

## **Annual Review 2016/17**

Discovering sustainable solutions to real-world cultural heritage problems through ground-breaking and cross-disciplinary research



## ABOUT

UCL ISH delivers sustainable solutions to real-world cultural heritage problems through ground-breaking cross-disciplinary research and innovative teaching for future heritage leaders. We are part of the Bartlett: UCL's global faculty of the built environment.

### DIRECTOR

Professor May Cassar  
E: [m.cassar@ucl.ac.uk](mailto:m.cassar@ucl.ac.uk)

### DEPUTY DIRECTOR

Professor Matija Strlic  
E: [m.strlic@ucl.ac.uk](mailto:m.strlic@ucl.ac.uk)

For any queries regarding the UCL Institute for Sustainable Heritage please visit:  
[ucl.ac.uk/bartlett/heritage](http://ucl.ac.uk/bartlett/heritage)

Cover image credit: Mark Kearney

## INTRODUCTION

Welcome to the UCL Institute for Sustainable Heritage Annual Review 2016/17. It provides information on our programmes and showcases the fantastic research of UCL ISH academics, researchers and students, often in collaboration with distinguished local and international partners.

UCL ISH's innovative, cross-disciplinary research combined with its commitment to public engagement has had a multiplier effect on the Institute's reputation. Our research and insights frequently form the basis of advice to policy-makers. I want to thank all UCL ISH academics, researchers, students and professional staff for their hard work, enabling the Institute to flourish.

UCL ISH hosted several firsts this year. We held our first ever Photo Competition with the theme of 'Future Heritage'. Dozens of UCL staff and students submitted excellent photographs on this theme, an important research strand in UCL ISH's strategy.

UCL ISH also launched its first Instagram account, Facebook account and blog page. These social media platforms have made our research more accessible to a wider and diverse public and are supporting important creative conversations around the Institute's research, news and events.

It has been another hugely successful year with many research papers published and recognition of their originality. A particular highlight has been the extensive media coverage surrounding Professor Matija Strlic and Cecilia Bembibre's research

paper: 'Smell of heritage: a framework for the identification, analysis and archival of historic odours'. Their research was featured in the Daily Telegraph, The Guardian, Daily Mail, The Times, BBC London News, BBC Breakfast, among others.

Finally, we were delighted to host the UCL Provost who toured the SEAHA Mobile Heritage Lab during the UCL Postgraduate Open Day. His endorsement of heritage science as 'a fascinating science which is incredibly well done at UCL' is an accolade that we strive to earn year after year.

2017/18 is developing into another exciting year as we expand into Here East on the Queen Elizabeth Olympic Park in Stratford, East London. This will provide UCL ISH academics, researchers and students with additional space, advanced robotically enabled hyperspectral 3D stereo instrumentation—the first of its kind globally—and new opportunities for cross-disciplinary work.

I hope you enjoy reading our review of research, news, external engagement activities and events in the pages that follow. We look forward to an exciting future which we hope you can share with us by attending our monthly Open Heritage guest lectures.



**Professor May Cassar**  
Director, UCL Institute for Sustainable Heritage

# HIGHLIGHTS 2016/17

## September 2016

**May Cassar and Shaun McKinnar submitted a proposal to Historic England for funding of research on the subject of 'Equestrian sport arena surfaces in designed landscapes: impacts and risk mitigation'.**

The ESRC funded UCL, Bloomsbury and East London Doctoral Training Partnership, for which Kalliopi Fouseki coordinated the Heritage Pathway, was successful. This provides studentships for PhD students working on social sciences.

## October 2016

**Katherine Curran received one of just 325 European Research Council Starting Grants awarded to researchers from all over the world to pursue ground-breaking research in European institutions across a wide range of disciplines.**

UCL ISH PhD Student Cecilia Bembibre received significant media coverage for her research on the smells of the past. Cecilia was interviewed for CNN, BBC and The Sunday Times, among others.

## November 2016

**UCL Provost Michael Arthur visited the SEAHA Mobile Heritage Laboratory. He was given a tour of the lab and gave an interview for the UCL ISH YouTube Channel about the importance of sustainable heritage.**

UCL ISH and leading scientists and artists produced 3D-printed artworks to research how modern art can be best preserved for future generations.

## December 2016

**May Cassar was invited by The Provost to represent UCL on the Initial Management Committee for the Consortium for the Preservation of Cultural Heritage following the UN Global Colloquium of University Presidents held at Yale University.**

Kalliopi Fouseki was appointed as a member of the Arts and Humanities Research Council (AHRC) Peer Reviewers College for three years.

## January 2017

**Matija Strlic completed negotiations on the Memorandum of Understanding to establish the UK hub of the European Research Infrastructure in Heritage Science.**

## February 2017

Matija Strlic won a £230k EPSRC bid for multi-user equipment (robotically enabled hyperspectral 3D stereo imaging setup), part of a larger £2M UCL grant. This is prototype equipment which will be the first of its kind globally and will be installed at Here East, UCL ISH's second base, in Stratford.



UCL ISH interview UCL Provost Michael Arthur. Credit: UCL ISH

## March 2017

**UCL ISH launched its first Photo Competition which will become an annual event. All UCL staff and students were invited to send entries capturing their idea of Future Heritage, an important research strand in UCL ISH's strategy.**

Kalliopi Fouseki co-organised the Historic Urban Landscape Forum with The Bartlett School of Architecture. The two-day forum critically reflected on the implementation of the UNESCO Recommendation on the Historic Urban Landscape and its impact on inclusive and sustainable urbanisation and prosperity.

