine Curran at [k.curran@ucl.ac.uk](mailto:k.curran@ucl.ac.uk)

## Live research projects:

- **From samples to complex objects – detecting material degradation in plastic artworks:** This explores the use of volatile organic compound (VOC) analysis as a non-invasive tool to detect degradation in plastic artworks.
- **Photo-degradation of polymer-based rapid-prototype materials and their conservation through nanotechnology-based treatments:** Degradation mechanisms of Rapid Prototype (RP) polymers are investigated and the effectiveness of novel nanomaterials for plastics conservation are assessed. In addition, a method (microfading) to rapidly identify photosensitive RP objects is being explored.
- **Spectrally dependent light sensitivity of modern materials:** This aims to probe the light sensitivity of modern materials more deeply and specifically to understand how the light degradation of modern polymers is spectrally dependent.



Photo credit: Birmingham Museums Trust

# RESEARCH: HERITAGE RISK AND RESILIENCE

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In recent years the world has faced a range of socio-economic and environmental challenges. War, population displacement, climate change, poverty are some of the global issues threatening people and places.

Where does heritage stand in a global world that faces increasing economic challenges? What risks do these challenges pose to heritage? What strategies can be employed for heritage to become more resilient in the face of these changes?

This research theme, led by Dr Kalliopi Fouseki, aims to explore these questions through cross-disciplinary studies and methods that merge social and technical approaches towards the understanding and management of heritage.

Through collaborations with heritage partners such as Historic England and National Trust, and a range of academic expertise in the disciplines of psychology, system dynamics and economics, UCL ISH is leading the complex understanding of heritage management.



Photo credit: Kalliopi Fouseki

## Research foci:

- Community participation
- Sustainable development and heritage resilience
- Energy efficiency in the historic built environment
- Heritage values
- Heritage in conflict.

## Live research projects:

- **Heritage, Communities and Participation:** This explores the social impact of heritage participation on communities living in rural and declining areas.
- **Heritage and Sustainable Development:** investigates critical approaches in culture-led regeneration.
- **Energy Efficiency in Heritage Sites:** This explores the system dynamic analysis of interview data.
- **Heritage, Conflict and Diplomacy:** This investigates how cultural property disputes related to the repatriation of cultural property can be resolved.
- **Heritage Values:** This aims to initiate a European dialogue between heritage practitioners, researchers and policy-makers.

For further detail please contact Dr Kalliopi Fouseki at [kalliopi.fouseki@ucl.ac.uk](mailto:kalliopi.fouseki@ucl.ac.uk)

# RESEARCH: FUTURE HERITAGE

Future Heritage is a new research theme, led by Professor May Cassar, that focuses on the future-proofing of heritage, intelligence gathering, foresight and policy studies and future embodiments of heritage (digital, time-based, hyper-sensory and immersive).

These areas are both new and complementary to UCL ISH's existing strands of Heritage Science, Heritage Resilience and Risk and Modern and Contemporary Heritage. Future Heritage will be developed in partnership with leading partners such as the British Library, Historic England, the Smithsonian Institution, Tate and community partners.

## Equestrian sport arenas in designed landscapes: Impacts and risk mitigation

UCL ISH is breaking the mould with a new cross-disciplinary research project. In a pilot study, ISH is leading a team of landscape architects, social scientists, equine biomechanics researchers, archaeologists and historic estate managers to understand and inform people on the front line of the risks to be addressed when integrating permanent equestrian sports arenas into designed landscapes.

Historically important open spaces have been instrumental in the evolution of equestrian sports, such as Eventing. Today, historic landscape managers are experiencing the effects of external pressures to integrate new technologies within equestrian sports in order to increase equine welfare and competitiveness, and to promote public participation. However this may also disrupt the character of the historic landscape.

The research is addressing the following questions:

1. How can cross-disciplinary scientific techniques from heritage science and equine science improve our understanding of the effect that equestrian sport in a designed landscape can have on the ground and to the horse?
2. What effect on public use and attachment to a designed landscape does the sport of Eventing have?
3. What guidance can be given to historic landscape managers and stakeholders on how to balance the preservation of designed landscapes with their use and sustainable development for equestrian sport?

