

I am an architect specialised in monumental conservation, and my work focuses on knowledge, conservation, restoration, and the sustainable management of historic built heritage, through an integrated approach that combines historical-critical expertise, conservation practices, and advanced digital technologies. My research primarily addresses the integration of heritage conservation, digital innovation, and sustainability.

My main areas of interest include architectural restoration and preventive conservation, Heritage Building Information Modeling (HBIM), Digital Twins applied to cultural heritage, HBIM–GIS integration, the development of semantic models for knowledge representation, multiscale digital surveying, and the energy-environmental and climatic analysis of historic buildings and contexts. In these areas, I develop and apply Scan-to-BIM and GIS-to-BIM workflows, parametric models, numerical simulations, and decision-support tools to support diagnostic phases, conservation design, and restoration interventions.

I also work on the energy and environmental improvement of built heritage, with particular attention to climate change mitigation and adaptation strategies, diagnostic investigations, and the analysis of building and microclimatic performance integrated within HBIM environments. Alongside my research activities, I have gained significant hands-on experience in monumental restoration in both national and international contexts, contributing to the definition of intervention strategies and to the documentation of historic built heritage through the integration of traditional approaches and advanced digital tools.

I have coordinated international research and cooperation missions in Morocco, China, Vietnam, and Albania, and have participated in activities in Uzbekistan, Mali, Mauritania, Montenegro, and Yemen, working on fortified sites, historic settlements, traditional architectures, and cultural landscapes. These experiences have strengthened a strongly interdisciplinary approach and a continuous dialogue between research, institutions, and stakeholders.

### Scientific and Academic Roles

- Member of the Joint Interdepartmental Working Group of the National Research Council of Italy (CNR) on “Climate, Environment and Cultural Heritage”
- Coordinator and co-head of the ARCHETIPO ARCHitectural HERitage Thesaurus through Integrated digital Procedures and Open data Working Group
- Member of the JOINT RESEARCH COMMITTEE – JRC of Dariah ERIC DARIAH.EU Research Infrastructure (from 2018)
- ISPC Responsible for the Memorandum of Understanding, Agreement on Strategic Cooperation Regarding the “Cultural Heritage Conservation and Enhancement of Urban and Rural Settlements and World Heritage Sites in Fujian Province, China”, between the School of Architecture and Civil Engineering of Xiamen University, the UNESCO, Shanghai Centre WHITRAP
- CNR Representative on the Steering Committee of the Framework Agreement with DG-ERIC, ICR and Roma Tre University (from 2022)
- Head of the Built Heritage Lab (BHiLab)
- Coordinator of the Virtual Competence Center VCC3 “Scholarly Content Management” of the DARIAH.EU Research Infrastructure.
- Responsible for the DARIAH-IT Research Infrastructure - Naples Node (OR3).
- Coordinator of Network 10 of the Research Laboratories of the DTC Lazio Research Infrastructure.
- Head of the ITABC Research Unit in Naples (URT) at the High Technology District for Sustainable Construction in Campania, “*STRESS scarl – Sviluppo Tecnologie e Ricerca per l’Edilizia Sismicamente Sicura ed Ecosostenibile*”.
- Project Lead of the research programme “*Development of multidisciplinary methodologies and design strategies for the analysis, conservation, and reuse of built heritage*”, at ITABC, National Research Council (CNR), Rome.
- Lecturer in first and second level university courses and masters:
  - Master “BIM Building Information Modeling” Department PDTA Sapienza Rome.

- Master "ACT Valorization and management of historical centers. Integrated actions for sustainable requalification and energy efficiency" Department PDTA Sapienza Rome and member of the Scientific Council.
- Master "Heritage Building Information Modeling (HBIM)" Department DSDRA Sapienza Rome.

### Invited Lectures

Invited as Speaker/Chairman in more than 30 National/International Congresses in the past ten years  
Participated as an invited lecturer and Keynote speaker at numerous national and international conferences and congresses.

