

Contents

Foreword

ix

Oral presentations

- The human factor
Giorgio Bonsanti 1
- Studies on the laser removal of consolidants and protective coatings from samples of Australian Aboriginal bark paintings
Deb M. Kane, Guido Palmer, Ben F. Johnston, Stephan Haefner, Andreas T. Bilicki, Alex Fuerbach and Alanna J. J. Fernandes 4
- Analysis of varnish removal on tempera paints by nanosecond and femtosecond UV lasers
Mohamed Oujja, Ana García, Carolina Romero, Javier R. Vázquez de Aldana, Pablo Moreno and Marta Castillejo 12
- Application of optical coherence tomography for monitoring some conservation treatments
Magdalena Iwanicka, Piotr Targowski, Ewa A. Kwiatkowska and Marcin Sylwestrzak 19
- Optical coherence tomography for high-resolution real-time varnish ablation monitoring
Piotr Targowski, Jan Marczak, Ewa A. Kwiatkowska, Marcin Sylwestrzak and Antoni Sarzyński 26
- Film formation of artists' acrylic paints in tropical climates using dynamic speckle interferometry
Nicole Tse, Elaine Miles and Ann Roberts 32
- A case study in the removal of paint and corrosion from cast iron using a Nd:YAG laser
Andrzej Dajnowski and Bartosz Dajnowski 40
- High repetition rate laser restoration and monitoring of large area gilded surfaces
Mitsu Kono, Ken G.H. Baldwin, Alison Wain, Margaret Sawicki, Igor K. Malkiel and Andrei V. Rode 45
- Real-time monitoring of laser-assisted removal of shellac from wooden artefacts using digital holographic speckle pattern interferometry
Eirini Bernikola, Kristalia Melessanaki, Kostas Hatzigiannakis, Vivi Tornari and Paraskevi Pouli 52
- Laser cleaning of excavated fresco fragments: testing and optimization of laser parameters and structural monitoring by means of digital holographic speckle pattern interferometry
Zsuzsanna Márton, Ivett Kisapáti, Paraskevi Pouli, Eirini Bernikola and Vivi Tornari 59
- Studying transportation effects on canvas paintings by full field digital holographic techniques
Elsa Tsiranidou, Eirini Bernikola, Vivi Tornari, Thomas Fankhauser, Matthias Läubli, Nathalie Bäschlin and Cornelius Palmbach 67
- Use of laser technology for the conservation project of an eighteenth-century terracotta sculpture by Gaspare Sibilla
Pietro Baraldi, Maria Giulia Barberini, Davide Fodaro, Lorenzo Pio Massimo Martino, Claudia Pelosi and Livia Sforzini 75
- Microstructure of laboratory replicates of ancient Egyptian faience: a new investigation with optical coherence tomography
Haida Liang, Margaret Sax and David Saunders 84
- Combining terrestrial laser scanner and SAR interferometry for structural monitoring of the archaeological monuments of Palatine Hill and Roman Forum (Rome, Italy)
Deodato Tapete, Nicola Casagli, Riccardo Fanti, Chiara Del Ventisette, Roberto Cecchi and Pia Petrangeli 89