For further project detail please contact Shaun McKinnar at [shaun.mckinnar@ucl.ac.uk](mailto:shaun.mckinnar@ucl.ac.uk)



# EPSRC CDT IN SCIENCE AND ENGINEERING IN ARTS, HERITAGE & ARCHAEOLOGY (SEAH)

The EPSRC Centre for Doctoral Training in Science and Engineering in Arts, Heritage & Archaeology (SEAH) represents a world-leading partnership of University College London, the University of Oxford and the University of Brighton, with more than 70 heritage, industry and research partners worldwide.

It recently recruited its third cohort of students, bringing the total number to 32. Currently, the CDT has 11 students completing the MRes SEAH (year one of the SEAH programme) and eight undertaking doctoral studies at UCL ISH. The doctoral projects span diverse topics from 3D imaging and spectroscopy to environmental and citizen science.

The students are engaged with their research as well as SEAH cohort activities, which include the annual, international SEAH Conference and a series of public engagement events. SEAH is particularly active in the latter and we have organised and attended a number of important events over the last year, including this year attending the Cheltenham Science Festival involving the SEAH Mobile Heritage Laboratory, a vehicle equipped for field research and public engagement.

SEAH has grown its reputation further this year, with a strong online presence, frequent media coverage and innovative student initiatives. 2016 marked the launch of the brand new Heritage Science Podcast, a series of monthly 30-minute episodes about all aspects of heritage science, organised and produced by SEAH students. SEAH students also run the Heritage Science Research Network blog, connecting heritage scientists and researchers who aim to study the conservation, interpretation and management of cultural heritage.

For further detail please contact Professor May Cassar at [m.cassar@ucl.ac.uk](mailto:m.cassar@ucl.ac.uk)

## Case study: SEAH engaging with industry

Hend Maghoub works with GILDEN Photonics Ltd. on hyperspectral imaging. As with all SEAH students, Hend has academic, heritage and industry supervisors, allowing her to develop excellent working knowledge of diverse sectors. On describing her experience of working with industry, she said:

*"The opportunity to be trained by my industry partner was very rewarding, particularly in the early stage of my PhD project. It allowed me to gain valuable hands-on experience and skills to start working on my research. Interacting with professionals who were generous with their time and support provided me with wide-ranging experience and allowed me to grasp the potential of my research not only in heritage and academia but also in industry."*

*"I am convinced this will have a significant effect on my progress and on my future plans."*

Hend Maghoub  
SEAH student



Photo credit: UCL Institute for Sustainable Heritage

# LEARNING AND TEACHING

UCL ISH uses innovative teaching techniques that encourage students to develop their own strong voice in areas in which views are often divided and debate can be fierce.

Teaching is led by accomplished academic staff, with support from practising professionals, to give a strong grounding in real-world issues. Group work and role-play feature strongly to help develop negotiation and leadership skills. Individually, students are encouraged to prepare for their future careers by promoting both their intellectual development and interpersonal skills.

UCL ISH currently offers two Master's programmes and two PhD strands with specialisms in different aspects of heritage.

## MRes in Science and Engineering in Arts, Heritage And Archaeology

This exciting course delivers heritage science in highly tailored and personalised teaching through research. The course caters to anyone enthused by cross-disciplinarity and our cohorts are typically extremely diverse. The modules cover a wide variety of subjects covering environmental, material and digital aspects of cultural heritage, as well as its wider societal, policy and economic context. Strong transferrable skills are developed in a module focused on heritage science communication, management and policy.

The final module promotes group learning during a research field trip to a historic house involving the SEAHA Mobile Heritage Laboratory. A significant proportion of teaching on the course is delivered by experts from world-leading heritage institutions, which is also where students typically spend time doing their extended research projects.

## MSc in Sustainable Heritage

This interdisciplinary programme aims to create the heritage leaders of the future. It provides 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 critically approach 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.

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



Image credit: Professor Matija Strlic

# DOCTORAL RESEARCH

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**UCL ISH is a lively and supportive PhD research environment, renowned for its cross-disciplinarity, with arts and humanities researchers working alongside physical and social scientists.**

Supervisors offer a wide range of expertise, often in collaboration with other UCL departments, as well as with external heritage and industrial partners. This enables students not only to respond to the real needs of the heritage sector, but also to develop valuable transferable skills and personal networks, essential for their future success in a competitive job market.

