3rd R-CHIVE CONFERENCE

30 June – 2 July 2021
12pm to 3pm EST (Virtual)

Program - Day 1 (June 30th, 2021)

- 12:00 – 12:30 pm

  Welcome and Introduction (*David Messinger*)

- 12:30 – 1:00 pm

  Ancient Manuscripts with a Special Relevance Today (*Fr. Justin*)

- 1:00 – 1:45 pm

  Demo of low-cost multispectral imaging system and software (Tania Kleynhans)

- 1:45 – 2:00 pm

  Break

- 2:00 – 2:30 pm

  Range of techniques employed alongside the multispectral imaging for discovery (*Kate Nicholson*)

- 2:30 – 3:00 pm

  Comparison between Hyperspectral and Multispectral imaging of palimpsested and damaged leafs (*Alex Zawacki*)

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Program - Day 2 (July 1st)

- 12:00 – 12:30 pm

  The variegated nature of imaging diverse collections: case studies at the Victoria and Albert Museum (Lucia Burgio)

- 12:30 – 1:00 pm

  Imaging in remote locations: challenges and workflow. (Damianos Kasotakis)

- 1:00 – 1:45 pm

  EduceLab: An ecosystem for advancing the scientific foundations of natural and cultural heritage science (*Brent Seales*)

- 1:45 – 2:00 pm

  Break

- 2:00 – 2:30 pm

  MSI on a budget: a practical discussion from the classroom (Helen Davies)

- 2:30 – 3:00 pm

  "Tricks of the Trade" in Processing Multispectral Images for Text Recovery (Keith Knox)

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Program - Day 3 (July 2nd)

- 12:00 – 12:30 pm

  Optimizing Spectral and 3D Imaging for Cultural Heritage Documentation Using Consumer Imaging Systems (Keats Webb)

- 12:30 – 1:00 pm

  Imaging spectroscopy to understand Vermeer's working process: collaborative effort with conservators and curators (John Delaney)

- 1:00 – 1:45 pm

  Resurrect3D: An online Platform for Visualizing Cultural heritage Objects (Gregory Heyworth)

- 1:45 – 2:00 pm

  Break

- 2:00 – 2:30 pm

  A Fifteenth-Century World Map Re-Discovered. Multispectral Imaging of Dresden Landesbibliothek's A.68, ff. 26v-27r. (Kevin Wittmann)

- 2:30 – 3:00 pm

When the same hand writes a text in the under-and upper-writing: looking again and seeing more in A.Perg.2, a non-palimpsest Qur'anic fragment (Alba Fedeli)

Speaker BIO's

Dr. Messinger received a Bachelor's degree in Physics from Clarkson University and a Ph.D. in Physics from Rensselaer Polytechnic Institute. He has worked as an Analyst for XonTech Inc., on the National Missile Defense Program for Northrop Grumman and was an Intelligence Community Postdoctoral Research Fellow. He is currently a Professor, the Xerox Chair in Imaging Science, and Director of the Chester F. Carlson Center for Imaging Science at the Rochester Institute of Technology where he was previously the Director of the Digital Imaging and Remote Sensing Laboratory. His research focuses on projects related to remotely sensed spectral image analysis using physics-based approaches and advanced mathematical techniques with particular emphasis on the use of data-driven techniques from the graph theory and manifold learning literature. Applications of this research have ranged from airborne and space-based imaging for archeology and disaster response to cultural heritage imaging.

Father Justin was born in Texas and grew up in Chile. He graduated from the University of Texas at Austin in 1971. Entering a Greek Orthodox monastery three years later, he was tonsured in 1977, and ordained deacon and priest the following year. He has been a member of Saint Catherine's Monastery, Sinai, since 1996. Elected librarian in 2005, and has supported the Sinai Palimpsests Project, and the current project for the photography of the Syriac and Arabic manuscripts.

