



The twelfth Biennial IRUG Conference

May 23-25, 2016

Book of Abstracts

ORMYLIA FOUNDATION

Art Diagnosis Centre

Ormylia, Greece



The twelfth Biennial Infrared & Raman Users Group Conference

www.irug12-ormylia.gr

Organised by

**ORMYLIA FOUNDATION Art Diagnosis Centre,
Ormylia, Greece**

International scientific committee

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Georgios Karagiannis, Ormylia Foundation Art Diagnosis Centre, GR

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David Thickett, English Heritage, London, UK

Local organising committee

Sophia Sotiropoulou

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Conference Program

Monday 23rd May

Conference Opening

Chair: Sophia Sotiropoulou

08:30 – 09:30	<i>Registration – Coffee</i>
09:30 - 10:00	Welcome addresses <ul style="list-style-type: none">• Priest Monk Serapion, President of the Ormylia Foundation Board of Directors• Georgios Karagiannis, Head of the Ormylia Foundation Art Diagnosis Centre• Beth Price, IRUG Regional Chair, Americas

Session 1: Non-invasive Spectroscopic Analysis of Artworks

Chair: Francesca Rosi, David Thickett

10:00 – 10:20	Characterization of materials in illuminated parchment manuscripts by r-FTIR, Raman and XRF <u>Wilfried Vetter</u> , Bernadette Frühmann, Federica Cappa and Manfred Schreiner
10:20 – 10:40	TR-FTIR techniques to support the conservation of metal surfaces: application to Renaissance gilded artefacts Andrea Cagnini, <u>Monica Galeotti</u> , Simone Porcinai, Barbara Salvadori
10:40 - 11:00	Non-invasive FTIR characterisation of varnishes of ancient brass scientific instruments belonging to the “Physic Cabinet” of the “Fondazione Scienza e Tecnica” in Florence Anna Giatti, Monica Galeotti, <u>Giancarlo Lanterna</u>
11:00 – 11:30	<i>Coffee break</i>
11:30 – 11:50	Thermal quasi-reflectography (TQR), handheld Raman spectroscopy, and optical profilometry: multi-technique mapping of decay in wall paintings Claudia Daffara, <u>Giacomo Marchioro</u> and Elisabetta Zendri
11:50 – 12:10	In-situ Raman spectroscopy as a key tool to study the nature of the soluble salts formed on mortars from the House of the Gilded Cupids (Pompeii) Nagore Prieto-Taboada, M. Veneranda, H. Morillas, I. Marcaida, S. Fdez-Ortiz de Vallejuelo, M. Maguregui, K. Castro, D. Rau, <u>Dawn Yang</u> , E. De Carolis, M. Osanna and Juan-Manuel Madariaga
12:10 – 12:30	Raman spectroscopic examination of mixed-phase pigments in Byzantine illuminated manuscripts <u>Catherine Schmidt Patterson</u> and Nancy Turner
12:30 – 12:50	Tracing the Ottoman palette of stone sculptures on the island of Crete <u>Zoi Eirini Papiiaka</u> , Aggelos Philippidis, Panagiotis Siozos, Maria Vakondiou, Kristalia Melessanaki, Demetrios Anglos
13:00 – 14:30	<i>Lunch break</i>

Session 2: Database and Methodological Developments on Raman Spectroscopy

Chair: Manfred Schreiner, Lynn Brostoff

14:30 – 14:50	Improved methodologies for the identification of inks in works of art by Raman spectroscopy <u>Silvia Centeno</u> , Maddalena Bronzato, M. Lorena Roldán, Adriana Rizzo, Alfonso Zoleo, Polonca Ropret, Barbara Biondi, Alfonso Venzo, Sara Bogialli
14:50 – 15:10	Distinguishing manufacturing practices for titanium white pigments: new Raman markers for dating commercial oil-based paints <u>Corina Rogge</u> and Julie Arslanoglu
15:10 – 15:30	Raman spectroscopy identification of red pigments on Upper Paleolithic ornaments from Grotta di Pozzo (Abruzzo, Italy) <u>Eliana Catelli</u> , Delia Gazzoli, Margherita Mussi
15:30 – 15:50	Introduction to the Infrared and Raman Users Group (IRUG) web-based Raman spectral database <u>Beth Price</u> , Haddon Dine, Andrew Lins, Charles Davis, Suzanne Quillen Lomax, Boris Pretzel, Marcello Picollo, Gabriel Richards
15:50 – 16:20	<i>Coffee break</i>

Session 3: Instrumental Developments - Novelties in commercial instruments.