## [Anna Rudnicka — Metrology of Crowdsourced Data in Heritage Science](#)

Anna's PhD thesis focuses on the feasibility and usefulness of visitor-collected data in the area of heritage science. Anna is developing low-cost methodologies that heritage institutions can use to monitor environmental factors that affect heritage, and to track the condition of material heritage across time. By exploring the framework of citizen science, where visitors to heritage spaces are encouraged to gather data with their smartphones, the experiments promote, but also test, the concept of 'Heritage Citizen Science'.

## [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](#)

Carolien's PhD research focuses on 3D prints that 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 been shown to be unstable, presenting an unresearched conservation challenge. The degradation mechanisms of RP polymers are investigated and the effectiveness of novel nanomaterials for plastics conservation assessed. In addition, a method to rapidly identify photosensitive RP objects is being developed. Impact will be maximised through stakeholder engagement (designers, curators, conservators) reducing the lab-to-market time, and through direct engagement with the RP industry.

## [Cecilia Bembibre — Smells of Heritage](#)

Cecilia's PhD research looks at the smells of the past. The project explores 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 smell walks, will complement the experimental data. The project partners are the National Trust and Odournet Group. Researching our olfactory past, and its connections to the present, will help us identify ways to understand and protect our multisensory heritage.

# DOCTORAL RESEARCH

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## Hend Mahgoub — Quantitative Chemical Hyperspectral NIR Imaging of Historic Cellulosic Materials

Hend's PhD research explores the analytical robustness of quantitative chemical imaging of heritage materials of cellulosic origin. Spectral imaging has gained in importance as a non-invasive method of material characterisation; however, quantitative imaging applications are rare due to extremely complex calibration issues. Hend's project focuses particularly on this step, which will allow heritage institutions to measure change in collections using imaging. The cutting edge methodology will also be used to evaluate the effect of new de-acidification treatments as part of the European project "Nanorestart". The project has extraordinary potential to visualize the spatial distribution of an object's chemical composition and condition. This will assist in the development of improved management and preservation plans of collections.

## Eirini Gallou — Sustainable Heritage and Community Development in an Island Context: Investigation of Reciprocal Links

Eirini's PhD 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 economic crises, cultural projects often face reductions in resources. Eirini aims to offer tools for identifying the strengths and possibilities of community empowerment for safeguarding both monuments and their surrounding communities. By considering the sites and community as an interdependent whole, the question posed is: how can local communities engage in sustainable management of the sites that would ensure the future of both peripheral monuments and their linked communities?

## Dimitra Kizlari — Re-Branding Greece's National Image through Cultural Diplomacy

Dimitra's PhD research is an attempt at a new model for Greece's cultural diplomacy. Most countries invest in their cultural relations to gain leverage and recent literature argues 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 the global cultural arena. However, has the country taken advantage of the full potential of its cultural capital? The focal point of the study is the Hellenic Foundation for Culture.

## Maria Shehade — Negotiating Cultural Property Disputes: Bridging the Gap between Theory and Practice

Maria's PhD research examines cultural property disputes and the attempts for their settlement through negotiation. The research focuses on claims for the repatriation of antiquities and other cultural objects, in which the claimants are States and museums. The thesis investigates the Metropolitan-Italy case, the Getty-Italy case and the Getty-Greece case and presents a complete analysis of the negotiations carried out.

# DOCTORAL RESEARCH

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## Melanie Keable — the Application of Winter Statue Covers to Preserve Historic Marble Monuments

Melanie's PhD research 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.

## Mina Dragouni — Empowering Communities: Participatory Heritage Management and Sustainable Tourism in Deprived Destinations

Mina's PhD research explores sustainable heritage tourism in emerging destinations. 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 some of the most endangered cultural heritage in Europe.

## Natalie Brown — Collection Surveys as part of Library Document Supply Chain

Natalie's PhD research aims to improve understanding material change within large library collections through accessible non-destructive surveying tools. By incorporating near infrared spectroscopy (NIR), a sustainable, systematic and standardised method of analysis can be introduced where the material condition can be quantified and the data can be transformed into working knowledge that practitioners can use to improve preservation practices. The project is highly cross-disciplinary, where conservation, analytical chemistry and computational research methods will be used together. The project partners are the Library of Congress (US), the Bodleian Library (UK), and Lichtblau e.K. (Germany).

