SILVIA VETTORI

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Education and Training

- 2005: Graduated in Geological Sciences at the Dipartimento di Scienze della Terra (Università di Firenze) with a thesis in Environmental Mineralogy and since September 2006 qualified as a Geologist.
- 2007-2010: PhD in Earth Sciences at the University of Florence with a project on the use of non-invasive hyperspectral techniques applied to the Cultural Heritage field.
- 2010-2013: post-doc research grant at the LAM – Stone Materials Laboratory, Department of Construction and Restoration of the University of Florence.
- 2013-2017: post-doc research grant at the Institute for the Conservation and Valorisation of Cultural Heritage (CNR) in the FIRB MIUR 2012 project "Marmora Phrygiae, interdisciplinary methodologies for knowledge and preservation. Archaeology of architecture, information technologies and chemical-physical sciences for the historical reconstruction of building sites and the supplying of stones in a Roman and Byzantine city of Asia Minor, Hierapolis of Phrygia".
- 2017-2022: Permanent researcher at Institute for the Conservation and Valorization of Cultural Heritage (ICVBC) of National Research Council of Italy (CNR).
- 2023-now: Senior Researcher at Institute of Heritage Science (ISPC) of National Research Council of Italy (CNR).

Other

- Supervision of numerous degree theses at University of Florence.
- Peer review of: Heliyon, Construction and Building Materials ecc

Research activity

- Archaeometric investigations on white marbles, pigments, glass, ceramics, and metals;
- study of the causes and mechanisms of alteration and degradation of natural and artificial stone materials used in architecture and archaeological sites;
- monitoring of surfaces and environmental parameters, and development of new intervention strategies in archaeological and architectural contexts;

- evaluation of the effectiveness of cleaning methods and protective and consolidating treatments for stone materials.

She has acquired extensive experience and expertise in the use of various analytical techniques, both non-invasive and micro-destructive, applied in laboratory and in situ, mainly based on the use of X-rays.

Recent National Projects

-2015-2017: Participation in the project : "Survey and study of materials of Fortezza da Basso (Florence, Italy)"

-2013-2018: Participation in the research on "Plasters, mortars and stones of Villa Medicea di Cafaggiolo (FI)"

- 2016-2019: Participation in the Research Project "Analyses of materials of Baptistery of Florence and monitoring of restoration interventions" founded by Opera del Duomo (Florence, Italy)

- 2023-2025: Partecipation in the Italian Research Project PRIN 2022, "ARIANNA: An interoperable platform for aRchaeologIcAl sites: conservatioN, eNvironmental design and wider Accessibility after covid" founded by European Union NextGenerationEU and Italian Ministry of University and Research

-Participation to numerous diagnostic campaigns on artifacts of historical and artistic interest (bronze sculpture (Putto del Verrrocchio, Ciborio San Miniato), marble sculptures (sculptures of Uffizi Gallery, Archeological museum of Denizli (Turkey) *etc*.)

Synchrotron accesses (as main proposer)

- ESRF Proposal HG-217, BM08 (2023) The origin of the blue colour of protohistoric vitreous materials from Paduli (Colli sul Velino, Rieti, Italy). 18 shifts.

- ESRF Proposal, HG-268 BM08 (2026) Blackening of red cinnabar and malachite in historical Roman wall paintings: speciation of Hg and Cu by means of FY-TEY XAS mapping. 15 shifts.

Selected publications

- S. Vettori, F. Giannetti, E. Braschi, R. Avanzinelli, C. Virili, A.M. Jaia, A.Zanini, E. Cantisani, Bronze Age vitreous materials from Central Italy: A first insight through an interdisciplinary and multi analytical approach, Journal of Archaeological Science: Reports, 2025, 67, 105396-104410.

- M. M. N. Franceschini, T. Ismaelli, S. Vettori, L. Chelazzi, S. Ciattini, F. Di Benedetto, C. Grifa, E. Cantisani, Investigating Technology and Raw Materials Source of the Archaic and Classical Architectural Terracottas From the Athenaion in Castro (Apulia, Italy), Archaeometry, 2025, 0, 1–15.

- E. Villani, A. Suzuki, M. Ricci, B. Salvadori, S. Vettori, E. Cantisani, Red stains on heritage marbles: application of micro-scale analyses to assess the presence and distribution of lead compounds, Analyst, 2024, 149, 4872-4880.

- S. Vettori, E. Cantisani, T. Ismaelli, G. Scardozzi, A. Buccianti, F. Di Benedetto, An EPR study of the marbles from quarries of the Denizli region (Turkey): A contribution to the provenance assessment of materials with close relationships, Microchemical Journal, 2024, 202, 110802-110810.

- A. Suzuki, C. Riminesi, M. Ricci, S. Vettori, B. Salvadori, Testing of a new Yb:YAG fiber laser system for the removal of graphic vandalism from marble, Heritage Science, 2023, 11, 132-152.

- A. Andreotti, I. Bonaduce, E. Cantisani, I. Degano, B. Duman, T. Ismaelli, B. Salvadori, S. Vettori, Ancient restoration practices in the Monumental Nymphaeum at Tripolis ad Maeandrum (Turkey): multi-analytical approach on Roman and Byzantine bonding mortars, Journal of Cultural Heritage, 2023, 63, 71-80.

- B. Sacchi, S. Vettori, A. Andreotti, L. Rampazzi, M.P. Colombini, P. Tiano. Assessment of water repellent treatments for the stone of the Matera Cathedral façade (Italy). International Journal of Architectural Heritage, 2022, 16(3), 365-373.