### Coordination of International Projects

- ISPC Scientific responsible and WP3 leader of **Interreg Next Med** Project: SHAREN Energy-SHARing solutions and communities for enhanced ENergy efficiency in Mediterranean historic centres
- Coordinator of the European project "BEEP BIM for energy efficiency in the public sector" funded by the ENI CBC MED program with 7 Mediterranean countries (budget € 1,934,184.51).
- Director of the international Research Project "Cultural Heritage Conservation and Enhancement of Urban and Rural Settlements and World Heritage Sites in Fujian Province, China", funded by the University of Xiamen
- Director of the archaeological mission funded by MAECI in Vietnam: Studio, conservazione e valorizzazione delle cittadelle imperiali in Vietnam " (2023-2025).
- Director of the archaeological mission funded by MAECI in Marocco: "Studio, conservazione e valorizzazione delle Kasbah in Marocco " (2023-2025).
- Director of the archaeological mission funded by MAECI in Albania: "Multidisciplinary technologies for the study and conservation of post-Byzantine monasteries in Southern Albania" (2019-2021).
- Coordinator of the bilateral project with ICM (Ministry of Culture of Albania): "Multidisciplinary technologies for the conservation and enhancement of Mediterranean sites and cultural landscapes: Drinos River Valley (Al) and Amalfi Mills Valley (It)" (2028-2021).
- Scientific coordinator for the CNR of the international research project "Energy requalification of existing residential building heritage in Jiangsu Province." Xi'an Jiaotong-Liverpool University, University of Liverpool (2016-2017).
- Coordinator of the Bilateral Project Manager Italy-China "CUANDIXIA TRADITIONAL VILLAGE. A shared approach to the conservation and sustainable historical urban regeneration" with Peking University of PRC (2015-2016).
- Director of the STM project: Conservation and Eco Regeneration of Historic Villages in China. Foreign host institution: UNESCO Whitrap World Heritage Institute of Training and Research-Asia and Pacific of Shanghai China 2017.
- Responsible for the bilateral Italy-China project "Conservation and Sustainable Urban Historical Regeneration of FUJIAN TOLOU UNESCO SITE" with Peking University of PRC.
- Coordinator of the Operational Unit Project PUMAH PLANNING URBAN MANAGEMENT AND HERITAGE PEOPLE MARIE CURIE ACTIONS International Research Staff Exchange Scheme Call: FP7-PEOPLE.
- Italian coordination of the European project SECHURBA Sustainable Energy Communities in Historic URBan Areas European Program INTELLIGENT ENERGY EUROPE Total funding amount € 981,441 (2009-13).
- Coordinator of the Operational Unit for Conservation Restoration. Project: Study, investigation, evaluation, design, supervision, and monitoring of the Church of San Nicola Nicosia Cyprus. United Nations Office for Project Services UNOPS.

### National Projects

- ISPC CNR Unit coordinator of PRIN 2022 SCAENAE Teatro Barocco Italiano. Paradigmi della Scena e della Memoria Culturale

- ISPC CNR Unit coordinator of the project "Digital Twin City, finanziato nell'avviso "riposizionamento competitivo RSI" a valere sul programma Fesr 2021-2027
- Coordinator of the project "Integrated HBIM Information System for the conservation and management of cultural sites in Lazio (HBIM4LazioHERITAGE)" - POR FESR LAZIO 2014/2020 – Regione Lazio Public Notice "Research Groups 2020".
- Coordinator of the Research Unit OR2 - "Sustainable HBIM for the conservation, management, and enhancement of sites" of the PON Project "IDEHA Innovation for Data Elaboration in Heritage Areas - Innovations for data processing in the Cultural Heritage sector" PNR 2015-2020. Lead organization: CNR (€ 9,146,451.80) 2018-2022.
- Coordinator of the HBIM4MANN Project for the creation of an HBIM (Heritage Building Information Modeling) platform for the conservation and management of the National Archaeological Museum of Naples (2018-2022).
- Coordinator of the Research Unit UO3 - ISPC Naples University Campus San Giovanni a Teduccio. Project "E-rihs-IT Developing National and Regional Infrastructural nodes of DARIAH in Italy" for the strengthening of research infrastructures (2018-22).
- Scientific coordinator and representative for the CNR "PROSIT - PROGETTING IN SUSTAINABILITY qualification and digitization in construction" (2017-2021).
- Scientific coordinator and coordinator for the ISPC of the project design activities of Lazio DTC Area of Specialization "Center of Excellence" ("AdS Culture") of the Smart Specialization Strategy of the Lazio Region. (2018-22).
- Scientific Coordinator and No. 10 Laboratory Coordinator (with Prof. Carlo Bianchini) of the Lazio DTC Technological District for new technologies applied to cultural heritage and activities (2017-2022).
- Responsible for the ISPC project "SISMI Technologies for improving safety and reconstruction of historic centers in the seismic area." Research project funded by the Lazio DTC (2016-2018).
- Coordinator of the Research Unit OR4 PON Research and Competitiveness 2007-2013 METRICS Methods and technologies for the management and requalification of historic centers and buildings funded by the PON Research and Competitiveness 2007-2013 program (2015-2018).
- Scientific Coordinator of the "MIME Museum of Memory and Evolution of the Irpinia Territory." P.O.R. F.E.S.R. CAMPANIA 2007-2013 (2016-18).
- Coordination and scientific responsibility for the CNR of the SMART CASE PON Research and Competitiveness 2007-2013 (2017).
- Scientific responsible for the CNR project PROVACI 2007-2013 "PON01\_02324\_CULTURAL HERITAGE\_Convergence Regions (2015-2016).

