

PERSONAL DATA

Researcher Unique Identifiers	ORCID ID: 0000-0001-8966-4492 ResearcherID: ABE-2767-2021 Scopus Author ID: 57190676503 Web of Science ResearcherID: KXQ-8672-2024
- Education	Ph.D in Environment and Cultural Heritage (Sapienza University of Rome, Dept. Earth Sciences)
- Affiliation	Institute of Heritage Science (ISPC) National Research Council (CNR) Via Salaria km 29,300, 8 00015, Montelibretti (RM), Rome, Italy
- Contacts	e-mail: elenaverticchio@cnr.it

RESEARCH AND PROFESSIONAL ACTIVITIES

December 2023 – ongoing	Research Fellowship at the Institute of Heritage Science (ISPC) of National Research Council (CNR) Project: “Patrimonio culturale e creatività nelle transizioni verde e digitale per società inclusive” (FOE 2021, CUP B63C21000940005) Research topic: “Sviluppo di processi diagnostici e simulativi energetico-ambientali per ottimizzare l’analisi, la conoscenza e la conservazione di edifici storici e delle opere d’arte e collezioni al loro interno” Scientific supervisor: Dr. Filippo Calcerano
December 2022 – December 2023	Research Fellowship at the Institute of Heritage Science (ISPC) of National Research Council (CNR) Project: “INT4ACT hIstory coNstruction for beauty CommunicaTion” (PRIN 2017, CUP F85F21001090003) Research topic: “Sviluppo di strumenti digitali e applicazioni simulate per il miglioramento dei processi di analisi, conoscenza e conservazione del patrimonio costruito con particolare riguardo ai luoghi della cultura” Scientific supervisor: Dr. Filippo Calcerano
June 2022 – November 2022	Internship at Mazzini Lab Società Benefit Projects: “RMCH – Risk Management for Cultural Heritage” (Erasmus+, Agreement n° 2021-1-IT01-KA220-VET-000034797), “SOS Heritage” (Creative Europe, Agreement n° 101055573)
February 2018 – September 2018	Internship at British Library (London, UK), London Metropolitan Archives (London, UK), and Istituto Centrale per il Restauro e la Conservazione del Patrimonio Archivistico e Librario (Rome, Italy). Project: “La conservazione preventiva nelle biblioteche: le migliori pratiche di gestione dei materiali archivistici e librari da Londra a Roma”, financed within Torno Subito 2017 (POR FSE Lazio 2014-2020 CUP: J86G16000160009).

July 2017 – November 2017	Collaboration at Istituto Centrale per il Restauro (Rome, Italy), CUP: B82C16000060001, CIG: ZB11F06D15. Project Manager: Carlo Cacace. Project: “Attività necessaria per effettuare misurazioni specialistiche con la strumentazione UAL realizzata” in “Roma. Dipinti su tavola. Restauro e monitoraggio del contenuto di acqua nel materiale. Sperimentazione iniziata sulla tavola del Vivarini per la misurazione continua del valore di umidità assoluta (UAL) in tavole lignee, su 9 punti tramite sistema di acquisizione e trasmissione dati via web CR1000”.
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PARTICIPATION IN RESEARCH PROJECTS

- 2025 “SHAREN – Energy-SHaring solutions and communities for enhanced Renewable ENergy in the MEDiterranean historic centres”
(Interreg NEXT MED 2021-2027, Project ref. number A_T_2.1_0513_SHAREN)
- 2025 “BEACON – Built hEritage sustAinable CONservation”
(PRIN 2022, project ID: 2022C3XWSA)
- 2024 “E-RIHS – European Research Infrastructure for Heritage Science”
(HORIZON-INFRA-2021-DEV-02, grant n. 101079148)
- 2023 “INT4ACT hIstory coNstrucTion for beauty CommunicaTion”
(DTC Lazio - Centro di Eccellenza del Distretto Tecnologico della Cultura della Regione Lazio, CUP: F85F21001090003).
- 2023 “TECH-START – key enabling TECHnologies and Smart environment in the Age of gReen economy, convergent innovations in the open space/building system for climate mitigation” (PRIN 2017, project ID: 20177JHMLA).
- 2022 “RMCH – Risk Management for Cultural Heritage”
(Erasmus+, Agreement n° 2021-1-IT01-KA220-VET-000034797)
- 2022 “SOS Heritage” (Creative Europe, Agreement n° 101055573)
- 2019 “CollectionCare – Innovative and affordable service for the Preventive Conservation monitoring of individual Cultural Artefacts during display, storage, handling and transport” (H2020-NMBP-ST-IND-2018-2020, grant n. 814624).