## Puja Bharadia — Uncertainty of Damage Functions in Preventive Conservation

Puja's PhD research looks at damage functions as models that attempt to predict the variables that cause irreversible change (damage). Using historic paper as a case study to obtain a damage function, this research aims to understand the predicted uncertainty of artificial ageing. Model interaction effects in the explanatory variables (specifically multiple linear regression) can also result in different model outcomes. Using these methods, the uncertainty of the damage function can aid decision-making in preventive conservation. The project is funded through a AHRC Collaborative Doctoral Award in partnership with The National Archives, UK.

# DOCTORAL RESEARCH

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## Sascha Olinsson — how to advance Sustainable Management of the Archaeological Heritage – introducing Social Entrepreneurship to Heritage Management

Sasha's PhD thesis focuses on management strategies for heritage. Culture has been under-prioritized in ever tighter national budgets. However, it can be argued that this is a consequence of the inability of heritage management to transform their mediation strategies to meet modern expectations. This project is hence concerned with developing a strategy for sustainable management of heritage sites. The project will explore two suitable concepts; open-air museum mediation concepts and social entrepreneurship practices.

## Tiphaine Bardon — Terahertz Time-Domain Spectroscopy And Imaging Of Archival Documents

Tiphaine's EngD research focuses on identifying when terahertz time-domain imaging is likely to successfully uncover drawings or texts from inaccessible layers in a complex archival document and is a useful non-invasive alternative to current digitization processes. Parameters influencing contrast in terahertz images of historical documents will be explored, including the dispersive refractive indices and absorption coefficients of archival materials, the physical structure of documents, as well as the choice of signal parameters and terahertz imaging systems or configurations used to produce the terahertz image. The potential and limitations of the use of terahertz time-domain spectroscopy for material identification in archival collections will also be explored.

## Tuchung Liu — Policing Cultural Capacity? Sustainable Heritage-Led Urban Regeneration in Taiwan

Tuchung's PhD research looks at sustainable heritage-led urban regeneration in Taipei and Tainan City, Taiwan. In terms of the making of 'cultural heritage', this research aims to explore the impacts of urban cultural policy on the framing of cultural values of heritage, and the production of cultural capacity to imagine a place's future in the historical areas. In this sense, the process of policy making for cultural sustainability could and should inspire policy stakeholders to be concerned with the problems between urban development and heritage preservation, but also the promotion of the public benefit of cultural heritage for a common future.

## Yun Liu — Online Collections Modelling Tool

Yun's PhD research 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 guidelines.

# UCL ISH MASTER'S STUDENTS

## Case study: MRes Science and Engineering in Arts, Heritage and Archaeology papers kick off a new heritage science collection

In 2016, the peer-reviewed Springer journal Heritage Science announced a new collection of Open Access papers dedicated to Science and Engineering in Arts, Heritage and Archaeology.

The collection is edited by SEAHA lecturer Dr Josep Grau-Bové and the first papers feature research carried out as part of students' CDT SEAHA studies: the dissertation in the frame of our innovative MRes needs to be written in the form of a scientific paper, and ideally immediately submittable for publication. This is excellent recognition of the cutting edge quality of research carried out by our SEAHA CDT students.

*"The MRes SEAHA prepares our students for heritage science research in the real world.*

*"Our alumni have found work as leading researchers and managers in heritage organisations or industry, or have continued to engage with complex research questions as academic researchers."*

**Professor Matija Strlić**  
UCL ISH Deputy Director

## Case study: MSc Sustainable Heritage visit to Gozo

In December 2015, MSc Sustainable Heritage staff and students visited Gozo, working with Heritage Malta to carry out studies that contributed to the design of the first Gozo national museum.

Over two weeks the students studied environmental data collected within four existing museums and the building earmarked for the new Gozo national museum, performed condition assessments of different museum collections, risk assessments, building mapping and pest management exercises.

The students presented their findings to the Malta Government Minister for Gozo and the Board and staff of Heritage Malta.