### Participation in International and National Projects

- ECHOES Project (Horizon Europe) – WP11 Participant: Sustainability, Value Chain and Impact of Digital Services for Cultural Heritage
- GreenHER Project – International Project on Green Transition and Cultural Heritage (Slovenian Coordination)
- Participates in the ISPC Rome operational unit of the H2020 project: SSHOC Social Sciences and Humanities Open Cloud (€ 14455 594).
- Participant in the Operational Unit of the SHINE project - Strengthening the Italian Nodes in the co-financed E-RIHS PON for Research and Innovation 2014-2020 project.
- Participant in the Operational Unit PRIN 2017 - TECH-START.
- Participation in the project "CHEAC Cultural Heritage After Covid. Interoperable Pompeii. A digital platform between restoration, environmental design, and new enjoyment opportunities" coordinated by Federico II with the Polytechnic of Milan. Experimental case study: an insula of the Pompeii Archaeological Park (House of Ariadne).
- Participation in the "SIGMA - LC" – DTC – Intervention TE1 – Center of Excellence composed of Registry of Skills and Regional Innovation Hub on Technologies and Materials aimed at the development of high-quality artistic craftsmanship coordinated by Sapienza Department DSDRA.

## Awards

- **Best Paper Award – 3DModelling&BIM 2023**  
*HBIM for information management of diagnostics in conservation projects: the case of the St. John Monastery in Müstair.*
- **ENI CBC Med – BEEP Project (2022)**  
Selected among the 11 “**Promising Projects**” in the ENI CBC Med Qualitative Monitoring Plan (Puglia Region, National Contact Point).
- **HBIM4MANN Project (2022)**  
Selected as a “**Success Story**” for cultural heritage digitisation within the EU study VIGIE2020/654 (UNESCO Chair on Digital Cultural Heritage).
- **Best Paper Award – 3DModelling&BIM 2021**  
*Implementation of HBIM tools for historic built heritage knowledge: digitisation of the Masonry Quality Index.*
- **PRO-SIT Project Award (2019)**  
Award for outstanding value at **FORUM PA Sud**, Festival of Cohesion for Sustainability (POR FESR Campania 2014–2020).
- **Best Practice Award 2012 – Enterprise Europe Network (EEN)**  
*Efficient Strategies for Reaching International Agreements (EACI).*
- **Best Practice Award 2012 – Intelligent Energy Europe (Category I)**  
*SECHURBA Award for the best historical climate change strategy.*
- **European Union Prize for Cultural Heritage – Europa Nostra Award 2009**  
Research Category, for the international project *Bedestan (Church of San Nicola), Nicosia, Cyprus.*

