

## EVA LUNA RAVAN, PhD

Research fellow at Institute of Heritage Science of the National Research Council of Italy, Via Biblioteca 4, 95123 Catania, Italy

E-mail: [evalunaravan@cnr.it](mailto:evalunaravan@cnr.it)

Master's degree in chemistry, University of Turin

PhD cum laude at Sapienza University of Rome

### SCIENTIFIC PAPERS

1. Caliri, Claudia; Tapia, José; Privitera, Giulia Maria; **Ravan, Eva Luna**; Miliani, Costanza; Romano, Francesco Paolo, *Novel mobile 3D confocal X-ray fluorescence (3D CXRF) scanner for the non-invasive characterization of layered cultural heritage artworks*, *Journal of Cultural Heritage* 79 (2026), 147-155, <https://doi.org/10.1016/j.culher.2026.03.004>;
2. Michela Botticelli, Claudia Caliri, Rosario Andolina, Marco Cardinali, Angela Cerasuolo, Santo Gammino, Costanza Miliani, Zdenek Preisler, **Eva Luna Ravan**, Gianluca Santagati, Francesco Paolo Romano, Andrea Zezza; *Raphael seen through MA-XRF: understanding the master and his atelier by studying the Capodimonte collection*, *Journal of Cultural Heritage* 77 (2026), 156–167, <https://doi.org/10.1016/j.culher.2025.11.004>;
3. D. Quintero Balbas, **E.L. Ravan**, M. Botticelli, C. Caliri, T. Brancolini, A. Cagnini, F. P. Romano, J. Striova, High-Lateral Resolution Image Recovery and Degradation Mapping of Daguerreotypes Using Portable Reflectance and Mobile  $\mu$ -XRF, MA-XRD, and Benchtop  $\mu$ -Vibrational Spectroscopies, *Talanta* 299 (2026) 129140, <https://doi.org/10.1016/j.talanta.2025.129140>;
4. Santagati G., Fatuzzo C. G.; Karydas A. G.; Caliri C.; Aquilanti G.; Botticelli M.; **Ravan E.L.**; F.P. Romano; *Development and characterization of a high-sensitivity and high-throughput in-house multimodal TXRF/GIXRF mobile spectrometer*, *Spectrochimica Acta Part B: Atomic Spectroscopy*, Volume 232, October 205, 107279; <https://doi.org/10.1016/j.sab.2025.107279>;
5. C. Caliri, **E.L. Ravan**, S. Bottura-Scardina, S. Longo, F.P. Romano, M. Maulu; *Unveiling Hidden Text: Advanced X-ray Fluorescence Imaging of Severely Damaged Manuscript Folios from MS Turin*, BNU, L.II.14 (T). In *Studi Francesi* 206, Reconstruire le passé: IA, philologie et imagerie au secours des manuscrits brûlés, vol. LXIX, no. 206 (2025), ISBN 9791259934024;
6. Thea Winther, Jaakko Tahkokallio, Brenda Doherty, Sara Norrehed, Aldo Romani, Sara Ellis-Nilsson, Lucrezia Barchi, Claudia Caliri, Michela Botticelli, Fauzia Albertin, **Eva Luna Ravan** & Tuomas Heikkilä, *The Palette of the Medieval North – a non-invasive investigation of the colourants of ten fragments from Medieval Swedish Manuscripts*. *Npj Herit. Sci.* 13, 48 (2025), <https://doi.org/10.1038/s40494-025-01599-w>;
7. Botticelli, M., Miliani, C., **Ravan, E. L.**, Caliri, C., & Romano, F. P. (2024). Naples Yellow Revisited: *Insights into Trades and Use in 17th-Century Sicily from the Macro X-ray Fluorescence Scanning of Matthias Stomer's 'The Mocking of Christ'*. *Heritage*, 7(3), 1188-1201. <https://doi.org/10.3390/heritage7030057>;
8. P. Buscaglia; C. Caliri; F. P. Romano; D.P. Pavone; **E. L. Ravan**; C. Conti; M. Catrambone; C. Miliani; I. Degano; A. Andreotti; F. Nardella; M. Samadelli; A. Paladin; R. Genta; M. Cardinali; F. Pozzi; D. Picchi *Unraveling the mummy's shroud a multi-analytical study of a rare painted textile from Roman Egypt*, *Journal of Cultural Heritage*, Volume 68, 2024, 107-121, <https://doi.org/10.1016/j.culher.2024.05.006>.