## April 2017

**Katherine Curran launched the prestigious European Research Council (ERC) Starting Grant.**

Matija Strlic and UCL ISH in partnership with European partners, received €4M to support the development of a distributed European research infrastructure for heritage science, with its UK hub being one of the cornerstones.

## May 2017

**May Cassar and Shaun McKinnar hosted a workshop at Burghley Park, the site of the world-renowned Burghley Horse Trials. Linking experts in equine biomechanics, geophysics, cultural heritage, landscape architecture and archaeology, the workshop demonstrated the cross-disciplinary work being led by UCL ISH.**

SEAHA student Panos Andrikopoulos was named as one of the 40 under 40 most promising lighting designers in the Lighting Design Awards.

## June 2017

**UCL ISH staff visited the National Heritage Centre for Horseracing and Sporting Art in Newmarket on their away day. Staff were given a tour of the museum and complex by the Director, joined a live demonstration of re-training race horses and listened to talks about the museums community outreach and volunteer programme.**

Professor Matija Strlic gave his Inaugural Lecture. Matija presented the complexities as well as the challenges of the heritage science field. The event was a huge success with over 100 attendees.



Matija Strlic and Cecilia Bembibre interviewed on BBC Breakfast for their research on smells of the past. Credit: BBC Breakfast

# 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'.

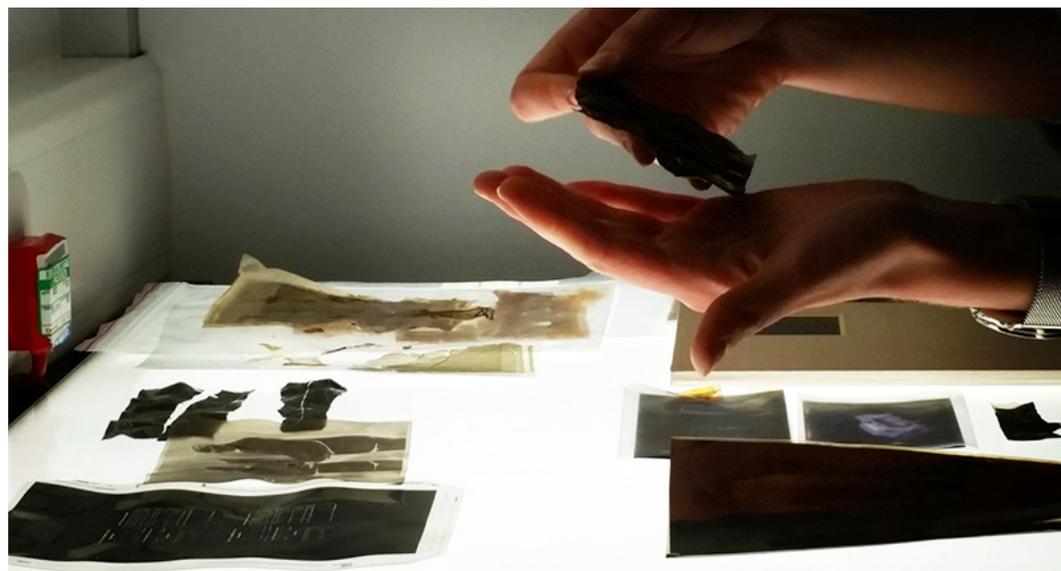
Most of UCL ISH's research spans subjects in the arts and humanities and the hard sciences. This means expertise is drawn from across many disciplines, not just within the Institute, but also from the BEAMS Heritage Science and Engineering Network, a community of experts in departments across UCL with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

Public engagement is an important part of the institute's work. UCL ISH has disseminated its research through newspaper articles, television, poetry, stand-up comedy, public lectures and participation in public events at institutions such as the British Museum and the British Library.

## Research themes

Our research falls within the following themes:

1. **Heritage Risk and Resilience**
2. **Heritage Science**
3. **Contemporary and Modern Heritage**
4. **Future Heritage**



'We scare because we care' submitted to the UCL ISH Photo Competition 2017.  
Credit: Yun Liu, SEAHA student

# RESEARCH: HERITAGE RISK & RESILIENCE

**This theme positions heritage at the heart of global socio-economic and environmental challenges. Global realities threatening people and places include war, population displacement, climate change, social injustice and poverty.**

Heritage has traditionally been viewed by heritage managers as 'an object at risk' of loss. As a result, heritage management has focused on developing strategies for protecting heritage from present and future risks and threats. It is only recently that heritage has been regarded as an active, enabling process for sustainable development. This active approach to heritage is what makes heritage and its management resilient towards global challenges.

A critical and sustainable approach to heritage management should not only look at how heritage can be protected, but also how heritage can function as an enabling factor of sustainable and resilient development.

For heritage to enable resilient and sustainable development it is imperative that novel, cross-disciplinary, socio-technical methods are developed by interdisciplinary research teams and in partnership with stakeholders from the heritage and policy sector to look at the dynamic change of heritage over time.

UCL ISH is pioneering this development through collaborating with academics from social and physical sciences, heritage institutions and industries.

## Research focus

### 1. Heritage as a driver for peace:

This area focuses on the ways in which heritage is being used in conflict reduction.

### 2. Heritage participation as a driver for community/social development:

This subject area aims to measure the social impact of participatory heritage projects on communities and the institutions involved.