## Committees and Other Technical-Scientific Bodies

- Programme Committee Member, DARIAH Annual Event 2023 –Budapest, Hungaria
- Programme Committee Member, DARIAH Annual Event 2024 – Lisbon, Portugal
- Programme Committee Member, DARIAH Annual Event 2025 – Gottingen, Germany
- Programme Committee Member, Rehabend from 2020 to 2026
- Member of the Scientific Committee of the conference/workshop series "3D Modeling & BIM" Sapienza University of Rome (2017-2025).
- Working group for the implementation of the activities provided for by the E-RIHS.it Lazio European Research Infrastructure project for heritage science.
- Member of IBIMI - Italian Chapter of Building Smart, a global community of chapters, members, partners, and sponsors led by a leading entity: buildingSMART International.
- Referee for *Restauro Archeologico* Firenze University Press [www.fupress.net](http://www.fupress.net).
- Referee for the *Journal of Architecture and Urbanism*.
- Referee for the *Journal of Cultural Heritage*.
- Member of the sector group Tourism and cultural heritage of the European Enterprise Europe and the sector group: "Sustainable Construction" Enterprise Europe Network.
- Member and President of calls for Research Grants and Researcher - Evaluation Commission of the CNR.
- Member of the Scientific Committee of the I Jornadas Internacionales El Agua: Patrimonio y Desarrollo. Una aproximación a la puesta en valor de los sistemas hidráulicos en la cuenca mediterránea.
- Scientific coordination of the International Conference "Intelligent Use of Technologies for the Protection and Enhancement of Cultural Heritage" Expo 2015 Auditorium Pacis Rome.
- Scientific coordination of the International Greenability Conference 2011 - Green Sustainability for the rebirth of historical cities and the conservation of architectural heritage. "SECHURBA Project.
- Scientific coordination of the conference "Sustainability for built heritage from diagnostics to restoration interventions" June 29, 2011.
- Scientific coordination of the conference "Integrated conservation and documentation of fortified cities through advanced digital processing systems" Culture 2000 Program.
- Member of the "Italian Society of Architecture Technology" (SITdA).

## Scientific Coordination and Chair Roles

- **Scientific Coordinator and Chair**  
*International Workshop “Digital Integrated Strategies to Safeguard Heritage Construction Technologies”* (2024), organized with the Cyprus Institute and the University of Catania, within the **DARIAH Funding Scheme for Working Group Activities** (WG ARCHETIPO, DARIAH-EU).
- **Session Chair and Co-Organizer**  
*XI Congress of the Italian Association of Urban History (AISU) – “Beyond the Gaze: Interpreting and Understanding the City”* (University of Ferrara).  
**Session:** *Measuring environmental quality for the recovery and enhancement of the historic city.*
- **Special Session Chair and Organizer**  
*IMEKO MetroArchaeo International Conference 2023* (Rome).  
**Special Session:** *Semantic enrichment of 3D models for knowledge representation of archaeology and built heritage.*
- **Scientific Coordinator**  
*ENI CBC Med BEEP Project – Steering Committee Meetings* (Kick-off and subsequent editions, 2021–2023), held online and at international venues.
- **Scientific Coordinator**  
*ENI CBC Med BEEP – Final Event*, within the **MED Green Forum** (University of Florence).

## Supervision of Graduated PhD Students, Postdoctoral Research Fellows

- 2020 present:
  - (Co)advisor of 4 PhD students in Sciences for Cultural Heritage at:
    - University of Ferrara
    - University of Bari
    - University of Minho
    - Dapienza University of Rome
- 2010 – present:
  - Supervision of 10 postdoctoral research fellows at CNR- ITABC and ISPC Rome

## Selection of recent Scientific Publications

Elena Gigliarelli is the author or co-author of over 200 scientific publications, projects, articles, proceedings, and books of national and international relevance. Below is a selection (the most recent and monographs):

- **Cursi, S., Martinelli, L., Calcerano, F., Calvano, M., & Gigliarelli, E.** (2025). *Digital Twin and HBIM-to-IoT for Smart Museum Management – The Case of the DART Museum Chiostrò del Bramante*. in: **SCIRES-IT**, 15(2), 71–84. <http://www.sciresit.it/article/view/13987>
- **Cursi, S., Martinelli, L., Gigliarelli, E., Calcerano, F., Leonardi, M. L., Azenha, M., Oliveira, D. V., & Calvano, M.** (2025). Leveraging linked data for enhanced knowledge representation in historical centers safety assessment: Insights from Castelnuovo di Porto, Rome. in: **Archeologia e Calcolatori**, Supplemento 13, 217–231. <https://doi.org/10.19282/ACS.13.2025.16>
- **Alexandrou, K., Martinelli, L., Thravalou, S., Gigliarelli, E., Artopoulos, G., & Calcerano, F.** (2025). *Heritage BIM and performance simulation interoperability: Methodological insights from representative case studies in Cyprus and Italy*. in: **Architectural Engineering and Design Management**, 0(0), 1–23. <https://doi.org/10.1080/17452007.2025.2451404>
- **Verticchio, E., Martinelli, L., Gigliarelli, E., Potts, A., Lucchi, E., & Calcerano, F.** (2025). *Built Heritage Adaptation and Mitigation: The Need for a Joint Effort through Heritage Science*. in:

**Climate Mitigation and Adaptation Strategies for Cultural and Natural Heritage.**

Elsevier. <https://doi.org/10.1016/B978-0-443-34061-1.00010-X>

- **Cursi, S., Leonardi, M. L., Martinelli, L., Calvano, M., Azenha, M., Oliveira, D. V., Gigliarelli, E., & Calcerano, F.** (2024). *Leveraging linked data for enhanced knowledge representation in historical centers safety assessment: Insights from Castelnuovo di Porto, Rome.* in: **Archeologia e Calcolatori**, ISSN 1120-6861, e-ISSN 2385-1953.
- **Verticchio, E., Martinelli, L., Gigliarelli, E., & Calcerano, F.** (2024). *Current practices and open issues on the whole-building dynamic simulation of historical buildings: A review of the literature case studies.* in: **Building and Environment**, 258, 111621. <https://doi.org/10.1016/j.buildenv.2024.111621>
- **Leonardi, M. L., Cursi, S., Gigliarelli, E., Oliveira, D. V., & Azenha, M.** (2024). *Leveraging semantic web rule languages to define modeling assumptions for the structural analysis of unreinforced masonry buildings.* in: **ITcon – International Journal of Construction Information Technology**, 29, 1058–1082. <https://doi.org/10.36680/j.itcon.2024.047>
- **Martinelli, L., Calcerano, F., Adinolfi, F., Chianetta, D., & Gigliarelli, E.** (2023). *Open HBIM-IoT Monitoring Platform for the Management of Historical Sites and Museums. An Application to the Bourbon Royal Site of Carditello.* in: **International Journal of Architectural Heritage**, 19(2). <https://doi.org/10.1080/15583058.2023.2272130>
- **Calcerano, F., Thravalou, S., Martinelli, L., Alexandrou, K., Artopoulos, G., & Gigliarelli, E.** (2023). *Energy and Environmental Improvement of Built Heritage: HBIM Simulation-Based Approach Applied to Nine Mediterranean Case-Studies.* in: **Building Research & Information**. <https://doi.org/10.1080/09613218.2023.2204417>
- **Cornaro, C., Bovesecchi, G., Calcerano, F., Martinelli, L., & Gigliarelli, E.** (2023). *An HBIM Integrated Approach Using Non-Destructive Techniques (NDT) to Support Energy and Environmental Improvement of Built Heritage: The Case Study of Palazzo Maffei Borghese in Rome.* in: **Sustainability**, 15(14), 11389. <https://doi.org/10.3390/su151411389>
- **Cursi, S., Martinelli, L., Paraciani, N., Calcerano, F., & Gigliarelli, E.** (2022). *Linking external knowledge to heritage BIM.* in: **Automation in Construction**, 141, 104444. <https://doi.org/10.1016/j.autcon.2022.104444>
- **Martinelli, L., Calcerano, F., & Gigliarelli, E.** (2022). *Methodology for an HBIM workflow focused on the representation of construction systems of built heritage.* in: **Journal of Cultural Heritage**, 55, 277–289. <https://doi.org/10.1016/j.culher.2022.03.016>
- **Di Biccari, C., Calcerano, F., D’Uffizi, F., Esposito, A., Campari, M., & Gigliarelli, E.** (2022). *Building information modeling and building performance simulation interoperability: State-of-the-art and trends in current literature.* in: **Advanced Engineering Informatics**, 54, 101753. <https://doi.org/10.1016/j.aei.2022.101753>
- **Calvano, M., Martinelli, L., Calcerano, F., & Gigliarelli, E.** (2022). *Parametric Processes for the Implementation of HBIM—Visual Programming Language for the Digitisation of the Index of Masonry Quality.* in: **ISPRS International Journal of Geo-Information**, 11(2), 93. <https://doi.org/10.3390/ijgi11020093>
- **Gigliarelli, E., Calcerano, F., & Martinelli, L.** (2022). *Methodology for the Energy Renovation of Heritage Buildings Using BIM.* Rome: **CNR Edizioni**.
- **Gigliarelli, E., Calcerano, F., D’Uffizi, F., Di Biccari, C., Mangialardi, G., & Campari, M.** (2019). *From Heritage BIM to BPS: A computational design-based interoperability approach.* in: **Proceedings of Building Simulation 2019**, Rome.
- **Gigliarelli, E., Calcerano, F., & Cessari, L.** (2017). *Numerical simulation and decision support systems: An integrated approach for historical buildings retrofit.* in: **Energy Procedia**, 133, 135–144. <https://doi.org/10.1016/j.egypro.2017.09.379>