SMUH Conference

Final Conference of the project "Safeguard of Modern Urban Heritage: a cross-disciplinary webGIS for Knowledge, Monitoring and Risk Analysis", PRIN 2022, 2022M7V3BM

Università degli Studi di Roma Tor Vergata
Dipartimento di Ingegneria Civile e Ingegneria Informatica - Aula Multimediale
16.12.2025

Steering Committee: Angelo Bertolazzi, Luisa Berto, Emanuela Bonano, Carlo Del Gaudio, Ilaria Giannetti, Giacomo Iovane
Organizing Committee: Fabio Di Carlo, Ilaria Giannetti, Zila Rinaldi

Programme

13:40 - *Introduction to the SMUH research project*

Part 1 - The Case Study of Borgo Trento in Verona

14:00 - *From Archival Document to Knowledge framework: An Informative Modelling Approach*
Angelo Bertolazzi (Università di Padova), Ilaria Giannetti (Università degli Studi di Roma Tor Vergata)
14:30 - *Exploitation of Multi-Temporal Satellite Differential SAR Interferometry for Investigating Displacement Phenomena in the Built-Up Environment: The Full-Resolution P-SBAS Approach*
Manuela Bonano (CNR-IREA), Pasquale Striano (CNR-IREA), Federica Casamento (CNR-IREA), Michele Manunta (CNR-IREA), Ivana Zinno (CNR-IREA), Riccardo Lanari (CNR-IREA)
15:00 - *From MT-DInSAR Data Elaboration to Structural Vulnerability Scenarios*
Andrea Miano (Università Telematica Pegaso); Carlo Del Gaudio (Università degli Studi di Napoli Federico II), Luisa Berto (IUAV – Università di Venezia), Diego Talledo (IUAV – Università di Venezia)
15:30 - *3DWebGis for Data Integration, Analysis and Representation*
Angelo Bertolazzi (Università di Padova), Ilaria Giannetti (Università degli Studi di Roma Tor Vergata), Francesco Mauro (Università di Padova), Francesca D'Uffizi (Università degli Studi di Roma Tor Vergata)

Part 2 – Further Case Studies and Research Perspective

15:45 – *Historical Analysis and open BIM-3DGIS for satellite data-based structural monitoring: the case study of Regina Margherita School Building in Rome*
Fabio Di Carlo (Università degli Studi di Roma Tor Vergata), Ilaria Giannetti (Università degli Studi di Roma Tor Vergata), Zila Rinaldi (Università degli Studi di Roma Tor Vergata), Alberto Meda (Università degli Studi di Roma Tor Vergata)
16:15 – *Automation in 3DGIS models for satellite data-based structural monitoring: the case study of a building block in Testaccio, Rome*
Fabio Di Carlo (Università degli Studi di Roma Tor Vergata), Kilian Bruckner (Università degli Studi di Roma Tor Vergata), Ilaria Giannetti (Università degli Studi di Roma Tor Vergata), Zila Rinaldi (Università degli Studi di Roma Tor Vergata)
16:45 - *Integrated Nonlinear Vulnerability Assessment of RC Frames under Imposed Settlements and Seismic Actions*
Carlo Del Gaudio (Università degli Studi di Napoli Federico II), Giacomo Iovane (Università degli Studi di Napoli Federico II), Andrea Miano (Università Telematica Pegaso);
17:15- *Construction History-based BIM for knowledge and management of existing bridges: the case study of Ponte della Vittoria in Verona*
Angelo Bertolazzi (Università di Padova), Ilaria Giannetti (Università degli Studi di Roma Tor Vergata), Francesco Sartore (Università di Padova)
17:45 – *Landscape and City Scenarios. The project as a tool for data selection.*
Luigi Siviero (Università di Padova)

18: 15 – *Conclusive Remarks*

Part 1 - The Case Study of Borgo Trento in Verona – *Abstract of the presentations*

From Archival Document to Knowledge framework: An Informative Modelling Approach

Angelo Bertolazzi (Università di Padova), Ilaria Giannetti (Università degli Studi di Roma Tor Vergata)