### 3. Sustainable heritage tourism through community participation:

This subject area investigates participatory models of community-led heritage tourism initiatives mainly in heritage landscapes located in rural and semi-rural areas, as well as open-air museums.

### 4. Sustainable futures for historic cities/historic urban environments:

This subject area examines the multiple heritage dimensions of historic cities and their change over time, unpacking values attributed by communities and heritage professionals.



Family shrine on a rice field  
Credit: Diana Rahman, UCL ISH student

# RESEARCH: HERITAGE SCIENCE

**Heritage science is a cross-disciplinary research area encompassing science of understanding of the past and management of heritage.**

It defies conventional disciplinary boundaries, proving a challenge but primarily an opportunity as a relatively young field of academic enquiry.

The Heritage Science Laboratory is a state-of-the-art infrastructure, fully equipped with environmental and material science instrumentation, many of which are transportable and can be deployed on field trips as part of the SEAHA Mobile Heritage Laboratory. This enables researchers to do research in situ, with heritage stakeholders.

The UCL ISH Heritage Imaging Suite is a cutting edge visible and near infrared imaging setup suitable for imaging small objects as well as buildings, enabling researchers to visualise the structure and composition of surfaces. Such research takes UCL ISH 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, with UCL ISH increasingly collaborating with the public in its research.

## Live research projects

### Nanorestart

This Horizon2020 funded European project is developing nanotechnology-based solutions for the conservation of contemporary art materials.

The project involves more than 30 international partners, including major heritage institutions in the UK and internationally.

### E-RIHS Preparatory Phase

The EU support and coordination action project E-RIHS PP will enable a large EU consortium to develop the legal and organisational structure of the European Research Infrastructure for Heritage Science. This initiative is going to transform the way we do heritage science research nationally and globally, by opening new opportunities for collaborative research.



'Out of the cauldron into the light' submitted to the UCL ISH Photo Competition 2017. Credit: Carolien Coon, SEAHA student

# RESEARCH: MODERN AND CONTEMPORARY HERITAGE

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

They are found in increasing numbers 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 in the UK's National Heritage Science Strategy, and UCL ISH is working with heritage organisations such as the V&A, the National Museum of Denmark, Birmingham Museums Trust and Tate to provide solutions to these problems.

By taking an 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 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 curation.

## Live research projects

### COMPLEX

In 2016, Dr Katherine Curran was awarded a prestigious Starting Grant from the European Research Council for a five year project entitled: COMPLEX: 'The Degradation of Complex Modern Polymeric Objects in Heritage Collections: A System Dynamics Approach'.

This project will explore and develop a new approach to understanding material degradation using system dynamics. The work will involve both mathematical modelling of physical and chemical degradation processes and laboratory-based and on-site analysis of material degradation. This work is done in collaboration with Tate and the Museum of London.



UCL ISH's Katherine Curran carrying out research experiments. Credit: Birmingham Museums Trust

# RESEARCH: FUTURE HERITAGE

**Future Heritage is a new research theme that focuses on the future-proofing of heritage, intelligence gathering, foresight and policy studies and future embodiments of heritage, including digital, time-based, hyper-sensory and immersive heritage.**

These areas are both new and complementary to UCL ISH's existing research themes. Future Heritage will be developed in partnership with leading partners Historic England, Tate, the British Library, the Smithsonian Institutions and community groups.

## Live research projects

### Looking at old ground in a new way

UCL ISH is undertaking a research project that aims to investigate the synergies between heritage science and sport science, and their impact on wellbeing.

The Institute has put in place a team of professionals from social science, equine biomechanics, archaeology, landscape design, Eventing, historic estate management and one of the UK's top 10 sporting events. This study aims to inform those working on the front line of the risks and mitigations to be addressed when integrating permanent sporting infrastructure into designed landscapes.

These historically important open spaces have been instrumental in the evolution of equestrian sports, such as Eventing. Technological advancements are becoming central to the ability of sporting events to attract more visitors and enhance

the athlete's experience. In the near future, caretakers of historic designed landscapes will need to address concerns on how best to integrate these technologies while maintaining the character and integrity of the landscape.

Identifying and prioritising common issues among different sectors are key drivers for effective and sustained collaboration. Unless attempts are made to share a language, communication for collaboration may prove difficult. Cross-disciplinary collaboration has the potential to answer these concerns.

Today, sporting events, particularly large scale events, are critical to the local and national economy. To sustain these events, their physical impact on designed landscapes needs to be understood and better managed. By presenting cross-disciplinary evidence and integrating the views of all relevant stakeholders, this study will help create a novel decision-making process that bridges sport and heritage.



Burghley Horse Trials 2017 cross-country competition in Grade 2\* designated Burghley Park. Credit: K.H. Iwaszkiewicz

# LEARNING AND TEACHING



UCL ISH's Josep Grau-Bove giving a lecture in the UCL ISH Heritage Laboratory. Credit: UCL ISH

**Everybody has a stake in cultural heritage. UCL ISH trains future conservators of that heritage, and carries out research leading to innovative, sustainable solutions.**

Sustainable heritage is a field that has quickly gained recognition and value in the worlds of management, hard science and industry. It is one that attracts—and demands—a rich mix of people, backgrounds and disciplines to answer complex and searching questions.

Our student body includes many from the fields of science, engineering, architecture, curation, conservation, interior design, marketing and property development, who come to our programmes with very different perspectives on heritage issues and a willingness to have their views informed and formed.

