



Venice  
International  
University

**Venice International University  
International PhD Academy**

**Preserving and Safeguarding the Beauty of Cultural Heritage:  
Fundamentals, Methods and Applications of State-of-the-Art Diagnostic  
Tools Using Optical, X-Ray and Particle Probes**

**Venice International University  
November 6-10, 2023**

**Faculty**

1. Massimo Carpinelli, University of Milano-Bicocca, Scientific Coordinator
2. Alberto Bravin, University of Milano-Bicocca
3. Letizia Monico, National Research Council of Italy (CNR), Scientific Coordinator
4. Costanza Miliani, National Research Council of Italy (CNR)
5. Claudia Conti, National Research Council of Italy (CNR)
6. Francesco D'Acapito, National Research Council of Italy (CNR) & European Synchrotron Radiation Facility (ESRF)
7. Francesco Paolo Romano, National Research Council of Italy (CNR)
8. Roberto Senesi, Tor Vergata University of Rome, Scientific Coordinator
9. Carla Andreani, Tor Vergata University of Rome
10. Warren S. Warren, Duke University, Scientific Coordinator
11. Alessandra Fornetti, Venice International University (VIU)
12. Ilda Mannino, Venice International University (VIU)

**Guest speakers**

1. Patrizio Antici, Institut National de la Recherche Scientifique (INRS)
2. Marine Cotte, European Synchrotron Radiation Facility (ESRF)
3. John Delaney, National Gallery of Art, Washington
4. Christian Greco, Museo Egizio (Torino)
5. Rosangela Mastrangelo, ISIS@MACH ITALIA and University of Florence
6. Claire Pacheco, Centre de recherche et de restauration des musées de France (C2RMF)
7. Luciano Pensabene, Peggy Guggenheim Collection (Venezia)
8. Antonella Scherillo, ISIS UK
9. Luca Tortora, Roma Tre University

## Day 1 | Monday, November 6, 2023

### Morning | Introduction to Color: Chemical, Physical and Spectroscopic Principles

- 9:00 – 9:30 *Registration and Welcome Remarks (VIU & PhD Academy Coordinators)*
- 9:30 – 11:00 Molecular origins of color and color perception (Warren S. Warren, Duke University)
- 11:00 – 11:30 *Break*
- 11.30 – 13:00 The interaction of radiation with matter: linear and nonlinear spectroscopic techniques for pigment characterization (Warren S. Warren, Duke University)
- 13.00 – 14.00 *Lunch*

### Afternoon | Advanced Raman Spectroscopy methods and Transversal Skills Session

- 14.00-15.30 Poster presentation in 3 minutes (students)
- 15.30 – 15.45 *Break*
- 15:45 – 16:45 Advanced Raman Spectroscopy methods and their application to Cultural Heritage materials (Claudia Conti, CNR)
- 16.45 – 18:00 Transversal Skills Session - Introduction to project management (Patrizio Antici, INRS)

## Day 2 | Tuesday November 7, 2023

### Morning | Introduction to Medium-Large Scale Infrastructures for Cultural Heritage and Muon methods

- 9:00 – 9:45 ERIHS - European Research Infrastructure for Heritage Science (Costanza Miliani, CNR)
- 09:45 – 10:15 Cultural Heritage at the ESRF: developing new instruments and facilitating access (Marine Cotte, ESRF)
- 10:15 – 11:00 ISIS@MACH ITALIA (Carla Andreani and Roberto Senesi, Tor Vergata University of Rome)
- 11:00-11:30 *Break*
- 11.30 – 13:00 Principles of muon techniques and applications in Cultural Heritage (Massimo Carpinelli, University of Milano-Bicocca)
- 13.00 – 14.00 *Lunch*

### Afternoon | Management of Cultural Heritage objects and virtual experiments at ISIS/ISIS@MACH ITALIA

- 14:00 – 15:00 Management of Cultural Heritage objects (Christian Greco, Museo Egizio)
- 15:00-16.15 Virtual experiments at ISIS neutron source for Cultural Heritage (Antonella Scherillo, ISIS UK)



16:15-16:30 *Break*

16:30-18.00 Virtual experiments at the ISIS@MACH ITALIA Medium Range Facility for Cultural Heritage (Rosangela Mastrangelo, ISIS@MACH ITALIA and University of Florence and Roberto Senesi, Tor Vergata University of Rome and ISIS@MACH ITALIA)

### **Day 3 | Wednesday November 8, 2023**

#### **Morning | X-ray methods**

9:00 – 10:30 Fundamentals on Synchrotron Radiation and X-ray Methods  
(Francesco D'Acapito, CNR and ESRF)

10:30 – 11:00 *Break*

11:00 – 12:00 Shedding light on ancient materials: exploring Cultural Heritage with X-Ray Mobile Techniques (Francesco Paolo Romano, CNR)

12:00 – 13:00 Applications of micro X-ray absorption spectroscopy to the study of historical material (Marine Cotte, ESRF)

13.00 – 14:00 *Lunch*

#### **Afternoon | Visit at the Peggy Guggenheim Collection**

14:50 *Waterbus to Venice from San Servolo pier*

15:30 Visit at the Peggy Guggenheim Collection with introduction by the Director and lecture by Luciano Pensabene (conservator/restorer in chief of the Collection)

19:00 *Social dinner in Venice at San Trovaso Restaurant*

### **Day 4 | Thursday November 9, 2023**

#### **Morning | PIGE/PIXE methods and ToF-SIMS Session**

9:00-10:15 Introduction to PIGE/PIXE spectroscopies, AGLAE and application on Cultural Heritage (Claire Pacheco, C2RMF)

10:15 – 10.30 *Break*

10:30 – 11:45 New diagnostics using novel particle sources (Patrizio Antici, INRS)

11:45 – 13:00 2D and 3D chemical imaging at nanometer resolution through ToF-SIMS  
(Luca Tortora, Roma Tre University)

13:00 – 14:00 *Lunch*

#### **Afternoon | Transversal Skills Session**

14:00 – 15:00 Transversal Skills Session - Dealing with scientific press (Warren S. Warren and John Delaney)

15:00 – 15:30 *Break*

15:30 – 17:00 Poster presentation in 3 minutes (students)



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## Day 5 | Friday November 10, 2023

### Morning | 2D and 3D imaging methods

09:00 – 10:30 3D Imaging X-ray Methods and applications in Cultural Heritage (Alberto Bravin, University of Milano-Bicocca)

10:30 – 11:00 *Break*

11:00 – 13:00 2D chemical Imaging applications in Cultural Heritage (John Delaney, National Gallery of Art, Washington)

13:00 – 14:00 *Lunch*

### Afternoon | Transversal Skills Session

14:00 – 15:00 Transversal Skills Session – Beating the Odds for Journal Acceptance (Warren S. Warren, Duke University; Senior Deputy Editor, *Science Advances*; John Delaney, NGA, Washington; Associate Editor, *Science Advances*)

15:00 – 16:00 Transversal Skills Session - How to communicate your research to the general public (Ilda Mannino and Alessandra Fornetti, VIU)

16:00 – 17:00 *Final Discussions and Wrap-up (VIU, PhD Academy Coordinators & students)*