Effective management of built heritage requires a thorough understanding of historical, material, and construction aspects. However, researching data on nineteenth- and twentieth-century built heritage poses significant challenges due to the abundance and redundancy of primary and secondary sources. The availability, sometimes inconsistent or completely absent, of numerous technical documents, drawings, images, and technical documentation from the building companies and the construction site, requires careful data mining to identify the information and metadata that can contribute to the creation of digital data, the essential basis for the building's digitization. Within SMUH project the Borgo Trento case study in Verona allowed to develop a data research methodology for analyzing the built environment within the Adige River loop at various levels. The first, concerning the buildings along the Adige River, involved an in-depth investigation through the intersection of various archival sources to securely define the data relating to the building's precise dating, materials, and structure. The second involved a thorough analysis of construction types (materials and structure) and a classification by age group. Both contributed to the development of a taxonomy of buildings that was used to populate the webGIS platform for the management and valorization of 20th-century built heritage in Verona.

Exploitation of Multi-Temporal Satellite Differential SAR Interferometry for Investigating Displacement Phenomena in the Built-Up Environment: The Full-Resolution P-SBAS Approach

Manuela Bonano (CNR-IREA), Pasquale Striano (CNR-IREA), Federica Casamento (CNR-IREA), Michele Manunta (CNR-IREA), Ivana Zinno (CNR-IREA), Riccardo Lanari (CNR-IREA)

Ground and structural displacement monitoring in urban areas is a key priority for infrastructure security and climate resilience. Multi-temporal DInSAR techniques, using satellite SAR data, accurately detect and analyze surface displacements over wide areas with limited operating costs. This research applies the advanced Full Resolution Parallel Small BAseline Subset (FR P-SBAS) approach. FR P-SBAS utilizes HPC architectures (CPU/GPU) to efficiently perform rapid, long-term, multi-temporal DInSAR analysis across different scales. By exploiting SAR data with native high spatial resolution, the method generates deformation time series at the maximum image resolution. This allows for the accurate, fast mapping of highly localized displacements affecting critical infrastructures and individual buildings, significantly aiding in vulnerability assessment and risk mitigation strategies. By focusing on the two case studies relevant to the extended urban areas of Roma and Verona, this Chapter aims to investigate how the multi-temporal DInSAR measurements can support early-warning strategies for infrastructure management and urban planning, as well as risk assessment frameworks and decision-making processes for the resilience and safety in the built environment. Accordingly, we present the results achieved by applying the FR P-SBAS approach to the whole X-band SAR data archives, collected since 2011 in Stripmap mode (~3x3 m spatial resolution) from the first- and second-generation COSMO-SkyMed (CSK/CSG) satellite constellations of the Italian Space Agency (ASI), over the selected metropolitan areas. These data are particularly suitable for investigating the spatial/temporal variations of localized displacements associated with anthropogenic hazards, as well as for assessing the health conditions of critical infrastructures.

From MT-DInSAR data elaboration to structural vulnerability scenarios

Andrea Miano (Università Pegaso); Carlo Del Gaudio (Università degli Studi di Napoli Federico II), Luisa Berto (IUAV – Università di Venezia), Diego Talledo (IUAV – Università di Venezia)

The seismic evaluation of reinforced concrete (RC) buildings is often conducted without taking into account possible pre-existing damage caused by other factors, such as ground settlements. In recent years, significant attention has been devoted by researchers to properly addressing multi-hazard interactions and their combined influence on structural behavior, rather than following a simplified single-hazard approach, in order to improve the accuracy of numerical models used for seismic vulnerability assessment. These combined effects are becoming increasingly relevant, as many existing structures have reached or surpassed their original design service life. In this study, a representative three-dimensional RC building, including infill panels, is designed and modeled for gravity loads. The numerical modeling of structural elements was first defined, including the characterization of the nonlinear behavior to be considered in the calculations. The infill walls were modeled using a simplified equivalent diagonal strut approach, ensuring an effective representation of their contribution to the overall structural response. Subsequently, analyses under gravity loads were performed using a force-controlled procedure to verify the global stability of the structure. The effects of imposed settlements were then simulated through force-controlled analyses, enabling the assessment of damage induced by differential ground movements. Then, lateral load analyses were conducted using a displacement-controlled approach, in order to evaluate the seismic performance and derive the global capacity of the structure. Based on the single degree of freedom associated system, non linear dynamic analyses were performed. Data from MT-InSAR analysis have been collected and analyzed in order to correlate a measure of the settlement retrieved by satellite monitoring system and the seismic performance of

*the buildings. Several indicator*s have been considered and tested as potential proxy measures for the settlement distribution profile.