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

The **MSc Sustainable Heritage programme** introduces students to the latest conservation policies, projects, methodologies and practices in the context of historic buildings, sites, landscapes and collections.

The **MRes Science and Engineering in Arts, Heritage and Archaeology (SEAHA)** is a pioneering Masters programme that delivers an outstanding cross-disciplinary heritage science education.

## Career prospects

**The UCL ISH student survey results showed that nine out of 10 graduates from the last five years have secured a job or are pursuing a PhD or other further study.**

87% of students who answered the survey agreed that the programmes had a positive impact on their careers.

**Current UCL ISH alumni job roles include:**

*National Project Manager at English Heritage*

*Education Assistant in a Sculpture Garden*

*Educational Coordinator at Education Ministry*

*Curator at Government Art Collection*

*Projects Building Surveyor, National Trust*

*First Secretary, Embassy of Japan in Egypt*

*Freelance Preventive Conservator*

*PhD in Cultural Heritage*

*Director Architect*

*PhD in Heritage Science*

*Head of Conservation, National Archives of the Netherlands*

# LEARNING AND TEACHING: MSc SUSTAINABLE HERITAGE

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

## MSc

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 Masters programme.

## MSc trip to Malta

A highlight of the MSc Sustainable Heritage is the two-week study visit to Malta, hosted by Heritage Malta.

In November 2016, students visited St Paul's Catacombs in Rabat, Malta, to investigate the impact of a European Regional Development Fund project. The students studied interactions between buildings, collections, landscapes, visitors and underground archaeological sites and learned about a variety of diagnostic and analytical tools for assessing heritage sites.

At the end of the two-week visit the students presented their work to the

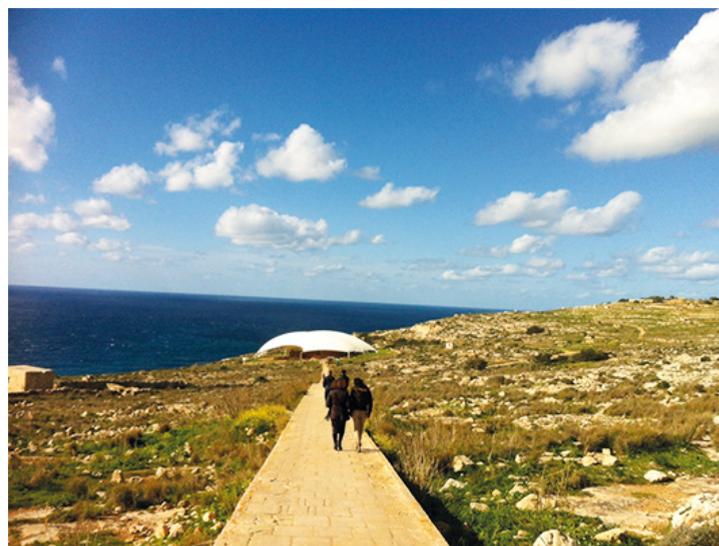
Board of Heritage Malta.

In April 2017, a report of the students' work was sent to Heritage Malta. Heritage Malta are currently acting upon several of the students' recommendations.

*"The course stretched me in ways I couldn't have anticipated. The teaching was broad-ranging and fast-paced, providing a critical framework with which to navigate the sector and practical skills to offer in work placements.*

*"I would recommend the MSc programme in Sustainable Heritage to anyone with an interest in interdisciplinary approaches to heritage, a willingness to be challenged, and a commitment to collaborative working."*

**Tessa Harvey**  
MSc Sustainable Heritage student  
(2014 - 2016)



MSc Sustainable Heritage students visiting the UNESCO World Heritage Site of Hagar Qim and Mnajdra in Malta. Credit: Katherine Curran

# LEARNING AND TEACHING: MRes AND SEAHA CDT

## MRes

The Masters in Science and Engineering in Arts, Heritage & Archaeology (SEAHA) is a pioneering Master's course that delivers an outstanding cross-disciplinary heritage science education through a one-year research project. The programme introduces a unique assembly of scientific disciplines—physical sciences, engineering, imaging, computing, social sciences—brought together in order to address research questions relating to cultural heritage. The MRes can be taken either on its own or in the frame of the Centre for Doctoral Training (CDT).

## CDT

The EPSRC Centre for Doctoral Training (CDT) SEAHA represents a world-leading partnership of UCL, the University of Oxford and the University of Brighton, with more than 60 heritage, industrial and research partners worldwide.

The doctoral projects span diverse topics from 3D imaging and spectroscopy to environmental and citizen science and comprise of the MRes SEAHA, followed by a PhD at either of the three partner universities.



The SEAHA Mobile Heritage Laboratory. Credit: Matija Strlic

## Case study: SEAHA engaging with industry

SEAHA PhD student Mark Kearney's project is concerned with monitoring the decay of modern materials found in heritage environments. Mark's project is supervised by academic, heritage and industrial professionals, enabling him to deliver a multifaceted project. Mark is partnered with Arkema, a leading chemicals and advanced materials company.