## NATIONAL AND INTERNATIONAL CONFERENCES

1. **(Author) Oral presentation - E.L. Ravan**, Rosario Andolina, Irene Barba Castagnaro, Michela Botticelli, Costanza Miliani, Gianluca Santagati, C. Caliri, C. Miliani, F.P. Romano, *Investigating sulfur crystal formation in arsenic sulfide pigments by using advanced mobile x-rays methods*, Workshop CHANGES SPOKE 5, Catania, Italy, October 28–30 2025;
2. **(Author) Oral presentation - E.L. Ravan**, Rosario Andolina, Irene Barba Castagnaro, Michela Botticelli, Costanza Miliani, Gianluca Santagati, C. Caliri, C. Miliani, F.P. Romano, *Investigating sulfur crystal formation in arsenic sulfide pigments by using advanced mobile x-rays methods*, ISA2025, Catania, Italy, June 19-20 2025;
3. **(Author) Oral presentation - E.L. Ravan**, Rosario Andolina, Irene Barba Castagnaro, Michela Botticelli, Costanza Miliani, Gianluca Santagati, C. Caliri, C. Miliani, F.P. Romano, *Investigating sulfur crystal formation in arsenic sulfide pigments by using advanced mobile x-rays methods*, TECHNART2025, Perugia, Italy, May 05-09, 2025;
4. **(Author) Poster presentation – E.L. Ravan**, Silvia Bottura-Scardina, Rosario Andolina, Irene Barba Castagnaro, Michela Botticelli, Sveva Longo, Marco Maulu, Costanza Miliani, Gianluca Santagati, Francesco Paolo Romano, Claudia Caliri, *Illegible writings recovered in carbonized fire-damaged manuscripts with high lateral resolution and high chemical sensitivity  $\mu$ -xrf scanning: the case of the Torino BNU, l.ii.14*, TECHNART2025, Perugia, Italy, May 05-09, 2025
5. **(Author) Oral presentation – E.L. Ravan**, H. Brecoulaki, A.G. Karydas, C. Miliani, F.P. Romano, C. Caliri, *Egyptian Blue: variability in production technology, material provenance and deterioration*, XIII Congresso Nazionale AIAR, Palermo, Italy, February 12-14, 2025
6. **(Author) Poster presentation - E.L. Ravan**, C. Caliri, C. Miliani, F.P. Romano, *Advanced X-ray methods for the non-invasive investigation of pigment degradation*, Convegno CHANGES "Patrimonio culturale al futuro: sostenibilità sociale, innovazione tecnologica, trasformazione digitale. Le ricerche in corso nel Progetto CHANGES", Università di Roma Tre, Roma, Italy, January 23-24 2025.
7. **(Author) Oral presentation – E.L. Ravan**, F.P. Romano, A. Marketou, F. Pinakidou, K. Tsampa, A.G. Karydas, H. Brecoulaki and C. Caliri, *Egyptian Blue: variability in production technology, material provenance and deterioration*, EXRS-2024, Athens, June 24-28 2024;
8. **(Author) Poster presentation – E.L. Ravan**, A. Marketou, F. Pinakidou, C. Caliri, C. Miliani, F.P. Romano, A. Rodler-Roerbo, H. Brecoulaki, A.G. Karydas, *Egyptian Blue in Macedonian paintings: materials, technology and provenance investigated by using X-ray techniques*, GRC – Gordon Research Conference, Les Diablerets, Swiss, July 07-12 2024;
9. **(Author) Poster presentation – E.L. Ravan**, A. Marketou, F. Pinakidou, C. Caliri, C. Miliani, F.P. Romano, A. Rodler-Roerbo, H. Brecoulaki, A. G. Karydas, *Egyptian Blue in Macedonian paintings: materials, technology and provenance investigated by using X-ray techniques*, GRS – Gordon Research Seminar Les Diablerets, Swiss, July 06-07, 2024;
10. **(Author) Poster presentation – E.L. Ravan**, F.P. Romano, C. Caliri, C. Miliani, D. Buti, D. Magrini, C. Conti, A. Botteon, M. Realini, E. Davanzo, E. Ferraris, V. Turina, F. Rosi, *Multimodal noninvasive approach revealing the ancient Egyptian palette*, Technart 2023, Lisbon, May 7-12 2023;
11. **(Co-Author) Oral presentation – José Tapia**, Gianluca Santagati, Costanza Miliani, **Eva Luna Ravan**, Claudia Caliri and Francesco Paolo Romano, *Confocal and angular-resolved XRF: a comparative study of mobile techniques for the non-invasive analysis of layered structures in artworks*, Workshop CHANGES SPOKE 5, Catania, Italy, October 28–30 2025;