Chair: Georgios Karagiannis

16:20 – 16:40	Presentation of “ORMYLIA” Foundation development actions focused on work that has been carried out with marketplace devices. Georgios Karagiannis, Ormylia Foundation Art Diagnosis Centre
16:40 – 17:10	Daniel Barchewitz, B&W Tek: Portable Raman for On-site Analysis Jan Wülfken, Agilent Technologies: Newest Developments in FTIR Spectroscopy for art and historical object conservation: Truly mobile and non-destructive FTIR tools and the highest spatial resolution true Imaging FTIR Vasiliki Chalepli, InterActive S.A: New generation FT-IR spectrometers: The precious tool from Research to Routine analysis

Session 4: Posters very short introduction

Chair: Beth Price, Stamatis Boyatzis

17:15 – 18:30	Very short introduction to the posters, 3 min per paper.
	μ-FTIR spectroscopy and other methods in technological expertise of golden paint <u>Irina Burtseva</u> , G.Gorohova, A.Mazina
	Contribution of Attenuated Total Reflection Fourier Transform Infrared spectroscopy (ATR-FTIR) in the investigation of historical parchment documents <u>Cristina Carșote</u> , Irina Petroviciu, Elena Badea and Lucreția Miu
	FTIR Spectroscopy study on wooden materials consolidated with acrylic based resins <u>Silvana Vasilca</u> , Thomas Guiblain, Ioana Stanculescu, Laurent Cortella, Quoc-Khoi Tran
	Tissue preservation of 16-18th Century mummies of Roccapelago (Modena, Italy): a SEM and FTIR study <u>Maria Grazia Bridelli</u> , Chiaramaria Stani, Victor Erokhin, Mirko Traversari, Elisabetta Cilli
	Physical and histological investigation of the embalmed skin: application to some Egyptian mummy heads from the Marro collection (Turin) <u>Maria Grazia Bridelli</u> , Chiaramaria Stani, Andrea Baraldi, Rosa Boano, Emma Rabino Massa
	On the rocks – unveiling the richness and specificities of the Guadameci from the Portuguese Templar Charola of the Convent of Christ in Tomar, Portugal <u>Catarina Miguel</u> , L. Falcão, Sara Valadas and Antonio Candeias
	Technological Survey of Rock Crystal Object <u>Klara Drabkova</u> , Zuzana Zlámálová Čilová
	Spectroscopic non-destructive characterization of gamma irradiated paintings Maria-Mihaela Manea, Daniel Negut, Ioana Stanculescu, Rares Suvaila, Marian Virgolici, Valentin Moise
	“PigmentX” application for pigment identification <u>Olimpia – Hinamatsuri Barbu</u> , Cătălin Dima, Adrian Stefănică and Horia Nicolau
	Complex methods of fine-art objects research Anna Litvinova
	Analysis of Lucerne auction paintings by mobile Raman and complementary analytical and imaging techniques Catherine Defeyt and <u>David Strivay</u>

