

# CURRICULUM VITAE

EUROPEAN FORMAT

## PERSONAL INFORMATION

Name, Surname	Claudia, Conti
E-mail	claudia.conti@cnr.it
Nazionalità/Nationality	Italian
Researcher unique ID	0000-0002-5379-7995
WoS Researcher ID	JNT-5951-2023

## WORK EXPERIENCE

Dates	<b>Jan 2023 - to present</b>
Name and address of employer	National Research Council, Piazzale Aldo Moro, 7 - 00185, Roma, Italy Institute of Heritage Science (ISPC) Unit of Milan
Type of business or sector	Conservation scientist
Occupation or position held	Research Director
Dates	<b>March 2020 – Dec 2022</b>
Name and address of employer	National Research Council, Piazzale Aldo Moro, 7 - 00185, Roma, Italy Institute of Heritage Science (ISPC) Unit of Milan
Type of business or sector	Conservation scientist
Occupation or position held	Senior Researcher
Dates	<b>Apr 2017 - Feb 2020</b>
Name and address of employer	National Research Council, Piazzale Aldo Moro, 7 - 00185, Roma, Italy Institute of Heritage Science (ISPC) Unit of Milan
Type of business or sector	Conservation scientist
Occupation or position held	Researcher (permanent position)
Dates	<b>Sept 2008 - Apr 2017</b>
Name and address of employer	National Research Council, Piazzale Aldo Moro, 7 - 00185, Roma, Italy Institute for the Conservation and Valorization of Cultural Heritage Unit of Milan
Type of business or sector	Conservation scientist
Occupation or position held	Short term researcher

Dates	<b>March 2011 – June 2012</b>
Name and address of employer	Milan Polytechnic, School of Architecture and Society, Piazza Leonardo da Vinci, 32 – 20133, Milano, Italy
Type of business or sector	Lecturer
Occupation or position held	“Analytical evaluation of the historical buildings materials“ course

Dates	<b>April 2005 - Aug 2008</b>
Name and address of employer	National Research Council, Piazzale Aldo Moro, 7 - 00185, Roma, Italy Institute for the Conservation and Valorization of Cultural Heritage Unit of Milan
Type of business or sector	Conservation scientist
Occupation or position held	Research grant

Dates	<b>Sept 2002 - Dec 2004</b>
Name and address of employer	Research Institute for Innovative Materials, Terni (Umbria)
Type of business or sector	Laboratory assistant
Occupation or position held	Fellowship

## EDUCATION AND TRAINING

Date	<b>Jan 2007 – Jan 2010</b>
Name and type of organisation providing education and training	Milan Polytechnic, Italy
Principal subjects' occupational skills covered	Title: Calcium oxalate: chemical stability, conservation treatment based on ammonium oxalate, historical films”. Study of the transformation mechanisms of calcium oxalates occurring in the monument surfaces by means of vibrational spectroscopy (Raman and FTIR), X-Ray diffraction (XRD and single crystal) and scanning electron microscopy (SEM-EDS and FE-SEM); ii) exploration of new spectroscopic methods (μRaman mapping) to investigate the distribution inside the carbonatic substrates of a novel conservation inorganic treatment (ammonium oxalate).
Title of qualification awarded	<b>PhD (Materials Engineering) 22° cycle</b>

Date	<b>Sept 1996 – March 2002</b>
Name and type of organisation providing education and training	University of Perugia, Italy
Principal subjects' occupational skills covered	Experimental petrology applied to archaeometrical issues: the Renaissance pottery from Deruta (Umbria, Italy).
Title of qualification awarded	<b>MSc (Geological Science)</b>

## RESEARCH ACTIVITIES

My scientific path covered so far is characterized by a highly multidisciplinary approach, bridging together the areas of physical, chemical sciences and Cultural Heritage. The critical concerns arising from the conservation field gave me the opportunity to looking for new challenges and methods of investigation by means of a close collaboration between theory and experiment, laboratory and restoration site. After my PhD I opened new research fields in an independent way, involving different branches of physics, chemistry and geology. My main resulting scientific interests and experiences include:

- **Raman spectroscopy:**

- Development of a new Raman method (micro-SORS) able to obtain chemical information about the subsurface of Cultural Heritage materials in a non-invasive way with major impact envisaged across several scientific disciplines and industry.