12. (Co-Author) Oral presentation – F. Falcone, N.K. Kladouri, M. Botticelli, K.Tsampa, **E.L. Ravan**, G. Santagati, A. Grigoraki, P. Lazaris, I. Panagakos, K.Tsakri, F.P. Romano, C. Miliani, A.G. Karydas and C.Caliri, Non-invasive ma-xrpd and ma-xrf analysis of egyptian wooden funerary stelae from the hellenic national archaeological museum, 111° Congresso Nazionale SIF, Palermo, September 22-26, 2025
13. (Co-Author) Oral presentation - K. Ambrogioni, F. Mirani, F. Gatti, A. Maffini, D. Mazzucconi, A. Pola, C. Conti, E. M. Grassi, **E. L. Ravan**, F.P. Romano, V. Kantarelou, F. Schillaci, L. Giuffrida, D. Margarone, M. Passoni, Laser-driven radiation sources for cultural heritage: laser-driven PIXE and XRF on historical and archaeological artifacts, 51st EPS Conference on Plasma Physics, Vilnius, Lithuania, July 7-11, 2025;
14. (Co-Author) Oral presentation - Francesco Mirani, Kevin Ambrogioni, Francesco Gatti, Alessandro Maffini, Dario Rastelli, Davide Mazzucconi, Andrea Pola, Claudia Conti, Elisa Maria Grassi, **Eva Luna Ravan**, Paolo Francesco Romano, Vasiliki Kantarelou, Francesco Schillaci, Lorenzo Giuffrida, Daniele Margarone and Matteo Passoni, In-air laser-driven PIXE and XRF on historical and archaeological artifacts: a proof-of-principle experiment at the ELI Beamlines facility, FISMAT2025, Venice, Italy, July 7-11, 2025;
15. (Co-Author) Oral presentation – Michela Botticelli, Kalliopi Tsampa, Tecla Arcidiacono, Francesca Falcone, Costanza Miliani, **Eva Luna Ravan**, Gianluca Santagati, Andreas Karydas, Hariclia Brecoulaki, Vassilis Perdikatsis, Claudia Caliri, Francesco Paolo Romano, *Copper arsenate greens in ancient art: advanced mobile and lab-based x-ray methods for re-defining the palette of macedonian funerary painting*, TECHNART2025, Perugia, Italy, May 05-09, 2025;
16. (Co-Author) Oral presentation – José Tapia, Gianluca Santagati, Costanza Miliani, **Eva Luna Ravan**, Claudia Caliri and Francesco Paolo Romano, Confocal and angular-resolved XRF: a comparative study of mobile techniques for the non-invasive analysis of layered structures in artworks, TECHNART2025, Perugia, Italy, May 05-09, 2025;
17. (Co-Author) Poster presentation – F. Falcone, N.K. Kladouri, M. Botticelli, K.Tsampa, **E.L. Ravan**, G. Santagati, A. Grigoraki, P. Lazaris, I. Panagakos, K.Tsakri, F.P. Romano, C. Miliani, A.G. Karydas and C.Caliri, *Non-invasive ma-xrpd and ma-xrf analysis of egyptian wooden funerary stelae from the hellenic national archaeological museum*, TECHNART2025, Perugia, Italy, May 05-09, 2025;
18. (Co-Author) Poster presentation – Gianluca Santagati, Tecla Arcidiacono, Michela Botticelli<sup>1</sup>, Claudia Caliri, Francesca Falcone, Costanza Miliani, **Eva Luna Ravan** and Francesco Paolo Romano, *Lab-based xas spectroscopy in the study of pigment materials serving the FIXLAB platform of E-RIHS*, TECHNART2025, Perugia, Italy, May 05-09, 2025;
19. (Co-Author) Poster presentation – Rosario Andolina, Zdenek Preisler, Claudia Caliri, Enrico Ferraris, Costanza Miliani, **Eva Luna Ravan**, Paolo Marco Riela, Martina Terzoli, Valentina Turina, Francesco Paolo Romano, *Classification of egyptian funerary nets from MA-XRF*, TECHNART2025, Perugia, Italy, May 05-09, 2025;
20. (Co-Author) Oral presentation – Michela Botticelli, Andrea Busacca, Claudia Caliri, Claudia Fatuzzo, **Eva Luna Ravan**, Francesco Paolo Romano, Brenda Doherty, Aldo Romani, Francesca Rosi, A.G. Karydas, H. Brecoulaki, *Revisualizing the artist's palette in the Hunt frieze of the tomb of Philip II at Vergina through the MOLAB in situ investigation*, ReVis International workshop, Athens, Greece, April, 5 2025;
21. (Co-Author) Oral presentation - Claudia Caliri, Michela Botticelli, **Eva Luna Ravan**, Gianluca Santagati, Zdenek Preisler, Rosario Andolina, Salvo Longobardi and Francesco Paolo Romano, *XRAYLab: Innovating Mobile X-ray Technologies for Tangible Cultural Heritage Analysis*, ReVis International workshop, Athens, Greece, April, 5 2025;

