

SOTIRIA KOGOU

EDUCATION

- October 2013-
January 2018:** **PhD in Physics**
Department of Physics and Mathematics, School of Science & Technology,
Nottingham Trent University, Nottingham, UK.
Thesis: "Investigation of the complementary use of non-invasive techniques for
the holistic analysis of paintings and automatic analysis of large-scale spectral
imaging data".
- September
2004-
March 2010:** **BSc in Physics**
Department of Physics, University of Crete, Heraklion, Crete, Greece.
Thesis: "The role of the substrate in the laser cleaning process; a study on the
laser assisted removal of polymeric consolidation materials from various
substrates".

LANGUAGES

- Greek (Native)
- English (Excellent Command)
- French (Intermediate)

CARRER HISTORY

- October 2017-
present:** **Research Fellow in the Imaging & Sensing for Archaeology, Art History &
Conservation (ISAAC) research group in Nottingham Trent University**
Main Responsibilities:
- Operation & data interpretation of a series of non-invasive techniques (i.e. spectral
imaging, optical coherence tomography, reflectance spectroscopy, X-ray
fluorescence spectroscopy & Raman spectroscopy)
 - Development of machine learning methods for the interpretation of spectral imaging
datasets.
 - Organisation & coordination of field trips in collaboration with national &
international institutions.
 - Supervision of masters and PhD students.
- April 2009-
November 2011:** **Research Assistant at Foundation for Research and Technology Hellas -
Institute of Electronic Structure and Lasers (FORTH-IESL)**
Main Responsibilities:
- Research activities in the Laboratory of Laser Applications on Cleaning &
Conservation of Cultural Heritage objects.
 - Supervision of undergraduate students in 'Laser cleaning of artworks' & 'Laser-
based analytical techniques for the analysis of artworks' laboratories.

TEACHING EXPERIENCE

- January 2018-
present:** **Nottingham Trent University (NTU)**
Supervision of masters and PhD students in ISAAC lab.
- October 2016-
June 2017:** **Nottingham Trent University (NTU)**
Demonstrator in Physics Laboratories
- April 2009-
November 2011:** **Foundation for Research and Technology Hellas - Institute of
Electronic Structure and Lasers (FORTH-IESL)**
Supervision of undergraduate students' laboratories on 'Laser cleaning of
artworks' and 'Laser-based analytical techniques for the analysis of
artworks'

ORGANISATION OF WORKSHOPS

- March 2019:** Organisation of the European Research Infrastructure for Heritage Science (E-RIHS) Dissemination Day in Nottingham, UK.
- March 2019:** Organisation & coordination of the Science & Heritage Interdisciplinary Research Training Workshop in Nottingham Trent University, Nottingham, UK.
- August 2017:** Hands-on tutorial given at a workshop on the application of hyperspectral imaging and Optical Coherence Tomography (OCT) for the analysis of objects of cultural heritage in collaboration with the National Museum of China (Beijing, China)

PARTICIPATION IN FIELD TRIPS

- February 2019:** In situ analysis of the wall-paintings of the Music Room in Brighton Pavilion (Brighton, U.K)
Main Responsibilities: Co-ordination of the field trip & performance of reflectance and X-ray fluorescence (XRF) spectroscopic and spectral imaging measurements.
- November 2018:** In situ analysis of the wall-paintings of the Blessed Sacrament Chapel in St. Barnabas Cathedral (Nottingham, U.K)
Main Responsibilities: Co-ordination of the field trip & performance of spectroscopic and spectral imaging measurements.
- March 2018:** In situ analysis of the Peruvian Export paintings collection of the Museum of International Folk Arts in Santa Fe (U.S.A)
In situ analysis of the watercolour paintings of the Fierro's collection at The Getty Institute in Los Angeles (U.S.A)
Main Responsibilities: Organisation of data collection & performance of reflectance spectroscopic and spectral imaging measurements
- September 2017 & August 2016:** In-situ analysis of the murals in Mogao Caves [UNESCO Heritage Site] in Dunhuang (China)
Main Responsibilities: Organisation of data collection & performance of reflectance, Raman and X-ray Fluorescence (XRF) spectroscopic measurements
- August 2016:** In-situ examination of Leonardo da Vinci's 'St. John the Baptist' in Louvre museum in Paris (France)
Main Responsibilities: Performance of Optical Coherence Tomography (OCT) measurements
- January 2014:** In-situ examination of Chinese Export paintings of the collections of Victoria & Albert (V&A) and Royal Horticulture Society (RHS)
Main Responsibilities: Performance of Optical Coherence Tomography (OCT) measurements
- February 2014:** In-situ measurements at English Heritage (EH) enamels
Main Responsibilities: Performance of Optical Coherence Tomography (OCT) measurements
- July 2011:** In-situ analysis campaign in Byzantine churches in Crete (in collaboration with the 13th Ephorate of Byzantine Antiquities in Crete):
A CHARISMA Campaign for in-situ measurements in Byzantine churches in Crete with the aim to use innovative non-destructive technology (multispectral cameras and DHSPi) for the investigation of natural deterioration mechanisms of the wall paintings.
Main Responsibilities: Performance of spectral imaging measurements