Tania Kleynhans worked as a Safari guide in Southern Africa for 15 years before returning to school to further her education. She received a Bachelor's degree in Mathematics and Honors degree in Operational Research from the University of South Africa, and an M.S. and PhD. in Imaging Science at the Rochester Institute of Technology. She works on various research projects – including algorithm development for calculating surface temperature from satellite imagery, thermal sensor calibration and band trade studies, pigment identification of hyperspectral data from paintings with machine learning and AI, and the development of a low-cost multispectral imaging system and software for historical document discovery. Tania leads the Rochester Cultural Heritage Imaging, Visualization and Education (R-CHIVE) group that focus on using various imaging modalities to uncover faded, erased or damaged historical texts.

Kate Nicholson is an Associate Professor in Applied Spectroscopy at Northumbria University in Newcastle Upon Tyne, UK. Her doctoral studies in Chemistry at Durham University, UK investigated the effects of interfacial curvature on ice crystal nucleation, and she continued to specialise in crystal growth theory in her post-doctoral work, winning the BACG young scientist award in 2007. As her analytical skills grew she specialised in non-invasive forms of spectroscopy, and became a founding member of 'Team Pigment' in 2013, where she developed portable spectroscopic analytical techniques for pigment identification in art and artefacts. She currently applies these techniques to medieval manuscripts to discover the trends and patterns in their production through the evolving historical political and economic landscape of the British isles.

Alexander J. Zawacki is a PhD candidate in English at the University of Rochester. He is also an operations coordinator at the Lazarus Project, which uses multispectral imaging and statistical processing software to digitally recover damaged manuscripts and cultural heritage objects. His current research focuses on ghosts, horror, and hermeneutics in the Middle Ages.

Dr Lucia Burgio is Senior Conservation Scientist at the Victoria and Albert Museum, London. She graduated in Chemistry summa cum laude from the University of Palermo, Italy and completed a PhD degree in Chemistry at University College London. After a few months working in Italy, she joined the Science Section, Conservation Department, at the V&A in 2000. Her main duties involve the analysis and technical examination of museum objects, usually with Raman microscopy, X-ray fluorescence and optical microscopy. She assists the Museum's curators and conservators in the examination and understanding of the objects, and also in their dating, attribution and authentication. She is a Fellow of the Royal Society of Chemistry, has been an Honorary Research Fellow at UCL since 2001 and has been chairing the AMC Heritage Science Expert Working Group, Royal Society of Chemistry, since 2014. Her main interests include pigments and other artists' materials as well as oriental lacquer.

Damianos Kasotakis is the director of imaging for the Early Manuscripts Electronic Library, and a PhD candidate. For the last decade he has worked in numerus spectral imaging

projects in libraries, museums and private collections from the desert of Sinai, to the canals of Cambridge. He has trained people in imaging systems operation, and spectral image processing. His contribution is also noted in designing workflows for large scale digitization projects.

W. Brent Seales is the Alumni Professor of Computer Science at the University of Kentucky and a Getty Conservation Institute Scholar (2019-20). Seales' research applies data science and computer vision to challenges in the digital restoration and visualization of antiquities. He was a Google Visiting Scientist in Paris (2012-13), where he continued work on the "virtual unwrapping" of the Herculaneum scrolls. In 2015, Seales and his research team identified the oldest known Hebrew copy of the book of Leviticus (other than the Dead Sea Scrolls), carbon dated to the third century C.E. The reading of the text from within the damaged scroll has been hailed as one of the most significant discoveries in biblical archaeology of the past decade.

Helen Davies is an assistant professor of the digital humanities in the English department at the University of Colorado, Colorado Springs. She recently earned her PhD in medieval literature at the University of Rochester. Her work focuses on medieval maps and the intersection between medieval studies and the digital humanities and has recently appeared in *Imago Mundi.*

Keith Knox is the Chief Science Advisor for EMEL, the Early Manuscripts Electronic Library. He is a graduate of the University of Rochester, with a B.S. in Electrical Engineering and a Ph.D. in Optics. He has over 40 years experience in imaging research, 30 years in Xerox Research in Rochester, New York and 11 years at the AMOS observatory on the island of Maui. Since the 1990s, he has recovered lost text from several manuscripts, including the Archimedes Palimpsest and the Diary of David Livingstone. Keith is the author of Hoku, a general-use, Java-based software application for processing multi-spectral image data of damaged or erased manuscripts.