*"UCL ISH facilities are second to none and the league tables for UCL nationally and internationally speak for themselves. The passion, enthusiasm and depth of knowledge from the staff within UCL ISH is boundless, this culture is systemic, and sits at the very core of the institute.*

*"This culture is infectious with the commitment and dedication demonstrated by all of the staff is quite staggering, going well beyond just the 'job spec' – providing inspiration, cohesive leadership and direction with supportive teaching."*

**Richard Hobbs**  
UCL ISH MSc student

# INTERNATIONAL PARTNERS

## Belgium

ACT Lighting Design, Brussels  
Catholic University Leuven  
EU Framework Programmes for Research, Brussels  
European Commission, Brussels  
European Parliament, Brussels  
Koninklijk Instituut voor het Kunstpatrimonium, Brussels

## Brazil

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

## Canada

Arius Technology, Vancouver  
Canadian Conservation Institute, Ottawa  
Pointstream, Ontario

## China

City University Hong Kong, Hong Kong  
Dunhuang Academy, Dunhuang

## Columbia

Gold Museum, Bogota

## Cyprus

The Cyprus Institute, Cyprus

## Czech Republic

Academy of Sciences of the Czech Republic  
Ústav Teoretické A Aplikované Mechaniky, Czech Republic

## Denmark

National Museum of Denmark

## Egypt

Bibliotheca Alexandrina, Alexandria  
Fayoum University, Fayoum  
Grand Egyptian Museum, Giza

## France

Arkema, Colombes

Centre de recherche sur la conservation  
Centre National de la Recherche Scientifique, Paris  
Chevalier-Aurelia, Paris  
Digital Research Infrastructure for the Arts and Humanities, Paris  
The Louvre, Paris  
Visual Acuity, Louverné

## Germany

Deutsches Archaeologisches Institut  
Fraunhofer Institute, Munich  
Lichtblau e.K., Dresden  
OSRAM, Berlin  
Zentrum für Bucherhaltung GmbH

## Greece

Foundation for Research and Technology Hellas, Heraklion  
National Technical University of Athens

## Hungary

Magyar Tudomanyos Akadémia

## Ireland

The Discovery Programme, Dublin  
Tyndall National Institute, Cork

## Italy

Accademia Brera, Milan  
Ca' Foscari University of Venice  
Central European Research Infrastructure Consortium, Trieste  
Centro Fermi, Rome  
ICCROM, Rome  
Italian National Research Council, Rome  
Peggy Guggenheim Collection, Venice  
University of Florence, Florence  
University of Rome Tor Vergata, Rome

## Japan

International Co-operation Agency

## Malta

Heritage Malta, Kalkara  
University of Malta, Msida

## Netherlands

Amsterdam City Archives  
Dutch National Archives, The Hague  
Eindhoven University Technology  
Odournet, Amsterdam  
Philips, Amsterdam  
Rijksdienst voor het Cultureel Erfgoed  
Rijksmuseum, Amsterdam  
University of Amsterdam

## Northern Ireland

Consarc Design Group, Belfast

## Norway

Institute for Cultural Heritage, Oslo

## Poland

Polish Academy of Sciences, Kraków,  
Uniwersytet Mikołaja Kopernika, Toruń

## Portugal

Laboratorio Nacional de Engenharia Civil, Lisbon

## Slovenia

Javni Zavod Republike Slovenije Za Varstvo Kulturne Dedeiscine, Ljubljana  
National Institute of Chemistry, Ljubljana  
University of Ljubljana, Ljubljana

## Spain

Agencia Estatal Consejo Superior de Investigaciones Científicas, Madrid  
Centro Nacional de Investigación sobre la Evolución Humana, Burgos  
Dalí Theatre and Museum, Figueres  
National Museum of Catalan Art  
Spanish Institute of Cultural Heritage, Madrid  
University of Barcelona  
University of Santiago de Compostela