In outlining their partnership, Mark said:

*"Partnering with Arkema has been a fantastic opportunity to expand my project's scope.*

*"I have been hosted by a subsidiary of Arkema, Bostik, at their R&D facility in France to discuss how they could be involved. Their enthusiasm for my project and their willingness to help has been of great benefit to me in this early stage of the project. I have been offered the use of their environmentally controllable 'Research House' that will allow me to gather valuable scientific data unachievable without such a facility.*

*"Their participation has also given me insights into the needs and workings of industry, something that is highly advantageous in the current job market."*

**Mark Kearney**  
SEAHA Student

# DOCTORAL RESEARCH

UCL ISH PhD students work with supervisors and partners that are engaged with real-world heritage projects and issues. Students respond to the real needs of the heritage sector while developing valuable transferable skills and personal networks, essential for their future success in the job market.

## 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.

## Puja Bhardia — Uncertainty of damage functions in preventative conservation

Puja's PhD research looks at damage functions as models that attempt to predict the variables that cause irreversible change. Using historic paper as a case study to obtain a damage function, this research aims 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. Using these methods, the uncertainty of the damage function can aid decision-making in preventive conservation.

## Natalie Brown — Collection surveys as part of library document supply

Natalie's PhD research aims to better understand 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 interdisciplinary where conservation, analytical chemistry and computational research methods are used together. The project partners are the Library of Congress (US), the Bodleian Library (UK), and Lichtblau e.K. (Germany).



Natalie performing viscometry measurements.  
Credit: Keats Webb

## 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 to a nation state in 1964 and subsequent constitutional and political milestones during the 1970s.

## Mina Dragouni — Empowering communities' participatory heritage management and sustainable tourism

Mina's PhD research explores sustainable heritage tourism in emerging destinations as a way towards achieving cultural, economic and social viability. It examines how heritage tourism can accommodate the active involvement of host communities in its strategic design and their collaboration with heritage managers and policymakers.



Research image submitted to the UCL ISH Photo Competition 2017.  
Credit: Eirini Gallou

## Cristina Duran Casablanacas — Preservation management modelling in archive and library collections

Cristina's PhD research explores the use of System Dynamics and related mathematical modelling techniques to help unveil the consequences of preservation management decisions during the lifetime of collections. In this model the activities within archives and libraries are seen as part of a complex system. If single preservation measures are put in the broader context of collection management, then questions emerge such as: are there management decisions that may have contra-intuitive and unintended consequences? And do short and long term consequences of actions differ from each other?

## Eirini Gallou — Sustainable heritage and community development on island context: investigation of reciprocal links

Eirini's PhD research focuses on the challenges and possibilities of local community participation to assist in peripheral island heritage management and in parallel, contribute to local community development. Eirini's research focuses specifically on mapping social impacts and understanding the pathway to social impact creation from a variety of engagement activities with heritage driving social capital theories.

## DOCTORAL RESEARCH (CONT.)

### 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.

### Mark Kearney — Negotiating cultural property disputes: bridging the gap between theory and practice

Mark's project is concerned with monitoring the decay of modern materials, such as plastics found in heritage environments. This is due to the rapid and often catastrophic decay suffered by many commonly found polymers. Consequently, the need for accurate and reliable conservation treatments or monitoring programmes are much needed. Mark's project will exploit the information gained from the volatile organic compounds (VOCs) naturally emitted from polymers with the aim to detect and monitor the decay of 3D artworks on open display or housed in storage environments.

### Dimitra Kizlari — Foreign cultural policy through the work of the National Institute for Culture

Dimitra's research analyses how foreign cultural policy is articulated through the work of the National Institutes for Culture. Her in-depth case study, the Hellenic Foundation for Culture, is complemented by another five case studies (British Council, Goethe Institut, Institut français, Instituto Cervantes, Swedish institut) and together they provide important insight on how cultural diplomacy in Europe is organised on a national level. Dimitra is looking at issues of agency in strategic planning through a neo-Marxist lens and questions the narratives and how the hegemonic culture in Greece promotes national identity.

### Tuchung Liu — Policing cultural capacity? Sustainable heritage-led urban regeneration in Taiwan

Tuchung's PhD research aims to explore the impact and potential of heritage-led urban regeneration and related urban cultural policy on the cultivation of cultural imagination. Using a case study of Taipei City, Taiwan and its historic district, Dadaocheng, this research investigates the relationship between heritage-making and imagination formation, especially in policy practice since the 1980s, to highlight the role of heritage in the promotion of sustainable urban development and cultural governance.

### Yun Liu — Online collections modelling tool

Yun's PhD research is developing 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 wider use of the knowledge of material degradation to inform environmental guidelines.

### 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 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'.



Oil paintings investigation using Infrared reflectography imaging technique by Hend Mahgoub and Bettina Sacher. Credit: UCL ISH

## DOCTORAL RESEARCH (CONT.)

### Danae Phaedra Pocobelli — Building Information Models from Monitoring and Simulation Data in Heritage Buildings

Danae's PhD research investigates the use of Building Information Modelling (BIM) for heritage buildings. As BIM has been developed for new buildings, the use of this tool in the heritage field is still challenging. Specifically, Danae is integrating BIM with a forecasting model connecting moisture ingress and façade weatherings, using damage function, wind-driven runoff models and sharp front theory.



Danae (on the left) laser scanning the Jewel Tower in Westminster, London. Credit: Josep Grau-Bové.

### 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'.

### Maria Shehade — Negotiating cultural property disputes: bridging the gap between theory and practice

Maria's research examines cultural property disputes and their settlement through negotiation, which constitutes one of the very few examples of negotiation theory application in heritage management. The research focuses on claims for the repatriation of antiquities and other cultural objects in which the claiming parties are States and museums are on the receiving end. The thesis investigates the Metropolitan-Italy case, the Getty-Italy case and the Getty-Greece case and presents for the first time a complete analysis of the negotiations, identifying the elements that affected their development.