3DWebGis for Data Integration, Analysis and Representation
Angelo Bertolazzi (Università di Padova), Ilaria Giannetti (Università degli Studi di Roma Tor Vergata), Francesco Mauro (Università di Padova), Francesca D'Uffizi (Università degli Studi di Roma Tor Vergata)
Digital archives have long supported the preservation and consultation of urban heritage, yet traditional static repositories often lack interoperability, dynamic querying, and accessible interfaces. These limitations impede their usefulness for decision-making in contemporary cities, where heterogeneous building stocks and overlapping vulnerabilities require integrated and adaptable analytical tools. The SMUH Project answer to this need by designing an open-source, GIS-based infrastructure that enables the collection, organization, and interactive visualization of complex datasets on urban built heritage. Focusing on the Borgo Trento district in Verona, the project integrates typological, constructive, chronological, and vulnerability data derived from extensive fieldwork and archival review. This contribution presents an integrated webGIS platform designed to support the decision-making process for managing and enhancing buildings and infrastructures in these specific urban contexts. The webGIS platform facilitates a multidisciplinary methodology based on the spatial analysis of georeferenced data. This data is derived from historical surveys, satellite radar surveys (SAR), and structural vulnerability assessments. The results include user-friendly interactive thematic maps and a GIS-based viewer for 3D informative models. A backend infrastructure built on PostgreSQL and PostGIS ensures scalable and interoperable database management, while GeoServer enables the publication of geospatial layers using standard protocols. The frontend, developed through MapStore, provides an intuitive WebGIS environment in which thematic maps, database tables, charts, and multimedia elements can be explored dynamically. At the same time, through the web app used for 3D analysis of SAR data, the platform's 3D extension allows users to view BIM models of individual building units in IFC format. Users can query these information parameters through a pre-set filter that corresponds to a standard, easy-to-read set.

Part 2 – Further Case Studies and Research Perspectives – *Abstract of the presentations*

Historical Analysis and open BIM-3DGIS for satellite data-based structural monitoring: the case study of Regina Margherita School Building in Rome
Fabio Di Carlo (Università degli Studi di Roma Tor Vergata), Ilaria Giannetti (Università degli Studi di Roma Tor Vergata), Zila Rinaldi (Università degli Studi di Roma Tor Vergata), Alberto Meda (Università degli Studi di Roma Tor Vergata)
This contribution presents a working methodology aimed at integrating historical-critical analysis, conducted based on archival sources, with documentation-based BIM/GIS modeling, to support the structural monitoring process using satellite interferometric data, obtained by means of SBAS-DInSAR analysis procedures. The methodology was developed using the monumental Regina Margherita school building in Rome as a case study and relies on the use of entirely open-source data modeling and representation applications. The contribution includes the construction of a BIM/GIS model that integrates and structures cognitive data related to the building's history and anatomy, along with the analysis of satellite interferometric data at both large and building scales. A specific section of the work was dedicated to using the BIM/GIS model for checking the satellite data at the building scale, verifying the positioning of the measurement points based on an accurate three-dimensional reconstruction, and for the integrated representation of data related to the building's history and current condition, including the main detectable structural damage, and the results of displacement analyses derived from the satellite data.