3D documentation of historic building stone and long-term observation of environmental influences and restorative measures <i>Nils Wetter, Sybille Herkner and Rainer Drewello</i>	98
The use of nonlinear microscopy techniques to assess the affected region in the laser cleaning of polymeric coatings <i>Sotiria Kogou, Alexandros Selimis, George J. Tsevelakis, Paraskevi Pouli, George Filippidis and Costas Fotakis</i>	103
The application of 3D electronic speckle pattern interferometry (ESPI) for the structural analysis of paintings on canvas <i>Christina Young</i>	108
Laser-induced breakdown spectroscopy (LIBS) for the characterization of organic materials in mural paintings <i>Sylvain Grégoire, Marjorie Boudinet, Frédéric Pelascini, Fabrice Surma, Yves Holl, Vincent Motto-Ros, Stéphanie Duchêne and Vincent Detalle</i>	116
Ultrafast laser studies of the characteristics and timescales of photodegradation in alizarin and purpurin <i>Sarah Thompson, Charles Rohde, Erin Griffey and M. Cather Simpson</i>	125
A spectroscopic study of ancient Roman fresco fragments from Casa di Augusto at the Palatino: towards an on-site multidisciplinary project <i>Chiara Alisi, Kerstin Barup, Maria Paola Bracciale, Alessandra Broggi, Francesco Castagnoli, Giovanna Cecchi, Cinzia Conti, Jenny Hällström, David Lognoli, Lorenzo Palombi, Valentina Raimondi, Maria Laura Santarelli, Anna Rosa Sprocati and Sune Svanberg</i>	132
An investigation of the potential of hyperspectral fluorescence lidar imaging of biodeteriogens on mural paintings <i>Alessia Andreotti, Antonio Cecchi, Giovanna Cecchi, Maria Perla Colombini, Costanza Cucci, Oana Cuzman, Cristina Fornacelli, Monica Galeotti, Francesca Gambineri, Ioana Gomoiu, David Lognoli, Dan Mohanu, Lorenzo Palombi, Sara Penoni, Marcello Piccolo, Daniela Pinna, Valentina Raimondi and Piero Tiano</i>	140
3D scanning and printing as conservation tools: an innovative treatment of a vandalized bronze statue, <i>The Thinker</i> by Rodin <i>Tonny Beentjes and Rozemarijn van der Molen</i>	146
Re-engineering Watt: a case study and best practice recommendations for 3D colour laser scans and 3D printing in museum artefact documentation <i>Mona Hess and Stuart Robson</i>	154
Exploring the use of laser scanning and finite element analysis in the restoration of Tullio Lombardo's marble sculpture of <i>Adam</i> <i>Ronald Street, Patrick Cunningham, Michael Bak and Daniel Fridline</i>	163
Poster presentations	
Laser cleaning of graffiti, deposits and oxide stains on dolomitic marble: comparison with traditional methods <i>Vanessa Antúñez Pérez, María del Pilar Ortiz Calderón, José María Martín Ramírez, Rocio Ortiz Calderon, Maria Auxiliadora Gómez Morón, Francisco Gámez, Ana Rodriguez Hortal and Bruno Martinez-Haya</i>	173
Modification of iron corrosion after pulsed laser irradiation <i>João Avelãs Resende, Anabela Hipólito and Margarida Pires</i>	176
Laser-induced breakdown spectroscopy (LIBS) analysis and laser cleaning of metal objects rescued from <i>HMS Swift</i> <i>Gabriel M. Bilmes, Fernando C. Alvira, Natalia Perez Zoloza and Alberto A. Orsetti</i>	179
Comparison of sixteenth- and seventeenth-century portrait miniatures by Raman microscopy and other techniques <i>Lucia Burgio, Anna Cesaratto and Alan Derbyshire</i>	182
Surface micro-morphology analysis during laser ablation treatments <i>Iliaria Cacciari, Daniele Ciofini, Marta Mascalchi, Andrea Azelio Mencaglia and Salvatore Siano</i>	184
Laser-induced fluorescence and ultrasound techniques to study thermal modification induced on white marble <i>Luisa Caneve, Francesco Colao, Cristina Giancristofaro, Franca Persia, Giulia Ricci and Angelo Tati</i>	186