ORAL PRESENTATIONS IN CONFERENCES

S. Kogou, L. Lee, G. Shahtahmassebi, H. Liang. An automated combined analysis of MA-XRF and VIS/NIR spectral imaging datasets using machine learning methods, MA-XRF, Macro X-ray Fluorescence Scanning in Conservation, Art and Archaeology, Catania, Italy (15-16 October 2019)

S. Kogou, L. Lee, G. Shahtahmassebi, H. Liang. A novel methodology for the automatic analysis of large collections of paintings, SPIE O3A VII, Munich, Germany (24-27 June 2019)

S. Kogou, G. Shahtahmassebi, H. Liang, B. Shui, W. Zhang, B. Su. Automatic, non-invasive analysis of Cave 465 mural at the UNESCO site of Mogao Caves, TechnArt 2019, Bruges, Brussels (7-10 May 2019)

S. Kogou, N. Hodgson, From Myth to Majesty: an historical and scientific exploration of fifteenth-century British royal genealogies from the 'Noah' tradition, Global Heritage Showcase, Nottingham, UK (18 May 2018)

S. Kogou, G. Shahtahmassebi, A. Lucian, C. S. Cheung, B. Su, H. Liang, Non-invasive multi-modal analysis of Cave 465 murals in Dunhuang, China, LACONA 11, Cracow, Poland (20-23 September 2016)

S. Kogou, G. Shahtahmassebi, A. Lucian, C. S. Cheung, B. Su, H. Liang. Automated analysis of large scale remote spectral imaging of paintings, SPIE, Munich, Germany (22-25 June 2015)

POSTER PRESENTATIONS TO CONFERENCES

S. Kogou, C. S. Cheung, P. Ricciardi, H. Liang, Examination of illuminated manuscripts using optical coherence tomography and non-invasive spectroscopic techniques, MANUSCRIPTS in the MAKING: Art and Science, Cambridge, England (8-10 DECEMBER 2016)

S. Kogou, C. S. Cheung, P. Ricciardi, H. Liang, A study of illuminated manuscripts using optical coherence tomography and non-invasive spectroscopic techniques, LACONA 11, Cracow, Poland (20-23 September 2016) [Best Poster Award]

S. Kogou, A. Lucian, C. S. Cheung, B. Su, H. Liang, Large scale high resolution remote spectral imaging of wall paintings, 41st International Symposium on Archaeometry (ISA), Kalamata, Greece (15 – 21 May 2016)

S. Kogou, A. Luciani, L. Burgio, K. Bailey, C. Brooks, H. Liang, Multi-modal non-invasive examination of Chinese export paintings, TECHNART 2015, Catania, Italy (27 – 30 April 2015)

V. M. Papadakis, Y. Orphanos, **S. Kogou**, K. Melessanaki, P. Pouli, C. Fotakis, IRIS: a novel spectral imaging system for the analysis of cultural heritage objects Proc. SPIE 8084, O3A: Optics for Arts, Architecture and Archaeology III, 80840W, Munich, Germany (6 June 2011)

S. Kogou , S. Chlouveraki, P. Pouli , C. Fotakis Removal of hard burial encrustation from ceramic shreds using Er:YAG and Nd:YAG laser irradiation, LACONA 9, London, England (7–10 September 2011)

PARTICIPATION IN RESEARCH PROJECTS

January 2021-present:	Dyeing: To discover the (in)visible through 19th C Nottingham lace. In collaboration with Art & Design Department-NTU and The National Archives (TNA). <u>Main Responsibilities:</u> <ul style="list-style-type: none"> • Interpretation of scientific data.
January 2020-present :	AI for DIGILAB: A new concept in digital infrastructure for heritage materials research. A project developed in the framework of AHRC program 'UK-US Collaboration for Digital Scholarship in Cultural Institutions'. <u>Main Responsibilities:</u> <ul style="list-style-type: none"> • Development and optimisation of machine learning software for data obtained from various spectral imaging modalities, quality control of the results. • Organisation of ISAAC Mobile Lab campaigns & collaboration on the case studies providing expertise in multi-modal complementary analysis.
September 2019-present:	Integrating Platforms for the European Research Infrastructure ON Heritage Science (IPERION-HS) <u>Main Responsibilities:</u> <ul style="list-style-type: none"> • Assistance in the organisation of preparatory phase of the MOLAB infrastructure. • Organisation of ISAAC mobile lab's contribution in MOLAB infrastructure (i.e. coordination of field trips, data processing and interpretation).
January 2018-present:	From Myth to Majesty: An Historical and Scientific Exploration of Fifteenth-Century British Royal Genealogies from the 'Noah' Tradition. In collaboration with Dr Natasha Hodgson from School of Arts & Humanities. The project is in collaboration with Canterbury University (New Zealand). <u>Main Responsibilities:</u> <ul style="list-style-type: none"> • Analysis of the scientific data • Organisation, coordination and participation in dissemination activities