Tuesday 24th May

Session 5: Methodological Developments on Vibrational Spectroscopy

Chair: Silvia Centeno, Sophia Sotiropoulou

08:45 - 09:30	Invited lecture Spectroscopic imaging: new trends and emerging applications to the objects of cultural heritage <u>Prof. Sergei Kazarian</u> , Professor of Physical Chemistry at Imperial College London.
09:30 - 09:50	Studying natural organic substances from cultural heritage through multivariate analysis of Raman and infrared signatures <u>Ludovic Bellot-Gurlet</u> , Céline Daher and Céline Paris
09:50 - 10:10	Gilt leather varnish analysis by infrared spectroscopy <u>Laurianne Robinet</u> , Marie Radepont, Sylvie Thao-Heu and Céline Bonnot-Diconne
10:10 - 10:30	Far infrared selectivity evaluation for reds and black pigments and lead degradation products P. Giménez, A. Linares, C. Sessa, E. Marín, H. Bagán, E. Boix, C. Clusella, Anna Vila, Birgit Vinther Hansen, Niels Borring, David Buti, Andreas Swane, Johanne M. Nielsen, Morten Ryhl-Svendsen and <u>José Francisco García</u>
10:30 - 11:00	<i>Coffee break</i>

Session 6: Damage Assessment and Degradation Analysis through Vibrational Spectroscopy

Chair: Laurianne Robinet, José Francisco García

11:00 – 11:20	FTIR spectroscopy of zinc carboxylates in model samples and modern paintings: the macro and micro-scale infrared properties <u>Francesca Rosi</u> , Francesca Gabrieli, Laura Cartechini, Alessandra Vichi, Sergei G. Kazarian, Costanza Miliani
11:20 - 11:40	Investigation of parchment degradation by nanoscale infrared spectroscopy Alexandre Dazzi, <u>Ariane Deniset-Besseau</u> , Laurianne Robinet, Gaël Latour, Marie-Claire Schanne-Klein, Curtis Marcott, Peter de Peinder and Kevin Kjoller
11:40 - 12:00	Raman and FTIR spectroscopy-based damage assessment of protein cultural heritage materials, artificially aged in urban gaseous pollutant atmospheres <u>Stamatis Boyatzis</u> , Soghomon Boghosian, Angelos Kalampounias, Ekaterini Malea, Stavroula Rapti, Efrosini Karantoni, Clio Vossou and George Panagiaris
12:00 - 12:20	Ageing processes in diterpenic resins used in artwork coatings <u>Victoria Beltran</u> , Gianfelice Cinque, Natividad Salvadó, Salvador Butí and Trinitat Pradell
12:20 - 12:40	Weathering of polyester and epoxy resins: degradation studies by in-situ time-lapse IRRAS, QCM and ex-situ MeV-SIMS Rita Wiesinger, D. Jembrih-Simbürger, I. Bogdanović-Radović, Z. Siketić, <u>Manfred Schreiner</u>
12:40 - 13:00	Fluorination technique to investigate photooxidative ageing products in bioorganic resin materials using infrared spectroscopy <u>Stefan Zumbühl</u> , Andreas Hochuli and Walter Caseri
13:00 - 14:30	<i>Lunch break</i>
14:30 - 14:50	Influence of the soft and strong artificial ageing on the photo-stability of artists' paints containing alkyd binder and phthalocyanine pigments <u>Marta Anghelone</u> , D. Jembrih-Simbürger and Manfred Schreiner
14:50 - 15:10	Effectiveness of protection, damage assessment and novel nano-particle based conservation treatment <u>Marianne Odlyha</u> , Sabina Rutkowska, Laurent Bozec, Angelica Bartoletti, Manfred Anders, Adrian Hawley, David Chelazzi, Rodorico Giorgi, Piero Baglioni
15:10 - 15:30	On site detection of cleaning system residues: a feasibility study for the application of reflection FTIR spectroscopy <u>Patrizia Moretti</u> , Laura Cartechini, Bruno Brunetti and Costanza Miliani
15:30 - 15:50	In situ measurement of damage with vibrational spectroscopy David Thickett
15:50 – 16:10	Analytical investigation of 20th century coatings on outdoor bronze sculptures from the JPGM <u>Herant Khanjian</u> , Julie Wolf, Arlen Heginbotham, Lynn Lee, Alessa Gambardella
16:10 – 16:40	<i>Coffee break</i>