- (<http://www.clf.stfc.ac.uk/CLF/45082.aspx>, <https://www.cnr.it/it/news/6041/una-tecnica-laser-rivela-cosa-si-trova-al-di-sotto-della-superficie-di-un-opera-d-arte>, <http://www.stfc.ac.uk/news/lasers-provide-a-new-way-to-analyse-priceless-art-without-damage/>, <https://www.cnr.it/it/news/5781/una-tecnica-laser-innovativa-per-scoprire-cosa-nasconde-la-superficie-di-un-dipinto>, <https://theanalyticalscientist.com/issues/0815/unraveling-art-with-analysis/>, <http://www.lavocedinyork.com/arts/arte-e-design/2014/10/04/dalla-collaborazione-tra-milano-e-oxford-arriva-micro-sors-una-nuova-tecnica-per-la-conservazione-delle-opere-d-arte/>).

- Application of micro/Raman and  $\mu$ Raman mapping in the compositional characterisation of Cultural Heritage objects and their decay, the assessment of the efficacy of conservation treatments, the investigating of the mechanisms of formation and transformation of crystalline phases formed following conservation treatments.

- **Physico-chemical mechanisms** occurring from the surfaces to the bulk of treated artworks: the wider research line concerns the development of new methods to evaluate the distribution and penetration depth of inorganic conservation treatments.

- In this context a number of experiments at large facilities have been carried out:

- Experiment proposal (ID 20160183): Elettra sincrotrone Trieste, MCX beamline;
    - Experiment proposal (ID 20167062): Elettra sincrotrone Trieste, MCX e SSSI beamline;
    - Experiment proposal (RB 1230018): ISIS sorgente di neutroni a spallazione (UK), ROTAX beam line;
    - Experiment proposal (ID 20131486): PSI sorgente di neutroni a spallazione (SW), NEUTRA station;
    - Experiment proposals (ID 20141682 e 20141618): PSI sorgente di neutroni a spallazione (CH), NEUTRA e ICON stations.
    - European Synchrotron Radiation Facility (ESRF), id15a beam line; Experiment proposal (ID 20160183)

- **Development of advanced non-invasive *in situ* analytical protocols** for the investigation of the surface and the bulk of artworks in conservation sites or museum collections. An extensive range of portable instruments are interrogated such as X-Ray fluorescence (macro and micro-XRF, confocal XRF), IR and Raman spectroscopy, spectrophotometry (VIS), OCT.

The **collaborations** listed below have been developed by me in an independent way providing me also with the enlargement of my horizons and expertise in several broad scientific areas:

a) STFC Rutherford Appleton Laboratory, Central Laser Facility (UK). **Visiting Scientist at**

the STFC Rutherford Appleton Laboratory in November 2014 and January 2018 **funded by two CNR's Short Term Mobility programs.**

Research line: development of novel Raman spectroscopy methods for the investigation of multiple, diffusely scattering, thin layers.

b) *University of Cincinnati, Optical Sensors Group (US).*

Research line: development of technological solutions for advanced portable Raman prototypes.

c) *Metropolitan Museum of Art (MET), Department of Scientific Research (US).* **Visiting Scientist** at the MET in January 2024 funded by the MET.

Research line: advanced Raman Spectroscopy methods and their application to museum collections (New York – US, 11 January, 2024).

d) *Northwestern University (US).* **Visiting Scientist** at the Center for Scientific Studies in the Arts (NU-ACCESS) of the Northwestern University/Art Institute of Chicago in May-June 2019 and September-October 2019. The research project has been selected as part of the **NU-ACCESS external research program.**

Research line: development of a novel method (*micro-SESORS*) combining micro-SORS with SERS for the investigation of fluorescent sublayers in Cultural Heritage materials.

e) *Dipartimento di Chimica, Materiali e Ingegneria Chimica "Giulio Natta", Milan Polytechnic.*

Research line: Raman Spectroscopy; investigation of distribution inside substrates of inorganic treatment with  $\mu$ Raman mapping, advanced portable Raman instrumentation.

f) *Energy Department, Milan Polytechnic*

Research line: X-Ray diffraction for the analysis of thin layers.