## Sweden

Chalmers University of Technology  
University of Gothenburg

## Switzerland

Leica Geosystems, Heerbrugg

## United Kingdom

Analytik Ltd  
Architype  
ARHR  
BBC R&D  
Birmingham Museum Trust  
British Library  
British Museum  
Burghley Preservation Trust  
Cadw  
Carden & Godfrey  
Centaur Biomechanics  
Cookson & Tickner  
Dept Business, Innovation & Skills  
Dept Culture, Media and Sport  
Diamond Light Source  
Digicave  
Dyson  
Ecclesiastical  
Electronics, Sensors and Photonics  
EPSRC  
English Heritage  
EURAXESS Conservation  
Faro Technologies  
The Freud Museum  
Gilden Photonics Ltd  
Historic England  
Historic Royal Palaces  
Historic Scotland  
House of Lords Select Committee  
Hutton+Rostrom Ltd  
ICON Heritage Science Group  
ISIS pulsed neutron and muon source  
Jason Bruges Studio  
Knowledge Transfer Network —  
Electronics, sensors & photonics  
LaVision UK Ltd  
Lexical Computing  
Mary Rose Trust  
Matelect Ltd  
Museum, Libraries and Archives Council  
The Museum of London  
The National Archives  
National Gallery  
National Heritage Centre for Horseracing



## and Sporting Art

National Heritage Science Forum  
National Maritime Museum  
National Museum of Scotland  
National Physical Laboratory  
National Records of Scotland  
National Trust  
Natural History Museum  
Opus Instruments  
Owlstone Inc  
Plowden & Smith Ltd  
Plowman Craven  
Proceq SA  
Q-bot  
Qi3  
ScanLAB  
Science and Technology Facilities Council  
Senceive Ltd  
SOCA – Studio of Cinematic Architecture  
Tate  
Technology Strategy Board  
TeraView Ltd  
TIGA  
Tobit Curteis and Associates  
TQC UK  
The University of Brighton  
The University of Oxford  
The University of Strathclyde  
V&A  
The Workers

## United States of America

Art Institute of Chicago  
Columbia University, New York  
Computer History Museum, California  
Dow Chemical, Philadelphia  
The Getty, Los Angeles  
Google Cultural Institute, Los Angeles  
Headwall Photonics, Fitchburg  
John Hopkins University, Maryland  
Library of Congress, Washington D.C.  
Metropolitan Museum of Art, New York  
Museum of Modern Art, New York  
The Smithsonian Institution, Washington D.C.

# EXTERNAL OUTREACH

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## Industry and business

The range of activities in which UCL ISH academic staff and researchers engage extends beyond traditional research and teaching. The sectors with which the Institute particularly engaged were industry and business, as a result of the launch of the CDT SEAHA. From SMEs in Europe to large international enterprises, their contribution has included support for studentships, research supervision and internships.

## Public engagement

As well as the production of peer-reviewed publications, UCL ISH organises guest lectures and conferences, which are open to heritage professionals, professionals from related sectors, policy makers and the public. The Institute's Director is a member of the Department for Culture, Media and Sport's Science Advisory Council and a Trustee of the National Heritage Science Forum and the Institute's Deputy Director was recently elected Chairman of the ICON Heritage Science Group. The Institute is consulted on the future needs of cultural heritage by the EU Joint Programming Initiative on Cultural Heritage and Global Change, and the European Strategy Forum for Research Infrastructures.

## Honorary and Visiting Professors

UCL ISH was honoured to announce that the Provost has appointed Dr David Saunders as Visiting Professor. Professor Heather Viles (University of Oxford) is Honorary Professor, as was the late Professor David Arnold (University of Brighton). Dr Christopher Young and Dr Jan Wouters are also appointed Visiting Professors.

## UCL ISH Guest Lecture Series

The UCL ISH Guest Lecture Series, held monthly during term-time, has been running for over 10 years. The lectures are held in memory of Nigel J. Seeley. Guest lecturers are invited to discuss the subject of sustainable heritage 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 2015/16 academic year include: heritage leadership, governance and policy, in addition to conservation practice within the context of sustainable development.

The well-attended series is video-recorded and made available via the UCL ISH YouTube channel.

## UCL ISH's online presence

Online public engagement by UCL ISH increased dramatically during 2015/16. The Institute's YouTube channel was a 2015 initiative and hosts the guest lecture series, with 1,000 video views since its creation. The UCL ISH Twitter account, @UCL\_ISH, has over 1,300 unique followers. The 2015/2016 academic year saw the creation of the Heritage Science Research Network blog, run by SEAHA CDT students, which hosts posts submitted by academics, researchers and students. SEAHA has also announced the launch of the Heritage Science Podcast this year, a series of episodes focussing on heritage science, organised and produced by students. Every month, SEAHA students talk to heritage practitioners, academics and students to better understand the subject.