- September 2019-February 2020:** **Discovering Pugin at St Barnabas Cathedral.** In collaboration with School of Architecture, Design & the Built Environment and School of Science and Technology. A project awarded with a National Lottery Grant.
Main Responsibilities:
- Coordination ISAAC mobile Lab's in-situ activity
 - Interpretation of spectral imaging, FORS and XRF data
- June 2018-October 2019:** **European Research Infrastructure for Heritage Science (E-RIHS)**
Main Responsibility: Assistance in the organisation and evaluation of preparatory phase of the project.
- March 2018:** **Tracing the history of Peruvian Export paintings.** In collaboration with Getty Research Institute-GRI (Los Angeles) & Museum of International Folk Art-MOIFA (Santa Fe).
Main Responsibilities:
- Organisation of the field trip.
 - Performance of spectral imaging, reflectance spectroscopy & OCT measurements
 - Interpretation of the multimodal analytical data.
- August 2016-September 2018:** **Non-invasive analysis & large-scale imaging of murals at the UNESCO World Heritage Site of Mogao caves in Dunhuang.** In collaboration with the Dunhuang Academy, China.
Main responsibilities:
- Organisation of 2 field trips (August 2016 and September 2017).
 - Performance of FORS, XRF and Raman measurements.
 - Development of machine learning method for the analysis of large spectral imaging datasets.
 - Interpretation of multi-modal data.
- January 2016:** **EU LaserLab project: An exploration of the complementarity between non-linear microscopy and OCT for the examination of paint and varnish layers** (Collaboration between Nottingham Trent University & Institute of Electronic Structure and Laser – Foundation of Research and Technology-Hellas)
Main Responsibility: Performance of the non-linear microscopic measurements in collaboration with colleagues from FORTH.
- December 2013-September 2014:** **Culture & Trade through the Prism of Technical Art History a Study of Chinese Export Paintings.** In collaboration with V&A Museum and Royal Horticulture Society, sponsored by AHRC and EPSRC.
Main Responsibilities:
- Performance of OCT scanning.
 - Processing and interpretation of data acquired with various non-invasive techniques (spectral imaging, FORS, Raman and XRF spectroscopies).
- October 2010-November 2011:** **FP7 infrastructure project “CHARISMA” (Cultural Heritage Advanced Research Infrastructures- Synergy for a Multidisciplinary Approach to Conservation/Restoration, CN 228330)**
Main Responsibility: Application and optimization of laser systems used in cleaning, structural diagnostics and compositional analysis of Cultural Heritage objects.
- April – September 2010:** **FP6-MOBILITY Marie Curie Excellence Grant MULTIRAD (Energetic Ultra-fast Laser-Driven Radiation Sources: Applications in Biology, Chemistry & Physics)**
Main Responsibility: Selection & preparation of samples.

CONTRIBUTION IN DIGITAL PLATFORMS

- Organisation, coordination and participation on the production of the ‘DIGITAL HUMANITIES AND HERITAGE SCIENCE RESEARCH INFRASTRUCTURES’ training module on the PARTHENOS platform, in the framework of European Research Infrastructure for Heritage Science/ E-RIHS participation in the PARTHENOS:

<https://training.parthenos-project.eu/sample-page/digital-humanities-research-questions-and-methods/dh-and-heritage-science-research-infrastructures/>

- Online presentation titled: “A novel methodology for the automatic analysis of large collections of paintings” in the SPIE O3A-Optics for Arts, Architecture and Archaeology VII website:
<https://www.spiedigitallibrary.org/conference-proceedings-of-spie/11058/110580Q/A-novel-methodology-for-the-automatic-analysis-of-large-collections/10.1117/12.2527611.short?SSO=1/>