SCIENTIFIC PUBLICATIONS

Publications are labelled as: article (a), book chapter (bc), and conference paper (cp).

- (bc) **Verticchio E.**, Calcerano, F., Martinelli L., Gigliarelli E., Potts A., and Lucchi E. “Built Heritage Adaptation and Mitigation: the need for a joint effort through Heritage Science” (2025). In “Climate Mitigation and Adaptation Strategies for Cultural and Natural Heritage. From Conceptualization to Action” (*Elsevier*) <https://doi.org/10.1016/B978-0-443-34061-1.00010-X>.
- (cp) Calcerano, F., Gigliarelli, E., Martinelli, L., **Verticchio, E.**, Virgili, V., and Miliani, C. “The European Research Infrastructure for Heritage Science (E-RIHS) as a strategic hub to support the energy and environmental improvement of historic buildings” (2025). In *5th International Conference on Energy Efficiency in Historic Buildings EEHB 2024* (Krems, 7-9 October 2024) https://www.eehb2024.org/files/ugd/3a9ac9_7e2a562347e5405a97e40c92acd19c65.pdf.

- (a) **Verticchio E.**, Martinelli L., Gigliarelli E., and Calcerano, F. "Current practices and open issues on the whole-building dynamic simulation of historical buildings: a review of the literature case studies" *Building and Environment* (2024) <https://doi.org/10.1016/j.buildenv.2024.111621>.
- (a) Frasca, F., **Verticchio, E.**, Bosco, E., Kuka, E., Lee, D. S. H., Andersen, C. K., ... & Siani, A. M. (2024). "Assessing microclimate thresholds for heritage preventive conservation to achieve sustainable and energy efficiency goals in a changing climate." *Scientific Reports*, 14(1), 18707 <https://doi.org/10.1038/s41598-024-69395-3>.
- (cp) **Verticchio, E.**, Calvano, M., Calcerano, F., Martinelli, L., Cessari, L., & Gigliarelli, E. (2024). Parametric implementation of urban microclimate models of historical villages. *DN*, 68-75, ISSN 2610-8755, pp. 68-75
- (cp) **Verticchio E.**, Calcerano, F., Martinelli L., and Gigliarelli E. "Building Energy Modelling for Historical Buildings: Current Distribution of Literature Case Studies in View of Climate Change". *Structural Integrity Procedia*, 55, 1-8 <https://doi.org/10.1016/j.prostr.2024.02.001>.
- (a) **Verticchio E.**, Frasca F., Matè D., Giammusso F.M., Sani M., Sebastiani M.L., Sclocchi M.C., and Siani A.M., (2023). "Assessing the Impact of Climate Change on the Biodeterioration Risk in Historical Buildings of the Mediterranean Area: The State Archives of Palermo." *Atmosphere*, 14(7), p.1169 <https://doi.org/10.3390/atmos14071169>.
- (a) **Verticchio E.**, Frasca F., Cavalieri P., Teodonio L., Fugaro D. and Siani A.M. (2022) "Conservation risks for paper collections induced by the microclimate in the repository of the Alessandrina Library in Rome (Italy)." *Heritage Science*. <https://doi.org/10.3390/s22124547>.
- (a) Frasca F., **Verticchio E.**, Merello, P., Zarzo, M., Grinde, A., Fazio, E., García-Diego, F.-J. and Siani A.M. (2022) "A Statistical Approach for A-Posteriori Deployment of Microclimate Sensors in Museums: A Case Study". *Sensors*, 22(12), 4547. <https://doi.org/10.1186/s40494-022-00714-5>.
- (cp) Frasca F., **Verticchio E.**, Libralato, M., D'Agaro, P., Cortella, G., Siani, A.M. and Cornaro, C. (2022) "A comparison among three whole-building dynamic simulation software and their applicability to the indoor climate modelling of historical buildings." In *5th IBPSA-Italy Conference (Bolzano, 29 giugno 2022 - 01 luglio 2022)*. <https://doi.org/10.13124/9788860461919>.
- (a) Stagno, V., Ricci, S., Longo, S., **Verticchio E.**, Frasca, F., Siani, A.M. and Capuani, S. (2022) "Discrimination between Softwood and Hardwood based on Hemicellulose Content obtained with Portable Nuclear Magnetic Resonance." *Cellulose* <https://doi.org/10.1007/s10570-022-04728-x>.
- (a) **Verticchio E.**, Frasca F., Bertolin C., and Siani A.M. (2021) "Climate-induced risk for the preservation of paper collections: Comparative study among three historic libraries in Italy." *Building and Environment*, 206, 108394. <https://doi.org/10.1016/j.buildenv.2021.108394>.
- (a) Frasca F., **Verticchio E.**, Cornaro C. and Siani A.M. (2021). "Performance assessment of hygrothermal modelling for diagnostics and conservation in an Italian historical church." *Building and Environment*, 193, 107672. <https://doi.org/10.1016/j.buildenv.2021.107672>.
- (cp) D'Erme, C., **Verticchio E.**, Frasca, F., Caseri, W., Cornaro, C., Siani, A.M., & Santarelli M.L. (2021). "Preliminary study of the mechanical and hygrothermal performance of concrete reinforced with nanofibrillated cellulose." *AIP Conference Proceedings* <https://doi.org/10.1063/5.0068522>.
- (a) Frasca F., **Verticchio E.**, Caratelli A., Bertolin C., Camuffo D., and Siani A.M. (2020). "A Comprehensive Study of the Microclimate-Induced Conservation Risks in Hypogeal Sites: The Mithraeum of the Baths of Caracalla (Rome)." *Sensors*, 20(11), 3310. <https://doi.org/10.3390/s20113310>.