Automation in 3DGIS models for satellite data-based structural monitoring: the case study of a building block in Testaccio, Rome
Fabio Di Carlo (Università degli Studi di Roma Tor Vergata), Kilian Bruckner (Università degli Studi di Roma Tor Vergata), Ilaria Giannetti (Università degli Studi di Roma Tor Vergata), Zila Rinaldi (Università degli Studi di Roma Tor Vergata)
This contribution presents a working methodology aimed at integrating reality-based 3D GIS modeling to support the structural monitoring process using satellite interferometric data, obtained by means of SBAS-DInSAR analysis procedures. The methodology was developed based on the case study of an urban block in the Testaccio district in Rome and relies on the use of image recognition and semantic segmentation techniques, based on state-of-the-art Deep Learning algorithms, for the construction of three-dimensional and semantic models at the urban scale, in accordance with the CityGML interoperability standard. The contribution includes the analysis of satellite interferometric data at both large and block scales. A specific section of the work was dedicated to using the BIM/GIS model for checking the satellite data

at the block scale, verifying the positioning of the measurement points based on an accurate three-dimensional reconstruction, and for the integrated representation of data related to the building's anatomy and the results of displacement analyses derived from the satellite data.

Integrated Nonlinear Vulnerability Assessment of RC Frames under Imposed Settlements and Seismic Actions

Carlo Del Gaudio (Università degli Studi di Napoli Federico II), Giacomo Iovane (Università degli Studi di Napoli Federico II),Andrea Miano (Università Telematica Pegaso)

This case-study deals with the nonlinear modelling, calibration, and preliminary integrated vulnerability assessment of a six-story reinforced concrete (RC) building archetype, developed within the PRIN SMUH project on the basis of the knowledge framework within the. The study addresses the combined effects of pre-damage due to vertical settlements and subsequent horizontal actions, with the objective of quantifying how settlement-induced drift demands and axial-force variation modify the seismic response. A comprehensive material characterization is implemented in OpenSeesPy using different constitutive laws. The structural model adopts a hybrid discretization strategy: nonlinear hinges for beams, distributed nonlinearity for columns, and a trilinear compression-only diagonal strut model for infills. A preliminary shear-crisis classification confirms that few column experienced shear failure and require modification in their flexural response for the considered configurations. Pushover analyses on the bare and infilled configurations reveal distinct collapse mechanisms. The bare structure exhibits a pronounced soft-story formation in the Y-direction due to geometric nonlinearity and high axial loads, whereas the infilled system shows soft-story mechanisms in both directions, with a sharper post-peak degradation driven by infill panel failure. Settlement analyses impose spatially variable vertical displacements generated through a bivariate exponential function, enabling both localized and diffuse settlement patterns. Results demonstrate substantial axial-force variation under localized settlements, including inversion from compression to tension at the most affected columns, while diffuse settlements generate limited variations. The induced distortions produce drift patterns compatible with infill damage thresholds. These findings provide a validated nonlinear model and a first quantification of settlement-seismic interaction effects, forming the basis for the updated seismic vulnerability framework.

Construction History-based BIM for knowledge and management of existing bridges: the case study of Ponte della Vittoria in Verona

Angelo Bertolazzi (Università di Padova), Ilaria Giannetti (Università degli Studi di Roma Tor Vergata), Francesco Sartore (Università di Padova)

The preservation, management, and maintenance of infrastructure is one of the most significant challenges in contemporary engineering. Arch bridges present a great diversity of structural and construction types, as well as materials (masonry, steel and iron, reinforced concrete), which have been developed and used over the centuries, complicating the actual analyses for safeguarding existing bridges. The studies conducted within the Construction History discipline provide key data for the historical and technical knowledge of the existing structures concerning the 'hidden' construction details, the building process, and the maintenance intervention that occurred during the service life. The contribution presents a methodology developed within Technical Architecture (CEAR 08/A) research group of University of Rome Tor Vergata and University of Padua. The actual approach of Building Information Modelling supports documental analyses based on archival sources and on-site surveys, producing a historical-technical data framework to be exploited in the management and safe-guarding of existing structures. The case study, provided by the 'Ponte della Vittoria' (Verona, 1951-53) a r.c. cellular bridge with a massive stone cladding, deeps the topic with a particular attention to the link among the archive data collection, the BIM model and the bridge management.

Landscape and City Scenarios. The project as a tool for data selection.