### Activities and responsibilities

1. **Member of ISPC board** (July 2024-to present)
2. Internship **Advisor** of PhD student from Milan Polytechnic (2023-2026)
3. Internship **Advisor** of students from Sorbonne Universite (2023)
4. **Supervisor** of PhD in Materials Engineering at Milan Polytechnic (2018-2022).
5. **Supervisor** of Nationale PhD in Heritage Science (2021-2024)
6. **Co-supervisor** of PhD in Energy and Nuclear Science and Technology (2023-2026)
7. **Supervisor** of the Raman Spectroscopy laboratory at ISPC since July 2021. The laboratory comprises benchtop and portable Raman instruments. ([https://www.ispc.cnr.it/it\\_it/2021/02/18/spettroscopia-raman-lab/](https://www.ispc.cnr.it/it_it/2021/02/18/spettroscopia-raman-lab/))
8. **Supervisor** of laboratory activity at ISPC since 2011. The laboratory activity includes optical, scanning electron microscopy, X-ray diffraction and Raman spectroscopy analyses carried out with benchtop instruments; *in-situ* measurements with Raman, X-Ray fluorescence and Optical Microscope portable devices are also performed.
9. **Member of the board of examiners** for fellowship at the Institute for the Conservation and Valorization of Cultural Heritage (CNR). Race announcement codes: ICVBC.BS.02.2010; ICVBC.MI.BS.01.2011; ICVBC.MI.BS.02.2011; ICVBC.MI.BS.03.2011; ICVBC-001.2013; ICVBC-002.2013; ICVBC.001-2014-MI; ICVBC.01-2017-MI; ISPC/10/2021/NA; ISPC/19/2021/FI
10. **Supervisor** of high school students within the "Alternanza Scuola Lavoro" project (2015-2017)
11. Regularly acting as a **reviewer** in peer-reviewed international journals (Journal of Raman Spectroscopy, X-Ray Diffraction, Analytical Chemistry, Applied Spectroscopy, Journal of Cultural Heritage) and in the research evaluation process of the Charles University in Prague.

### Participation to research projects

1. "Cultural Heritage Active Innovation for Sustainable Society (**CHANGES**)" - Piano Nazionale di Ripresa e Resilienza, Missione 4 "Istruzione e ricerca" – Componente 2 "Dalla ricerca all'impresa". (2022-2025) Participant.
2. "BiOmimetic fluorinated nanoProbes for multiscale Tumor detection by MRI and Advanced Raman techniques (**OPTIMA**)" (2022-2024) Participant.
3. "Dialogues between ancient Western Asia and us. Untold stories from Italian collections and archives (**DiWA**)". (2023-2025) Participant.
4. "Implementation of Spatially offset Raman spectroscopy at The National Archives for analysis of hidden materials." **The National Archives of London (UK)** (2023) Participant.

5. "Non-invasive micro-scale depth resolved imaging and sensing of materials in cultural heritage", International Exchanges 2020 Cost Share (Italy), funded by the Royal Society (2021-2023). Principal Investigator.
6. "A Multi-Analytical study for surfaces and interfaces modification induced by wet and dry processing (steady state as well as ALE) on AlGaIn/GaN hetero structures aiming to a better understanding of the phenomena which have direct impact on device performances in the Specialty Technologies Market" **LAM Research Unlock Ideas**, funded by LAM Research Corporation (2020-2021). Principal Investigator.
7. "On-site and non-invasive expertise of ancient manuscripts of the National Library of the Kingdom of Morocco: exchange of experience in setting-up analytical protocols with portable instrumentation" Bilateral project **CNR-CNRST** (Italy-Morocco) (2016-2017). Participant.
8. "Cultural Heritage Advanced Research Infrastructures Synergy for a Multidisciplinary Approach to Conservation/Restoration (**CHARISMA**) funded by European Council (2009-2014). Participant.
9. "Innovative technologies for the conservation and enhancement of cultural heritage (**Tecon@BC**)" funded by Tuscany region (2010-2012). Participant

My research contribution has been recognized also by **invitations** to international conferences, seminars and PhD juries:

#### **Invited speaker:**

1. Invited speaker (keynote) at SGI-SIMP conference (Bari, 3-5 September, 2024), Title: "Advanced deep Raman Spectroscopy methods for the non-invasive investigation of materials subsurface: impact on Heritage Science".
2. Invited speaker at ICORS conference (Roma, July 28 – August 2, 2024), Title: "Deep Raman for Heritage Science: state of the art".
3. Invited speaker at Materia Morandi workshop (Bologna, 24 November, 2023), Title: "Non-invasive diagnostic campaign for the palette identification".
4. Invited speaker at FisMat 2023 conference (Milano, 4-8 September, 2023), Title: "Deep Raman in Heritage Science: micro-SORS advancements".
5. Invited speaker at ICAVS 11 virtual conference (23-26 August, 2021), Title: "Sub-Surface Molecular Investigation of Cultural Heritage materials with advanced Raman spectroscopy methods".
6. Invited speaker a SciX2021 virtual conference (26 September – 1 October, 2021), Title: "Facing challenges of Cultural Heritage materials using micro-SORS".
7. Invited speaker a VISPEC online #4 (23 April, 2021). Title: "Sub-Surface Molecular Investigation in Turbid Art Materials using Raman Spectroscopy".
8. Invited speaker at online Photonics Spectra Conference 2021 (19-22 January, 2021)". Title: "Advanced Raman Spectroscopy Techniques in Cultural Heritage"
9. Invited speaker (plenary lecture) at online SciX2020 conference (12-15 October, 2020), Title: "Discovering the subsurface of materials by intact methods: the contribution of micro-SORS"
10. Invited speaker a SCIX2018 congress (Atlanta, US, 21-26 October, 2018), Title: "Recent evolutions of micro-SORS"
11. Invited speaker (plenary lecture) a GEORAMAN 2018 congress (Catania, 10-14 June, 2018), Title: "Non-destructive Raman investigations of subsurface materials: advances in Micro-SORS"
12. Invited speaker (plenary lecture) at International congress Technart (Bilbao, 2–6 May, 2017), Title: "Potential of micro-SORS for Cultural Heritage".
13. Invited speaker a SCIX 2015 congress (Providence, RI, US, 27 September – 2 October, 2015), Title: "Development of Micro-SORS for Subsurface Analysis of Thin Layers in Art and in other Areas"
14. Invited speaker a RAA 2015 congress (Wroclaw, Poland, 1-5 September, 2015), Title: "Extension of Spatially Offset Raman Spectroscopy to the Microscale for Conservation Science"
15. Invited speaker a Laser for Science Facility user Meeting (STFC Rutherford Appleton Laboratory, UK, 28-30 April, 2015) Title: "Micro-SORS on Art"
16. Invited speaker at International Scientific Workshop (HEROMAT European Project) (Perugia, 10 May, 2013) Title: "Raman micro-profiling to assess the penetration depth and distribution of ammonium oxalate treatment".

### **Invited lectures:**

1. Invited lecture at VISPEC 2026 School, Title: "Deep Raman methods for Cultural Heritage" (Pavia, 2-6 February, 2026).
2. Invited lecture at RAA2025 Raman Training School, Title: "Deep Raman methods for Cultural Heritage" (Pisa, 2 September, 2025).
3. Invited lecture at Università degli Studi di Milano Bicocca, PhD in Chemical, Geological and Environmental Sciences, Title: "Raman Spectroscopy in Cultural Heritage" (Milano, 23 May, 2025).
4. Invited lecture at THE AFAM Roadshow, Ricerca, Creatività, Innovazione, Title: "Infintamente piccolo, infintamente grande" (Como, 22 May, 2025).
5. Invited lecture at Politecnico di Milano, Workshop on Raman Spectroscopies for Materials Science (RaMS 2025), Title: "Deep Raman methods for the non-invasive investigation of multilayered materials in Cultural Heritage" (Milano, 15 April, 2025).
6. Invited lecture at Università degli Studi di Milano Bicocca, PhD in Chemical, Geological and Environmental Sciences, Title: "Raman Spectroscopy in Cultural Heritage" (Milano, 31 May, 2024).
7. Invited lecture at The Department of Scientific Research of the Metropolitan Museum of Art, Title: "Advanced Raman Spectroscopy methods and their application to Cultural Heritage materials" (New York – US, 11 January, 2024).
8. Invited lecture at Venice International University, International PhD Academy, Title: "Advanced Raman Spectroscopy methods and their application to Cultural Heritage materials" (Venice, 6 November, 2023).
9. Invited lecture at Università degli Studi di Milano Bicocca, PhD in Chemical, Geological and Environmental Sciences, Title: "Advances in Raman Spectroscopy for the non-invasive subsurface investigation of Cultural Heritage materials" (Milano, 27 May, 2022).
10. Invited lecture at Northwestern University, Title: "Micro-Spatially Offset Raman Spectroscopy for the investigation of Cultural Heritage materials" (Chicago – US, 9 June, 2019).
11. Invited lecture at Politecnico di Milano, PhD Course in Materials Engineering, Title: "Methods for the compositional analysis and characterization of materials" (Milano, 26 March, 2019).
12. Invited lecture at Politecnico di Milano, PhD in Preservation of the Architectural Heritage, Title: "Innovative methods in the study of painted surfaces. Raman Spectroscopy and some special techniques" (Milano, 14 February, 2019).
13. Invited lecture at Politecnico di Milano, Dipartimento di Energia - NanoLab Talk, Title: "Micro-Spatially Offset Raman Spectroscopy for the investigation of materials subsurface" (Milano, 12 February, 2019).
14. Invited lecture at Politecnico di Milano, PhD in Preservation of the Architectural Heritage, Title: "Diagnostic for Cultural Heritage: General overview and focus on spectroscopic methods" (Milano, 26 March, 2018).
15. Invited lecture at Duke University, The Fitzpatrick Institute for Photonics (FIP), Optics and Photonics Seminar Series, (NC) Title: "Micro Spatially Offset Raman Spectroscopy for subsurface analysis of painted layers" (Raleigh, NC, USA, 26 June, 2017).
16. Invited lecture at Politecnico di Milano, Facoltà di Architettura – Laboratory of historical buildings conservation". Title: "Science for art." (Milano, 16 November, 2018).
17. Invited lecture at Politecnico di Milano, PhD in Preservation of the Architectural Heritage, Title: "The role of instrumental diagnosis in the study of Cultural Heritage. The application on painting layers. Innovative methods in the study of painted surfaces. Raman spectroscopy and some special techniques." (Milano, 29 May, 2017).
18. Invited lecture at Openlabs 2015 INFN – Laboratori Nazionali di Frascati (Frascati, RM, 23 May, 2015), Title: "Arte e scienza: vedere l'invisibile".
19. Invited lecture at University of Lausanne, Institut de Police Scientifique, titolo: "Micro-Raman spectroscopy applied to the study of works of art" (18 May, 2011).