22. (Co-Author) Oral presentation - Sveva Longo, Rosario Andolina, Michela Botticelli, Salvatore Longobardi, Costanza Miliani, **Eva Luna Ravan**, Francesco Paolo Romano, Gianluca Santagati, Claudia Caliri, *Combined Macro-XRF and X-ray Radiography analysis of Renaissance Masterpieces*, XIII Congresso Nazionale AIAR, Palermo, Italy, February 12-14, 2025;
23. (Co-Author) Poster presentation – M. Botticelli, **E. L. Ravan**, D. P. Pavone, C. Caliri, C. Miliani, N. Kladouri, K. Tsampa, A. G. Karydas, A. Georgiadou, H. Brecoulaki, F. P. Romano, *A rediscovery of Macedonian artists' rich palette: the in-situ investigation of the Hunt frieze of the tomb of Philip II at Aigai (Vergina, Greece)*, XIII Congresso Nazionale AIAR, Palermo, Italy, February 12-14, 2025;
24. (Co-Author) Poster presentation - C. Caliri, R. Andolina, M. Botticelli, Z. Preisler, **E.L. Ravan**, G. Santagati, C. Miliani and F.P. Romano, *Novel X-ray imaging techniques for the noninvasive investigation of European Heritage within MOLAB platform of E-RIHS*, XIII Congresso Nazionale AIAR, Palermo, Italy, February 12-14, 2025;
25. (Co-Author) Oral presentation - Francesco Paolo Romano, Francesca Rosi, Claudia Caliri, Costanza Miliani, Letizia Monico, **Eva Luna Ravan**, Aldo Romani, *Integrated analytical technologies and artificial intelligence for advancing knowledge and conservation of tangible Cultural Heritage*, Convegno CHANGES "Patrimonio culturale al futuro: sostenibilità sociale, innovazione tecnologica, trasformazione digitale. Le ricerche in corso nel Progetto CHANGES", Università di Roma Tre, Roma, Italy, January 23-24, 2025;
26. (Co-Author) Oral presentation – A. Marketou, F. Pinakidou, **E.L. Ravan**, F.P Romano, H. Brecoulaki, A. Rodler-Rørbo and A. Karydas, *Tracing the trajectories of Egyptian blue production technology: XRD, sXRF and sXANES analysis of Hellenistic and Roman samples*, 30th Annual Meeting of the European Association of Archaeologists (EAA) in Rome, Italy, August 27-31, 2024;
27. (Co-Author) Oral presentation - Florence Liggins, S. Kogou, C. S. Cheung, A. Vichi, A. Suzuki, V. Detalle, X. Bai, M. Botticelli, C. Caliri, **E. Ravan**, F. P. Romano, C. Tennenini, P. Cassitti, H. Liang, *Understanding the Carolingian artist through a novel workflow involving multimodal remote and in-situ spectral imaging and spectroscopic techniques*, 30th Annual Meeting of the European Association of Archaeologists (EAA) in Rome, Italy, August 27-31 2024;
28. (Co-Author) Oral lecture – C. Caliri, R. Andolina, M. Botticelli, Z. Preisler, **E.L. Ravan**, G. Santagati, C. Miliani and F.P. Romano, *Novel X-ray imaging techniques for the noninvasive investigation of European Heritage within MOLAB platform of E-RIHS*, EXRS-2024, Athens, June 24-28, 2024;
29. (Co-Author) Oral presentation – A. K. Marketou, F. Pinakidou, **E.L. Ravan**, F.P. Romano, H. Brecoulaki, A. Rodler-Rørbo and A.G. Karydas, *On the production of Egyptian blue: sXRF and XANES analysis of pigment pellets*, EXRS-2024, Athens, June 24-28, 2024;
30. (Co-Author) Oral presentation – M. Botticelli, **E.L. Ravan**, D.P. Pavone, C. Caliri, F.P. Romano, B. Doherty, F. Sabatini, F. Albertini, F. Rosi, A. Romani, S. Kogou, F. Liggins, S. Cheung, H. Liang, K. Tsampa, A.G. Karydas, and H. Brecoulaki, *The MOLAB transnational access for an in situ investigation of the Hunt frieze of the tomb of Philip II at Aigai (Vergina, Greece)*, 2024 meeting on MA-XRF and RIS;
31. (Co-Author) Poster presentation – A. Piccirillo, P. Buscaglia, F. Pozzi, C. Caliri, F. P. Romano, D.P. Pavone, **E.L. Ravan**, C. Conti, M. Catrambone, C. Miliani, I. Degano, A. Andreotti, F. Nardella, M. Samadelli, A. Paladin, R. Genta, M. Cardinali, D. Picchi, *An Egyptian mummy of the Roman period with a painted shroud: a multi-analytical study of its technical features*, Technart 2023, Lisbon, May 7-12, 2023;
32. (Co-Author) Oral presentation – F.P. Romano, C. Miliani, C. Caliri, C. Fatuzzo, G. Privitera, **E.L. Ravan**, D. Zappalà and Z. Preisler, *A novel MA-XRD/MA-XRF scanner for pigment-specific mapping of paintings*, Technart 2023, Lisbon, May 7-12, 2023;