## UCL ISH ALUMNI AND SPONSORSHIP

UCL ISH alumni includes some of the cultural heritage sector's leading figures.

They are supported by a strong community of former UCL ISH colleagues, who remain in regular contact through events and social networks.

### Case study: Rob Woodside, Estates Director at English Heritage

Rob Woodside came to UCL ISH having spent 11 years working as an archaeologist in the National Trust.

He then moved on to work in commercial consultancy with Atkins Heritage, during which time he specialised in World Heritage Site management and spent time on secondment as Cultural Heritage Strategy Lead for the South Downs National Park Authority.

He returned to the National Trust in 2012 as Assistant Director of Conservation, where he leads a multi-disciplinary team of in-house consultants delivering major capital projects, including the £20m conservation project at Knole, the £5m re-roofing of the Wyne and the post-fire restoration of Clandon Park. He has recently taken up the post of Estates Director at English Heritage.

Rob is a guest lecturer on the ISH MSc programme and a specialist assessor to the British Council Cultural Protection Fund.

### Alumni sponsorship: The Richard Ayling legacy pledge

Earlier this year UCL ISH announced a legacy pledge in support of students of the Masters programme in Sustainable Heritage by The Bartlett alumnus Richard Ayling.

Richard studied at The Bartlett School of Planning between 1964 and 1966 and has a keen interest in conservation, particularly of historic buildings and churchyards. Richard spent much of his career working in the coal mining areas of Britain on the reclamation and re-use of derelict land.

When discussing the pledge, Richard noted his current concerns over the future of open spaces and communities affected by the demise of the National Coal Board and other nationalised industries and the reduced resources and staffing of local authorities to manage them.

*"Mr Ayling's generosity will mean that outstanding students will be able to achieve excellence at UCL free from the burden of financial constraints. The gift will truly benefit the professional and personal development of our students."*

**Professor May Cassar**  
Director for UCL ISH

# INTERNATIONAL PARTNERS

## Belgium

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

## Czech Republic

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

## China

City University Hong Kong  
Dunhuang Academy

## Columbia

Gold Museum, Bogota

## Cyprus

The Cyprus Institute

## Denmark

National Museum of Denmark, Copenhagen

## Egypt

Bibliotheca Alexandrina, Alexandria

Fayoum University  
Grand Egyptian Museum, Giza

## France

Arkema, Colombes  
Centre de recherche sur la conservation, Paris  
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, Berlin  
Fraunhofer Institute, Munich  
Lichtblau e.K., Dresden  
OSRAM, Berlin  
Zentrum für Bucherhaltung GmbH, Leipzig

## Greece

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

## 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

## Ireland

The Discovery Programme, Dublin  
Tyndall National Institute, Cork

## Hungary

Magyar Tudományos Akadémia, Debrecen

## Japan

Japan International Co-operation Agency, Tokyo

## 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, Amersfoort  
Rijksmuseum, Amsterdam  
University of Amsterdam

## N. Ireland

Consarc Design Group, Belfast

## Poland

Polish Academy of Sciences, Kraków  
Uniwersytet Mikolaja Kopernik, Torun

## Portugal

Laboratorio Nacional de Engenharia Civil, Lisbon

## Slovenia

Javni Zavod Republike Slovenije Za Varstvo Kulturne Dediscine, Ljubljana  
National Institute of Chemistry, Ljubljana  
University of 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, Barcelona  
Spanish Institute of Cultural Heritage, Madrid  
University of Barcelona  
University of Santiago de Compostela

## Sweden

Chalmers University of Technology, Gothenburg  
University of Gothenburg

## Switzerland

Leica Geosystems, Heerbrugg

## UK

Analytik Ltd  
Archetype  
ARHR  
BBC R&D  
Birmingham Museum Trust  
University of Brighton  
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  
EURA Conservation  
Faro Technologies  
Historic England  
Historic Royal Palaces  
Historic Scotland  
House of Lords Select Committee  
Hutton+Rostron Ltd  
ICON Heritage Science Group  
ISIS pulsed neutron and muon source  
Jason Bruges Studio  
Knowledge Transfer Network  
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  
University of Oxford  
Plowden & Smith Ltd  
Plowman Craven  
Proceq SA  
Q-bot  
Qi3  
ScanLAB  
Science and Technology Facilities Council  
Senceive Ltd  
The Sensors & Instrumentation Group  
SOCA – Studio of Cinematic University of Strathclyde  
Architecture  
Tate,  
Technology Strategy Board  
TeraView Ltd  
TIGA  
Tobit Curteis and Associates  
TQC UK  
V&A  
The Workers

## US

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, D.C  
Metropolitan Museum of Art, New York  
Museum of Modern Art, New York  
The Smithsonian Institution

# EXTERNAL ENGAGEMENT

The range of activities in which UCL ISH academic staff, researchers and students engage extends far beyond traditional teaching and research. This year, UCL ISH hosted six Guest Lectures, one inaugural lecture and many public engagement events.

## Online presence

Online public engagement by UCL ISH has increased significantly this year allowing important conversations to grow surrounding the Institute's research, news and events.