TECHICAL SKILLS

- Operation of spectral imaging systems and interpretation of the acquired data for analysis on Works of Art and Antiquities
- Use of Optical-Coherence Tomography (OCT) for analysis on Works of Art and Antiquities
- Use of Reflectance Spectroscopy for analysis on Works of Art and Antiquities
- Use of X-ray Fluorescence (XRF) spectroscopy for analysis on Works of Art and Antiquities
- Use of Raman spectroscopy for analysis on Works of Art and Antiquities
- Use of MatLab, R, ImageJ
- Development of machine learning methods for the interpretation of large spectral imaging dataset

PUBLICATIONS

- Y. Li, C.S. Cheung, **S. Kogou**, A. Hogg, H. Liang, H.,S. Evans, 2021. “Standoff laser spectroscopy for wall paintings, monuments and architectural interiors”. In *Transcending Boundaries: Integrated Approaches to Conservation*. ICOM-CC 19th Triennial Conference Preprints, Beijing, 17–21 May 2021, ed. J. Bridgland. Paris: International Council of Museums.
- S. Kogou**, G. Shahtahmassebi, A. Lucian, H. Liang, B. Shui, W. Zhang, B. Su, S. van Schaik, 2020. “From remote sensing and machine learning to the history of the Silk Road: large scale material identification on Mogao wall paintings” *Scientific Report* 10, 19312, <https://doi.org/10.1038/s41598-020-76457-9>
- S. Kogou**, L. Lee, G. Shahtahmassebi, H. Liang, 2020. “A new approach to the interpretation of MA-XRF spectral imaging data using neural networks” *X-Ray Spectrom.*, 1– 10. <https://doi.org/10.1002/xrs.3188>
- Y. Li, C. S. Cheung, **S. Kogou**, F. Liggins, H. Liang, 2019, "Standoff Raman spectroscopy for architectural interiors from 3-15 m distances", *Opt. Express*, vol. 27, issue 20, pp.31338-31347
- M. Read, C. S. Cheung, D. Ling, C. Korenberg, A. Meek, **S. Kogou**, H. Liang, 2019. "A non-invasive investigation of Limoges enamels using both Optical Coherence Tomography (OCT) and spectral imaging: a pilot study", *Proc. SPIE 11058, Optics for Arts, Architecture, and Archaeology VII*, 1105803, doi:10.1117/12.2527092
- S. Wijsman, S. Neate, **S. Kogou**, H. Liang, 2018. “Uncovering the Oppenheimer Siddur: using scientific analysis to reveal the production process of a medieval illuminated Hebrew manuscript”, *Heritage Science*, vol.6, no.15
- H. Liang, M. Mari, C.S. Cheung, **S. Kogou**, P. Johnson, G. Filippidis, 2017. “Optical coherence tomography and non-linear microscopy for paintings – a study of the complementary capabilities and laser degradation effects”, *Optics Express*, vol. 25, no. 16, p.19640
- S. Kogou**, S. Neate, C. Coveney, A. Miles, D. Boocock, L. Burgio, C. S. Cheung, H. Liang, 2016. “The origins of the Selden map of China : scientific analysis of the painting materials and techniques using a holistic approach”, *Heritage Science*, vol. 4, no. 28, pp. 1–24.
- S. Kogou**, A. Luciani, S. Bellesia, L. Burgio, K. Bailey, C. Brooks, H. Liang, 2015. “A holistic multimodal approach to the non-invasive analysis of watercolour paintings”, *Applied Physics A*, 121 (3) , pp. 999–1014
- M. Oujja, M. Sanz, E. Rebollar, J. F. Marco, C. Domingo, **S. Kogou**, P. Pouli, C. Fotakis, M. Castillejo, 2013. “Wavelength and pulse duration effects on laser induced changes on raw pigments used in paintings”, *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy*, 102, pp. 7-14
- S. Kogou**, A. Selimis, G. J. Tserevelakis, P. Pouli, G. Filippidis, C. Fotakis, 2012. “The use of non-linear microscopy techniques to assess the affected region in the laser cleaning of polymeric coatings”, *LACONA IX proceedings*, eds K. Birkholzer, N. Luxford, C. Korenberg, M. Strlic and D. Saunders, Archetype, UK, pp.103-107
- A. Selimis, G.J. Tserevelakis, **S. Kogou**, P. Pouli, G. Filippidis, N. Sapogova N. Bityurin and C. Fotakis, 2012. “Nonlinear microscopy techniques for assessing the UV laser polymer interactions”, *Optics Express*, vol.20 Issue 4, pp.3990-3996
- V. Papadakis, Y. Orphanos, **S. Kogou**, K. Melessanaki, P. Pouli, C. Fotakis, 2011. “IRIS; a novel spectral imaging system for the analysis of Cultural Heritage objects”, *SPIE*, vol. 8084