UCL ISH has several events scheduled for the 2016/17 academic year. With over 2,000 subscribers to the newsletter and event announcements, the Institute looks forward to continuing to expand its engagement and outreach.

# EXTERNAL OUTREACH

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## Here East, Stratford

UCL has taken possession of 3,000 square metres of 10-metre-high studio space at Here East, located in the Queen Elizabeth Olympic Park in East London. UCL ISH have secured an area at the new site, which will allow staff and students to conduct material analysis and environmental research, enabling the integration of research and community-based activities, and to develop the ISH Heritage Imaging Suite.

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 unmatched in the UK. The site also aims to bring together large educational organisations and innovative technology companies to create a hub for innovation and collaboration.

The opening of Here East is in advance of the development of the new campus, UCL East, on Queen Elizabeth Olympic Park.



Photo credit: UCL Bartlett Faculty

## Mobile Heritage Laboratory

In 2015, UCL ISH, together with partners the University of Oxford and the University of Brighton, was awarded funding, by EPSRC, for the procurement of a bespoke vehicle – the SEAHA Mobile Heritage Laboratory (MHL) – the first of its kind in the UK. The MHL is an initiative that distributes heritage science resources, mitigating inequality of access to science and heritage. The 'lab on wheels' can be used as a research or a public engagement platform for projects related to heritage science.

The MHL has had a busy year, with a total of 17 days spent at various public engagement events across the UK, including the Wellcome Trust and Historic Royal Palaces. Several scientific projects with science festivals in the UK has opened up heritage science to the next generation of researchers. The lab has around 50 pieces of equipment, which enables an array of research to be carried out. This year the MHL has demonstrated 3D microscopy, multispectral imaging, ground penetrating radar, reflectance transformation imaging, thermal imaging and pollutant monitoring.

## Cheltenham Science Festival

One notable visit for the MHL was to the Cheltenham Science Festival, which took place in June 2016, and is one of the largest science festivals in the world. Nine UCL ISH PhD researchers travelled to the festival to discuss heritage science and their PhD research with more than 500 visitors during a four-day event.

Never before has heritage science featured so strongly in the programme of the festival and it was a great opportunity to showcase the work of the 'lab on wheels'.

# PUBLICATIONS 2015/16

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Fouseki, K., Shehade, M. 2016. Heritage Activism and Cultural Rights: The Case of the New Acropolis Museum. In: Silverman, H., Waterton, E., Watson S., eds. *Heritage in Action: Making the Past in Present*. New York: Springer.

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Oriola, M., Campo, G., Ruiz-Recasens, C., Pedragosa, N., Strlic, M. 2015. Conservation management scenario appraisal for painting canvases at Museu Nacional d'Art de Catalunya. *Studies in Conservation*, 60 pp. 193-199.

Ruggiero, M.T., Bardon, T., Strlic, M., Taday, P. F., Korter, T.M. 2015. The Role of Terahertz Polariton Absorption in the Characterization of Crystalline Iron Sulfate Hydrates. *Physical Chemistry Chemical Physics*, 17, pp. 9326-9334.

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Strlic, M., Grossi-Sampedro, C., Dillon, C., Bell, N., Fouseki, K., Brimblecombe, P., Menart, E., Ntanios, K., Lindsay, W., Thickett, D., France, F., De Bruin, G. 2015. Damage Function for Historic Paper. Part II: Wear and Tear. *Heritage Science*, 3.

Strlic, M., Grossi-Sampedro, C., Dillon, C., Bell, N., Fouseki, K., Brimblecombe, P., Menart, E., Ntanios, K., Lindsay, W., Thickett, D., France, F., De Bruin, G. 2015. Damage Function for Historic Paper. Part I: Fitness for Use. *Heritage Science*, 3.

# UCL ISH STAFF 2015/16

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Photo credit: UCL Imagestore

## MANAGEMENT AND ADMINISTRATION

### **Professor May Cassar**

Director

### **Professor Matija Strlic**

Deputy Director

### **Daisy Voake**

Institute Administrator

### **Selina McCarthy**

SEAHA Centre Manager

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