33. (Co-Author) Oral presentation – C. Caliri, C. Fatuzzo, D.P. Pavone, G. M. Privitera, **E.L. Ravan**, Z. Preisler, C. Miliani and F.P. Romano, *A novel mobile MA-XRF scanner based on a hodoscopic multidetector system for application in the cultural heritage field*, Technart 2023 Lisbon, May 7-12, 2023.

## PARTECIPATION IN-SITU MEASUREMENT CAMPAIGNS

1. Participation in the MAXRF, 1D XRPD, MAXRD measurement campaign on the Book of the Dead of Merit at the Bibliothèque Nationale de France (BNF) from 26/05/2025 to 30/05/2025 as part of the E-RIHS.it infrastructure activity (access to the MOLAB platform BODEME project)
2. Participation in the experiment HG-237 beamline ID13 at ESRF synchrotron,  $\mu$ XRD mapping on artificial aged orpiment mock-ups; from 04/12/2024 to 08/12/2024, Grenoble, France;
3. Participation in the MAXRF, 1D XRPD, MAXRD measurement campaign in the frame of an international collaboration with the National Archaeological Museum of Athens (NAM): Archaic painted panels from Pitsa, 6th c. BC, Corinthia, Greece; from 11/11/2024 to 15/11/2024, Athens Greece.
4. Participation in the MAXRF, 1D XRPD, MAXRD, XRR measurement campaign in the frame of the MOLAB project: Margarito d'Arezzo: a study of his painting materials and techniques (MAMAT), in collaboration between Museo Nazionale d'arte medievale e moderna (MNAMM) in Arezzo, the National Gallery of London (NG\_L) and the National Gallery of Art in Washington (NGA\_W). Measurements held at MNAMM in Arezzo from 15/04/2024 to 19/04/2024 as part of the E-RIHS.it infrastructure activity (access to the MOLAB platform, MAMAT project).
5. Participation in the MAXRF and  $\mu$ XRF measurement campaign in the frame of the PRIN project: All Fire, all Flames (AFAF): from Philology to artificial Intelligence and Back. Recovering the MS L.II.14 of the Biblioteca Nazionale Universitaria di Torino damaged by the Fire of 1904, at Biblioteca Nazionale in Turin from 25/03/2024 to 29/03/2024;
6. Participation in the MAXRF, 1D XRPD, MAXRD measurement campaign on Gebelein painted linen (Museo Egizio, S. 17138) and on the Book of the Dead of Kha at the Egyptian Museum in Turin from 03/03/2024 to 12/03/2024 as part of the E-RIHS.it infrastructure activity (access to the MOLAB platform, GebelLinen project and BODEKA project);
7. Participation in the measurement campaign "Tracing the trajectories of Egyptian blue production technology: XRF and XANES analysis of samples from the Mycenaean to the Roman period" at ELETTRA Synchrotron Trieste (Italy), XRF beamline, proposal number 20205353 from 13/11/2023 to 17/11/2023.
8. Participation in the MAXRF, 1D XRPD and MAXRD measurement campaign on Pala d'altare by Callisto Piazza da Lodi at MASI in Lugano from 18/09/2023 to 22/09/2023 as part of the IPERION HS infrastructure activity (access to the MOLAB platform, CALPIA project)