This year, UCL ISH produced videos including:

- An interview with UCL President and Provost Professor Michael Arthur about the importance of sustainable heritage and the Mobile Heritage Lab.
- A video of the 2016 two-week study visit to Malta, filmed by UCL ISH student Mark Kearney.
- A video of the landmark workshop organised by UCL ISH at Burghley Park, the site of the world-renowned Burghley Horse Trials.
- An 'International Hello' video comprised of UCL BSEER students saying hello in different languages.

The UCL Institute for Sustainable Heritage blog is a 2017 initiative created originally for the 'Looking at Old Ground in a New Way' project.

Each blog post explains the impact of the landmark workshop hosted at Burghley Park, the site of the world-renowned Burghley Horse Trials. The workshop, part of the wider UCL ISH Future Heritage strand, explored the relationship between the performance of equine athletes and the condition of grounds – of particular importance to heritage sites rich in archaeology that host equestrian sporting events, like Burghley Park.

The blog posts were written by experts in equine biomechanics, geophysics, heritage, landscape architecture and archaeology and demonstrate the cross-disciplinary work being led by UCL ISH.



Filming in the laboratory. Credit: Matija Strlic

## Guest lecture series

The UCL ISH guest lecture series has been running for more than 10 years and plays a significant role in the Institute's growing engagement.

Once a month during term time, UCL ISH welcomes speakers to discuss the subject of sustainable heritage in relation to their own profession for an audience of heritage professionals, policy makers, industry professionals, the UCL community and members of the public.

The 2016/17 academic year saw an eclectic mix of speakers:

## October 2016

**Professor Sue Hamilton**  
UCL Institute of Archaeology

'Sustaining Eroding Heritage – the case of Rapa Nui (Easter Island)'

## November 2016

**Professor Tim Weyrich**  
UCL Department of Computer Science

'Problem-Aware Digitisation of Cultural-Heritage Artefacts'

## January 2017

**Ben Cowell**  
Historic Houses Association  
'Sustaining the Country House'

## February 2017

**Tobit Curteis**  
Tobit Curteis Associates  
'Useful data: practical environmental survey for real built heritage projects'

## March 2017

**Professor Carl Heron**  
The British Museum  
'Molecules at the Museum: the impact and implications of molecular investigation of museum specimens'

## April 2017

**Jane Henderson**  
Cardiff University  
'Satisfaction, uncertainty and data in conservation decision making'



UCL ISH Guest Lecture. Credit: UCL ISH

# EXTERNAL ENGAGEMENT (CONT.)

## The Mobile Heritage Laboratory

In 2015, UCL ISH, together with its partners the University of Oxford and the University of Brighton, were awarded funding 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.

This year the MHL spent 23 days at a variety of public engagement events. Staff and students have worked in collaboration with a number of high profile organisations to coordinate projects at The National Archives, the Vyne, British Science Festival, UCL Festival of Culture and many more.

A highlight from this year was the MHL's visit to Burlington House. SEAHA students collaborated with the Royal Society of Chemistry to hold a Science in Art workshop for three London schools at Burlington House, London.

Students presented to 65 children on a variety of topics, all of which included a practical demonstration in which they could participate.

This one-day workshop gave the children an opportunity to further experience practical applications of the knowledge they learn in school.

Speaking about the event, the organiser, Mark Kearney, said:

*"A key aim of the SEAHA CDT is to engage the public and show the novel and cutting edge scientific methods used by its students to study and interpret heritage."*

*"Collaborations such as this help the presenters build up experience speaking and also help develop a professional network outside of heritage science."*

**Mark Kearney**  
SEAHA Student

The SEAHA MHL activities are managed by Josep Grau-Bove and applications for access are assessed on a rolling basis through: <http://www.seaha-cdt.ac.uk/mobile-heritage-lab/apply>



The Mobile Heritage Laboratory outside Brighton Pavilion.  
Credit: Matija Strlic

## Case study: UCL ISH in the media

UCL ISH PhD student Cecilia Bembibre's research on smells of the past has been hugely influential this year, receiving widespread media coverage across the globe.

Cecilia's research looks at the role of olfaction in heritage, from identifying smells with historic value to exploring how Heritage Science can contribute to understanding and preserving them.

Her research was featured in the following media outlets:

- Atlas Obscura
- BBC Breakfast
- BBC London News
- Channel 5
- CNN en español
- Daily Mail
- Japan Times
- Smithsonian Magazine
- The Times

*"Smells play a powerful role in our daily lives and individual memories can be considered part of our intangible cultural heritage, not only for their own value, but through their connections to language, tradition and tourism."*

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

**Cecilia Bembibre**  
UCL ISH PhD Student



Cecilia Bembibre carrying out research in National Trust property, Knole House. Credit: James Dobson and the National Trust

# PHOTO COMPETITION

This year, UCL ISH held its first ever photo competition, inviting entries that captured the concept of 'Future Heritage'.

Dozens of University College London staff and students entered excellent photographs on the theme of 'Future Heritage', an important research strand in UCL ISH's strategy.

While heritage is often considered in a historical context, much of UCL ISH's work relates to protecting existing heritage from present and future impacts, which can range from global climate change and conflict to changing technologies and use.

The entries were judged by visual anthropologist and artist Marcel Reyez-Cortez, UCL ISH Director Professor May Cassar and UCL BSEER Communications Manager Alex Blackburn.