An integrated instrument for real-time profilometry and multispectral infrared reflectography for the analysis of deformations on paintings <i>Claudia Daffara, Raffaella Fontana, Marco Barucci, Enrico Pampaloni and Luca Pezzati</i>	189
Laser cleaning of copper-based coins <i>Maria Luisa De Giorgi, Emilia D'Anna, Andrea Della Patria, Horacio De Rosa, Antonella Lorusso, Panayiota Orfanou and Alessio Perrone</i>	192
Varieties of verdigris containing copper(II) hydroxychlorides and other compounds: preliminary results <i>José Manuel de la Roja, Margarita San Andrés, Natalia Sancho, Sonia Santos and Valentín G. Baonza</i>	194
Laser-induced fluorescence (LIF) and reflectance measurements of medieval frescoes by Giusto de' Menabuoi in the Padua Baptistery <i>Roberta Fantoni, Luisa Caneve, Francesco Colao, Ramiro dell'Erba, Luca Fiorani and Antonio Palucci</i>	198
Removal of bronze gilding layers using a 20ps fibre laser <i>Paul Fitzsimons, Kenneth Watkins, Abdelrazek El-Naggar and Zoe Allen</i>	201
Evaluation of laser cleaning of old copper roofing and gilding using tunable length laser pulses <i>Halina Garbacz, Elżbieta Fortuna-Zalesna, Jan Marczak, Marek Strzelec, Andrzej Koss and Anna Zatorska</i>	204
Laser cleaning to remove overpaint from paintings on canvas and wood <i>Maria Auxiliadora Gómez Morón, Pilar Ortíz, Jose María Martín, Vanessa Antúnez and Rocío Ortíz</i>	207
A new portable digital holographic speckle pattern interferometry (DHSPi) system for structural documentation of artworks <i>Kostas Hatzigiannakis, Eirini Bernikola and Vivi Tornari</i>	210
Application of confocal laser scanning microscopy in monitoring photodynamic treatment of phototrophic biofilms from Roman hypogea <i>Paul Hsieh, Elena Romano and Patrizia Albertano</i>	213
An initial investigation into the use of the Nd:YAG laser to remove resins from archaeological bone <i>Capucine Korenberg, Clare Ward and Hélène Delaunay</i>	216
Cleaning of artificially soiled papers by infrared and mid-infrared lasers <i>Domna G. Kotsifaki, Litsa Zekou, Simone Pentzien, Jörg Krüger and Alexandros A. Serafetinides</i>	219
Restoration work on the Loggia della Mercanzia, Siena (Italy) <i>Stefano Landi, Francesca Droghini, Marco Giamello and Giuseppe Sabatini</i>	222
Investigating the removal of resins from archaeological and artificially corroded iron using an Nd:YAG laser <i>Hye Youn Lee, Nam Chul Cho, Jong Myoung Lee and Jae Eun Yu</i>	225
A semi-quantitative Raman-LIBS analysis of Terra Sigillata wares <i>Cristiana Lofrumento, Marilena Ricci, Philippe Sciau, Yoanna Leon and Emilio Mario Castellucci</i>	228
Analysis of damage in the mural paintings from A Ribeira Sacra by means of electronic speckle pattern interferometry (ESPI) <i>Ana J. López, Emanuel Boaglio, Javier Lamas, Alberto Ramil, Lucía Pereira, Beatriz Prieto and Benita Silva</i>	231
Evaluation of the effectiveness of UV laser ablation of graffiti from ornamental granite <i>Ana J. López, Teresa Rivas, María Paula Fiorucci, Santiago Pozo, Javier Lamas and Alberto Ramil</i>	234
Possibilities and challenges of terahertz (THz) time domain spectroscopy for investigation of hidden wall paintings <i>Michael Panzner, Andrea Schmid, Wolfram Köhler, Adam Rosowski, Udo Klotzbach, Andreas Wetzig and Eckhard Beyer</i>	237
3D laser digitization for the condition monitoring of the Da Maiano terracotta roundels – five years on <i>Zoe Roberts and Kathryn Hallett</i>	240
Laser cleaning of granitic stones: modelling the heat-affected zone by means of a finite elements method <i>Emilio Saavedra, Ana J. López, María Paula Fiorucci, Javier Lamas, Alberto Ramil and Teresa Rivas</i>	243

Saving surface finishes on terracotta tiles using laser cleaning <i>Antonio Sansonetti, Chiara Colombo, Claudia Conti, Stefano Della Torre, Rebecca Fant and Jana Striova</i>	246
A novel approach: laser cleaning intermediated by agar gel <i>Jana Striova, Marilena Anzani, Leonardo Borgioli, Anna Brunetto, Alfio Rabbolini, Giacomo Roati and Antonio Sansonetti</i>	249
Study of the influence of atmospheric pollution on the open-air collection of the Railway Museum in Warsaw <i>Marek Strzelec, Jan Marczak, Terje Grøntoft, Anna Kozelska, Karolina Brama, Wojciech Skrzeczanowski, Anna Zatorska, Janusz Mróz, Susana López-Aparicio, Dariusz Zasada and Grażyna Z. Żukowska</i>	251
Principal component analysis of LIBS spectra of chrome-based pigments in a linseed oil binding medium: a potential indicator of ageing <i>Tamás Tóth and Zsuzsanna Márton</i>	254
Nd:YAG laser cleaning of encrustation layers on historic stained glass windows <i>Malgorzata Walczak, Katarzyna Szelagowska-Kunstman and Pawel Karaszkiwicz</i>	257