- S. Calandra, E. Cantisani, S. Vettori, M. Ricci, B. Agostini, C.A. Garzonio. The San Giovanni Baptistery in Florence (Italy): Assessment of the State of Conservation of Surfaces and Characterization of Stone Materials. Applied Sciences, 2022, 12(8), 4050-4076.

- E. Pecchioni, F. Fratini, E. Pandeli, E. Cantisani, S. Vettori. Pietraforte, the florentine building material from the middle ages to contemporary architecture. Episodes, 2021, 44(3), 259-271.

- E. Cantisani, O.A. Cuzman, S. Vettori, L. Chelazzi, S. Ciattini, M. Ricci, R. Manganelli Del Fá, L. Chiarantini, C.A. Garzonio. A multi-analytical approach for the study of red stains on heritage marble. Analyst, 2019,144, 2375-2386.

-Bracci S., Vettori S, Cantisani E. Degano I., Galli M. The ancient use of colouring on the marble statues of Hierapolis of Phrygia (Turkey): an integrated multi-analytical approach Archaeological and Anthropological Sciences, doi.org/10.1007/s12520-019-00803-w.

-Vettori, S., Cabassi, J., Cantisani, E., Riminesi, C. Environmental impact assessment on the stone decay in the archaeological site of Hierapolis (Denizli, Turkey) (2019) Science of the Total Environment, 650, pp. 2962-2973.

-Andreotti, A., Baroni, S., Bonaduce, I., Bozza, S., Cantisani, E., Ismaelli, T., Vettori, S.Ancient restorations at Hierapolis of Phrygia (Denizli, Turkey): Interdisciplinary research on materials and technologies (2018) Journal of Archaeological Science: Reports, 21, pp. 862-871.

-Rampazzi, L., Andreotti, A., Bressan, M., Colombini, M.P., Corti, C., Cuzman, O.A., d'Alessandro, N., Liberatore, L., Palombi, L., Raimondi, V., Sacchi, B., Tiano, P., Tonucci, L., Vettori, S., Zanardini, E., Ranalli, G.An interdisciplinary approach to a knowledge-based restoration: The dark alteration on Matera Cathedral (Italy) (2018), Applied Surface Science, 458, pp. 529-539.

-Cantisani, E., Falabella, A., Fratini, F., Pecchioni, E., Vettori, S., Antonelli, F., Giamello, M., Lezzerini, M.Production of the Roman Cement in Italy: characterization of a raw material used in Tuscany between 19th and 20th century and its comparison with a commercialized French stone material (2018) International Journal of Architectural Heritage, 12 (6), pp. 1038-1050.

-Suzuki A., Vettori S., Giorgi S., Carretti E., Di Benedetto F., Dei L., Benvenuti M., Moretti S., Pecchioni E., Costagliola P. (2018) Laboratory study of the sulfation of carbonate stones through SWIR hyperspectral investigation (2018) Journal of Cultural Heritage, 32, pp.30-37.

-Vettori, S., Cantisani, E., Chelazzi, L., Cuzman, O.A., Gatta, G.D., D'Andria, F. The dark colour of the Ploutonion at Hierapolis of Phrygiae (Turkey)(2018) Archaeometry, in press

-Shu, C.X., Cantisani, E., Fratini, F., Rasmussen, K.L., Rovero, L., Stipo, G., Vettori, S. "China's brick history and conservation: laboratory results of Shanghai samples from 19th to 20th century" (2017) Construction and Building Materials, 151, pp. 789-800.

-Centauro, I., Cantisani, E., Grandin, C., Salvini, A., Vettori, S. "The Influence of Natural Organic Materials on the Properties of Traditional Lime-Based Mortars" (2017) International Journal of Architectural Heritage, 11 (5), pp. 670-684

-Elena Pecchioni, Silvia Vettori, Emma Cantisani, Fabio Fratini, Marilena Ricci, Carlo Alberto Garzonio Chemical and mineralogical studies of the red chromatic alteration of Florentine Pietra Serena sandstone . European Journal of Mineralogy Volume 28 (1)2016

-Vettori S., Bracci S., Cantisani E., Riminesi C., Sacchi B., D'Andria F.. A multi-analytical approach to investigate the state of conservation of the wall paintings of Insula 104 in Hierapolis (Turkey) Microchemical Journal Volume 128, 1 September 2016, Pages 279-287.

-Fratini F., Pecchioni E., Cantisani E., Rescic S., Vettori S. Pietra Serena: the stone of the Renaissance. Journal of Geological Society (2015), 407 (1) 173-186.

-Cantisani E., Garzonio C.A., Ricci M., Vettori S. Relationships between the petrographical, physical and mechanical properties of some Italian sandstones (2013) International Journal of Rock Mechanics and Mining Sciences, 60, p. 321-332, ISSN: 1365-1609.

-Garfagnoli F., Ciampalini A., Moretti S., Chiarantini L., Vettori S. Quantitative mapping of clay minerals using airborne imaging spectroscopy: new data on Mugello (Italy) from SIM-GA prototypal sensor (2013) European Journal of Remote Sensing, 46, p. 1-17, ISSN: 2279-7254, doi: 10.5721/EuJRS20134601.

-Camaiti M., Vettori S., Benvenuti M., Chiarantini L., Costagliola P., Di Benedetto F., Moretti S., Paba F., Pecchioni E. Hyperspectral sensor for gypsum detection on monumental buildings (2011) Journal of Geophysics and Engineering, 8, p.126-S131.