Keats Webb is an imaging scientist at the Smithsonian's Museum Conservation Institute (MCI). Her recent research has been investigating the optimization of spectral and 3D

imaging for cultural heritage documentation using consumer imaging systems. Her work at MCI includes using scientific and computational imaging to aid in the research and conservation of the Smithsonian collections. Her specializations include spectral imaging and image-based 3D reconstruction. Webb received a PhD from the University of Brighton (2020) and an MRes from University College of London (2015) as part of the UK Science and Engineering in Arts Heritage and Archaeology (SEAHA) Centre for Doctoral Training.

Dr. John Delaney is the senior imaging scientist in the scientific research department of the conservation division of the National Gallery of Art, Washington. His research focuses on the adaptation of remote sensing sensors and processing methods for the study of paintings and works on paper. He is currently an associate editor for Science Advances in the area of Physical and Material Sciences and on the editorial board for Heritage Science. Dr. Delaney is also an affiliated Faculty Member in the Chester F. Carlson Center for Imaging Science, Rochester Institute of Technology, NY.

Gregory Heyworth is an associate professor of English, History and Computer Science at the University of Rochester. He holds BAs from Columbia and Cambridge in English, and a Ph.D. in Comparative Literature from Princeton.Trained as a medievalist, he is an expert in everything dealing with old books – languages, old handwriting, book history, illuminations, manuscript making – and above all in finding and editing books no one has read in centuries. In 2010, he founded the Lazarus Project as an initiative to recover damaged cultural heritage objects using spectral imaging around the world, having built the first, transportable, multispectral imaging laboratory. Under Gregory's direction, the Lazarus Project has recovered damaged manuscripts, maps, globes and paintings using multispectral imaging (MSI) and other technologies (x-ray fluorescence, IR thermography, volumetric imaging, reflectance transformation imaging) in nine countries from Azerbaijan to Wales. He and his team have recovered such renowned works as the Black Book of Carmarthen, the 1491 Martellus Map, the Vercelli Book, the Bronze-Age cave paintings of Laja Alta, and the damaged manuscripts of the Cathedral Library of Chartres.

Kevin Wittmann received a BA in Art History at the University of La Laguna and a MA in European Medieval Identity at the University of Lleida. He is currently a PhD candidate at the University of La Laguna, with the dissertation "The Oceanic Imaginary. The Atlantic Ocean

and its Southern Islands in Medieval *Mappaemundi* (9th – 14th Centuries)". His main line of research is medieval and early modern cartography, mainly the representation of the Atlantic Ocean and its archipelagoes, as well as the western limits of the known world and their perception in medieval cultures. He has presented his researches in many national and international congresses, and published several articles and books both in Spanish and international publications. His final MA dissertation, "The Islands at the End of the World. The Fortunate Islands in Medieval Maps" was published by the universities of La Laguna and Lleida.

Alba Fedeli is a research associate at the Asien-Afrika-Institut, Universität Hamburg working on the transmission of early Qur'ānic manuscripts and their writing system. She received her PhD from the University of Birmingham, UK, at the Institute for Textual Scholarship and Electronic Editing, after studies in Italy with Sergio Noja Noseda, and has first-hand knowledge of manuscript collections scattered all over the world, from Yemen to Ireland, from Russia to Qatar and Egypt. Her works include the edition of the Mingana-Lewis Qur'ānic palimpsest. She is the co-PI of InterSaME Project ('The intertwined world of the oral and written transmission of sacred traditions in the Middle East'), a DFG-AHRC joint project in co-operation with Geoffrey Khan.