9. Participation in the MAXRF measurement campaign on medieval manuscripts from Nordic countries at the Riksarkivet in Stockholm from 29/05/2023 to 02/06/2023 as part of the IPERION HS infrastructure activity (access to the MOLAB platform, MoMNopSaf project)
10. Participation in the MAXRF, 1D XRPD, MAXRD measurement campaign on the Hunt frieze of the tomb of Philip II at the Museum of the royal tombs in Vergina (Greece) from 07/03/2023 to 14/03/2023 as part of the IPERION HS infrastructure activity (access to the MOLAB platform, HFTV\_ReVis- Greece project);
11. Participation in the MAXRF and 1D XRPD measurement campaign on Etruscan cinerary urns at Musei Reali in Turin from 13/02/2023 to 17/02/2023 as part of the E-RIHS.it infrastructure activity (access to the MOLAB platform, DECORA project);

12. Participation in the MAXRF measurement campaign on an Egyptian mummy shroud at the Bologna Archaeological Museum from 23/01/2023 to 27/01/2023 as part of the E-RIHS.it infrastructure activity (access to the MOLAB platform, PAMUS project).

#### **PARTECIPATION IN RESEARCH PROJECTS**

1. **IPERION HS** DFM.AD006.166, participation in the activities of the XRAYLab in Catania within the MOLAB platform of the international consortium IPERION HS - Integrating Platforms for the European Research Infrastructure ON Heritage Science;
2. **ERIHS** (FOE 2020) DUS.AD003.019, participation in the activities of the XRAYLab in Catania within the MOLAB platform of the national node of the E-RIHS.it European infrastructure from 11/2022;
3. **PNRR CHANGES** PRR.AP019.001 FOE Cultura e Creatività DUS.AD017.180, Cultural Heritage Active Innovation for Sustainable Society, participation in the activities of the XRAYLab in Catania within the Spoke5 Science and Technologies for Sustainable Diagnostics of Cultural Heritage.

#### **PUBLIC ENGAGEMENT ACTIVITIES**

1. Participant at the first congress of the Institute of Cultural Heritage (ISPC) of the CNR held in Naples, 17th – 19th April 2023, presenting a video on my PhD activity;
2. Speaker at the VIII Espresso Seminar - X-ray based methods and instrumentation in Materials Science, Feb 7th 2024, INFN – LNS, Istituto Nazionale di Fisica Nucleare - Laboratori Nazionali del Sud (Catania);
3. Speaker at the opening event of Primavera della Scienza held by INFN-LNS, entitled Oltre il soffitto di cristallo: donne e scienza tutti i giorni dell'anno, March 5th, 2024, Istituto Nazionale di Fisica Nucleare - Laboratori Nazionali del Sud (Catania);
4. Speaker at the first event "CNR@scuola: ricerca, innova e proteggi le tue idee", in collaboration with the Institute of biomolecular chemistry (Cnr-Icb), organized by CNR-UVR, presenting the technologies developed during the research activity and the transfer and valorization opportunities faced. April 22nd, 2024, Liceo scientifico statale "Galileo Galilei" (Catania).