## Second place

'An uncertain future'

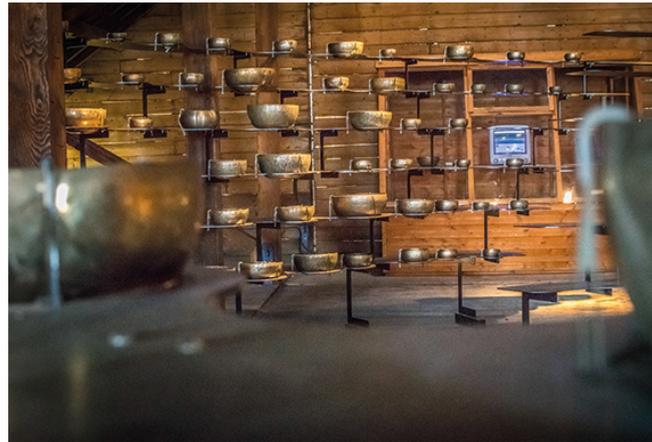


Mark Kearney, SEAHA student

The winning entries were:

## First place

'Longplayer' - This lighthouse houses Tibetan 'singing bowls' run by algorithms to play an evolving musical composition designed to play without repetition for 1000 years



Ahmed Kawser, UCL BSEER

## Third place

'Vanishing urban media - London'



Andre Afonso, UCL Bartlett School of Architecture

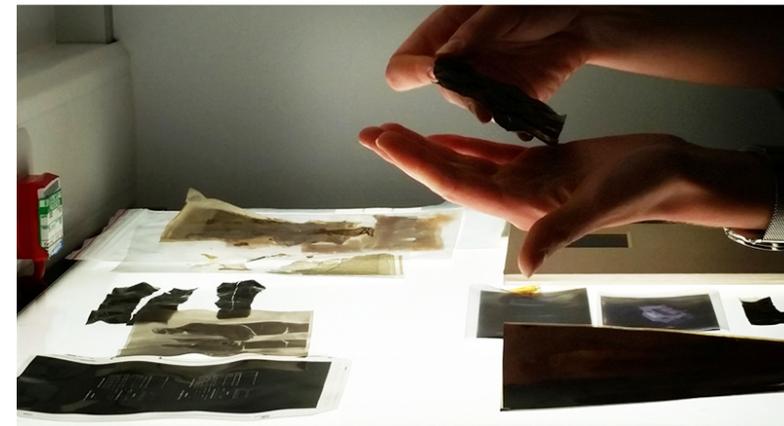
Other entries on the judges' shortlist included:



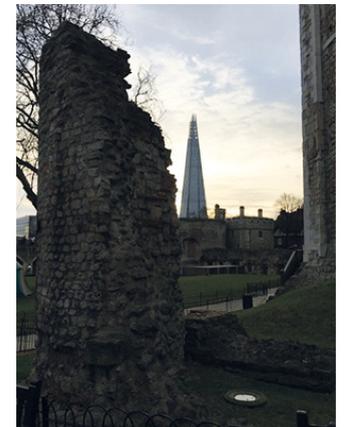
'Too busy selling it to use it' Mark Kearney, SEAHA student



'What future heritage?' Cosmo Phillipps, UCL ISH student



'We scare because we care' Yun Liu, SEAHA student



'Shards' Michael Michette, SEAHA student



'The room full of jars' Alejandra Albuerno, UCL Engineering



'Turbine hunting' Carolien Coon, UCL ISH student

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Bardon, T., May, R.K., Taday, P.F., Strlic, M. (2017). 'Contrast in terahertz images of archival documents - Part II: Influence of topographic features.' *Journal of Infrared, Millimeter, and Terahertz Waves*. 38, pp. 467-482.

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Duran, C., Grau, J., Fearn, T., Strlic M. (2017). Data mining in collections: from epidemiology to demography. 18th International Conference of the International Council of Museums Committee for Conservation. Copenhagen: ICOM.

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Garside DJ, MacDonald LM, Teunissen C, Curran K, Korenberg C, Robson S, (2016). Potential uses for spectrally variable lighting in museum environments, Progress in Colour Studies, UCL, UK, 14 Sep - 16 Sep.

Grau-Bové, J., Budić, B., Kralj Cigic, I., Thickett, D., Strlic, M. (2016). 'The effect of particulate matter on paper degradation.' *Her. Sci.* 4, #2.

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Mahgoub, H., Chen, H., Gilchrist, J.R, Fearn, T., Strlic, M. (2017). Quantitative Chemical Hyperspectral NIR Imaging of Islamic Paper. 18th International Conference of the International Council of Museums Committee for Conservation. Copenhagen: ICOM.

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# STAFF LIST

## MANAGEMENT AND ADMINISTRATION

**Professor May Cassar**

Director

**Professor Matija Strlic**

Deputy Director

**Daisy Voake**

Institute Administrator

**Selina McCarthy**

SEAHA Centre Manager (maternity leave)

**Robyn Parker**

SEAHA Centre Manager (maternity cover)

## STAFF

Alejandra Albuerne

Carolien Coon

Katherine Curran

Kalliopi Fouseki

Argyro Gkili

Josep Grau-Bové

Shaun McKinnar

Mark Underhill

Miriam Wright

To learn more about how UCL ISH delivers sustainable solutions to real-world cultural heritage problems through ground-breaking, cross-disciplinary research and innovative teaching, please visit:

[ucl.ac.uk/bartlett/heritage](http://ucl.ac.uk/bartlett/heritage)

UCL ISH

Central House

14 Upper Woburn Place

London, WC1H 0NN

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