Session 7: Materials characterization through Vibrational Spectroscopy

Chair: Ludovic Bellot-Gurlet, Monica Galeotti

16:40 – 17:00	Raman spectroscopic analysis and light fastness of specimens from Wilhelm Ostwald's colour system Alexandra Bridarolli, Thomas Prestel and <u>Christoph Herm</u>
17:00 – 17:20	Spectroscopic characterization of cobalt violet pigments in multi-layered structures: analysis and detection limits <u>Maria Kokkori</u> , Francesca Casadio and Lindsay Oakley
17:20 – 17:40	Combined Raman, X-ray Diffraction and UV-Vis spectroscopy characterization of natural and artificially aged neutral verdigris pigment <u>Lynn Brostoff</u> , Cynthia Connelly Ryan and Isabella Black

Wednesday 25th May

Session 8: Raman and FTIR Spectroscopy for the Study of synthetic polymers and modern materials

Chair: Maria Kokkori, Herant Khanjian

09:00 - 09:20	Die Kunststoffschule – a Unique Collection Identification of Plastics and their Ageing Phenomena <u>Susanne Brunner</u> , Thorsten Allscher
09:20 – 09:40	The colour of plastics: the identification of colourants in plastics <u>Suzan de Groot</u> , Henk van Keulen, Andrea Otte
09:40 – 10:00	A FTIR analytical study of 1960s synthetic polymer paintings and their artist repaints <u>Paula Dredge</u> , Raymonde Rajkowski, Céline de Courlon, Simon Ives and Nicole Tse
10:00 – 10:20	Polyurethane coatings in 20th century outdoor painted sculptures: discrimination of major subgroups by means of ATR-FTIR spectroscopy <u>Catherine Defeyt</u> , Julia Langenbacher and Rachel Rivenc
10:20 – 10:40	ATR study of dispersed nanosilica in carbonate and borate solutions <u>Eirini-Chrysanthi Tsardaka</u> , Maria Stefanidou, Georgios Apostolidis and Georgios Karagiannis
10:40 – 11:10	<i>Coffee break</i>
11:10 – 11:30	Closing remarks
11:30 – 13:00	<ul style="list-style-type: none">• Visit to the Ormylia Foundation's laboratories Meeting of the IRUG board
13:00 – 14:30	<i>Lunch</i>
14:30 – 16:00	<i>Visit to the Ormylia Monastery (Sacred Convent of the Annunciation)</i>

Polyurethane coatings in 20th century outdoor painted sculptures: discrimination of major subgroups by means of ATR-FTIR spectroscopy

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Like acrylics and alkyds, polyurethanes (PUs) represent an important class of industrial paints adopted by 20th and 21st artists; primarily by those creating outdoor painted sculptures (OPS). Because PU coatings offer a compromise between aesthetic and performance expectations, unachievable with other types of paints, they are commonly recognized as the most appropriate option for painted artworks intended for an outdoor setting. However, the PU class includes various systems and subgroups possessing very different properties, for instance two package solvent-borne, two package water-borne, one package water-borne and fluoropolymer polyurethanes.

The present research aims to provide to the conservation professionals a better understanding of the versatility and diversity of PU coatings through compositional information and to outline markers helpful to differentiate the major PU subgroups from OPS by means of ATR-FTIR spectroscopy. The ATR-FTIR study conducted on a wide range of PU reference materials from the Getty Conservation Institute (GCI) reference collection highlights the relevance of this routine analytical method to discriminate certain subgroups of PU coatings. Indeed, by investigating well-known specimen it was possible to outline diagnostic FTIR features for three specific systems; fluoropolymer PU, one package water-borne PU made from acrylic latexes and two package water-borne PU prepared with PU dispersions. Furthermore, the FTIR measurements performed on various activators and co-reactants emphasized the significant contribution of the polyisocyanate absorptions in the spectra of the activated two package PU systems. However, the results obtained for various unmodified and water dispersible HDI polyisocyanate activators showed that the FTIR-ATR technique does not allow the discrimination within both types.