- (cp) **Verticchio E.**, Frasca F., Cornaro C., and Siani A.M. (2020) "Investigation on the use of hygrothermal modelling for paper collections." *IOP Conference Series: Materials Science and Engineering*, 949, 012015. <https://doi.org/10.1088/1757-899X/949/1/012015>.
- (a) **Verticchio E.**, Frasca F., García-Diego F.J., and Siani A.M. (2019). "Investigation on the Use of Passive Microclimate Frames in View of the Climate Change Scenario." *Climate*, 7(8), 98. <https://doi.org/10.3390/cli7080098>.
- (cp) Frasca F., **Verticchio E.**, Cornaro C. and Siani A.M. (2019) "Optimising conservation of artworks, energy performance and thermal comfort combining hygrothermal dynamic simulation and on-site measurements in historic buildings." *Building Simulation Conference Proceedings*, 6, 4165-4172. <https://doi.org/10.26868/25222708.2019.210423>.
- (a) García-Diego, F. J., **Verticchio E.**, Beltrán, P., & Siani, A. M. (2016). "Assessment of the minimum sampling frequency to avoid measurement redundancy in microclimate field surveys in museum buildings." *Sensors*, 16(8), 1291. <https://doi.org/10.3390/s16081291>.

EDUCATION

15/03/2022

**Ph.D Doctor Europaeus in Earth Sciences
(curriculum Environment and Cultural Heritage), XXXIV cycle**

graduated at Sapienza University of Rome

Final Grade: Excellent

Supervisor: Prof. Anna Maria Siani

(Department of Physics, Sapienza Università di Roma)

Co-supervisors: Prof. Chiara Bertolin (Department of Mechanical and Industrial Engineering, Norwegian University of Science and Technology), Prof. Cristina Cornaro (Department of Enterprise Engineering, Università degli Studi di Roma "Tor Vergata")

Title: "An integrated approach for the climate-induced risk assessment within historic libraries combining microclimate data and modelling"

August 2021 –
November 2021

Visiting Ph.D. at Jerzy Haber Institute of catalysis and surface chemistry,
Polish Academy of Sciences (Poland)

Scientific supervisor: Prof. Łukasz Bratasz

25/01/2017

Master Degree in Science and Technologies applied for the Conservation of cultural heritage (LM-11)

graduated at Sapienza University of Rome

Supervisor: Prof. Anna Maria Siani

(Department of Physics, Sapienza Università di Roma)

Co-supervisor: Prof. Fernando-Juan Garcia-Diego

(Department of Applied Physics, Universitat Politècnica de València).

Final Grade: 110/110 cum laude

Title: "Studio di cornici microclimatiche e ottimizzazione della frequenza di campionamento delle osservazioni termo-igrometriche. Caso di studio: due ritratti di J. Sorolla nel Museo Pio V di València"

February 2016 –
May 2016

Visiting Master student at Department of Applied Physics, Universitat
Politècnica de València (Spain)

Scientific supervisor: Prof. Fernando-Juan Garcia-Diego