### **Invitation to Juries and scientific boards:**

1. Member of the PhD jury at the Università di Bologna, PhD in Cultural and Environmental Heritage, Candidate: Zelan Li, Dissertation title: "Advancing in hyperspectral imaging for Cultural Heritage: new acquisition systems and multivariate image analysis" (March 28,

- 2024).
2. Member of the Faculty of the International PhD Academy, Venice International University: *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* (November 6-10, 2023)
  3. Member of the Academic Board of the National PhD in Heritage Science (November 2022 – to present).
  4. Member of the Selection Committee of the National PhD in Heritage Science (38° cycle, September 2022).
  5. Member of the Advisory Board of the scientific international peer reviewed journal *Applied Spectroscopy Practica* published by the Society for Applied Spectroscopy (SAS) (2022 – to present)
  6. Member of the Advisory Board of the scientific international peer reviewed journal *Analyst* (I.F. 4.2) (2021 – to present).
  7. Member of Society for Applied Spectroscopy – SAS (2021 – to present)
  8. Member of the Selection Committee of the Craver Award (2021 – to present)
  9. Member of the PhD jury at the International PhD School of the University of Santiago de Compostela (EDIUS), Spain, Ph.D. in Applied Science to Cultural Heritage, Candidate: Giulia Reggio, Dissertation title: “Testing, validation and optimization of Surface-Enhanced Raman Spectroscopy (SERS) sensors for the detection of small molecules in cultural heritage materials” (October 26, 2021)
  10. Member of the PhD jury at the University of Stavanger, Faculty of Science and Technology, Norway, Ph.D. in Science and Technology, Candidate: Laura Borromeo Dissertation title: “Raman Spectroscopy applied to the mineralogical analysis of flooded chalk” (June 6, 2018)
  11. Member of the PhD jury at Ghent University, Faculty of Sciences, Ph.D. in Science: Chemistry, Candidate: Anastasia Rousaki, Dissertation title: “Raman spectroscopy of layered cultural heritage materials” (May 31, 2018).
  12. Member of the PhD jury at Ghent University, Faculty of Arts and Philosophy; Candidate: Alessia Coccato. Dissertation title: “Application of Raman and X-ray fluorescence spectroscopies to Cultural Heritage materials. The non-destructive examination of paintings, pigments, and their degradation”. (May 16, 2017).
  13. Member of the PhD jury at Ghent University, Faculty of Sciences, Ph.D. in Science: Chemistry, Candidate: Debbie Lauwers. Dissertation title: “Characterisation and Optimisation of Mobile Raman Spectroscopy for Art Analysis” (January 26, 2017).
  14. Member of the international peer-review panel of INES (neutron powder diffractometer) of the spallation neutron source ISIS (2015-2016, RAL – UK).

I received the following **prizes and awards**:

- a) 2020 *Craver award* of the Coblenz Society (for the efforts of young professional spectroscopists that have made significant contributions in applied analytical vibrational spectroscopy). <https://www.coblentz.org/awards/the-craver-award/>
- a) *best oral communication* at the Italian Physical Society Conference (Trieste, September 2013)
- b) *best poster* presentation at the International Congress on the Application of Raman Spectroscopy in Art and Archaeology (Parma, Italy, September 2011)
- c) *best poster* presentation at the International Vacuum Congress (Beijing, China, August 2010)
- d) my publication J. Raman Spectrosc., 39, 10, 1307, 2008 has been included in *CNR Highlights* (2008-2009, Darwin S.r.l., p.127)

I published 99 **peer-reviewed papers** in leading journals of the respective fields totalizing 2238 citations (from WOS, November 2025) and h-index 28/WoS, 34/Google Scholar.