Luigi Siviero (Università di Padova)

The relationship between information and city and landscape design in the digital age has become increasingly crucial. Technological evolution has radically transformed the way we collect, analyse, and use data in design. The advent of big data and information collection and processing technologies has provided the various stakeholders involved in the transformation of cities and landscapes with an unprecedented amount of information, often confusing and even more often difficult to interpret. As data increases, so do the overlaps and conflicts between the meanings attributable to surveys and analyses, often with an effect contrary to the possibilities they are supposed to offer. From traffic patterns to citizen preferences, from environmental to socio-economic data, to the increasingly detailed and precise representation of space, this information offers a different, and not always clearer, vision of the human environment. This topic was addressed in the context of four research projects with different and broader objectives and areas of analysis, but united by the attempt to manage information through digital platforms capable of not only archiving but also processing, cross-referencing, and overlaying it.

Bio of the Speakers

Luisa Berto received her Laurea degree in Civil Engineering with specialization in Structures (*summa cum laude* and special mention for the *curriculum studiorum*) from the University of Padua and her Ph.D. in Structural Mechanics from the University of Bologna. She is currently an associate Professor of Structural Analysis and Design at the University IUAV of Venice. She is a member of the Doctoral School Faculty Board at the University IUAV of Venice. She is lead or co-lead of the IUAV research unit in several national research projects. Her research interests mainly focus on the development and implementation of numerical models for the analysis of reinforced concrete and masonry structures including mechanical-environmental damage models for reinforced concrete, the seismic vulnerability assessment of existing structures and cultural heritage and the risk mitigation for art objects.

Angelo Bertolazzi, Engineer, Associate Professor of Architectural Engineering at the Department of Civil, Building, and Environmental Engineering (DICEA) of the University of Padua. His research interests focus on the history of construction and the valorization of built heritage. He trained at the Department of Architecture, Urban Planning and Surveying (DAUR) of the University of Padua, at the Ecole Doctorale Villes Transportes et Territories of the University of Paris-Est, where he obtained his PhD in Architecture and Engineering (2013), and at the Department of Geometries, Structure and Architecture – GSA (EN-SA Paris Malaquais).

Manuela Bonano received the Laurea degree (*summa cum laude*) in Environmental Engineering from the University of Cagliari in 2004 and the Ph.D. degree in Infrastructures and Transportation from the University of Roma La Sapienza in 2012. Since 2007, she has been with the IREA-CNR of Napoli, Italy, where she is currently a Senior Researcher working in SAR interferometry. Her main interests concern the development of multi-pass algorithms for full-resolution DInSAR applications, to investigate localized displacements affecting single buildings and infrastructures in anthropogenic hazard scenarios. She has been contributing, also with responsibility, to different national and international research projects aimed at the effective exploitation of Earth Observation technologies to support environmental management and risk mitigation scenarios. Recently, she has been involved in developing innovative, parallel, and scalable multi-temporal processing chains to process large full-resolution DInSAR data stacks, by exploiting distributed HPC capabilities, CC environments, and GPU devices.

Kilian Bruckner, Engineer**,** received the Laurea degree (*summa cum laude*) in Building Engineering from the university of Rome Tor Vergata in 2022. He is Ph.D. candidate in Civil Engineering from University of Rome Tor Vergata. His research interest focus on advanced digital tools for the management of the build environment, including parametric modelling, 3D semantic city models, image recognition and semantic segmentation techniques.

Federica Casamento received the Master degree in environmental engineering from the University of Palermo, Sicily, Italy, in 2021. She is currently working toward the Ph.D. degree in the "Information and Communication Technology and Engineering" programme with the University of Naples "Parthenope",Naples, Italy. Since 2021, she is with the Institute for Electromagnetic Sensing of the Environment (IREA)-National Research Council (CNR), Naples, as a Research Fellow. Her research interests include the DInSAR applications, specifically on developing algorithms to filter out atmospheric phase screen from DInSAR products, using external auxiliary data.

Carlo Del Gaudio received his M.Sc. in Civil Engineering in 2011 and his PhD in Seismic Risk in 2015, at the University of Naples Federico II. He is Assistant Professor in Structural Engineering at Department of Structures for Engineering and Architecture of University of Napoli Federico II. He has 49 Scopus-indexed documents with about 1567 citations and a h-index equal to 20. He is lecturer of Reinforced Concrete Structures, co-lecturer of Structural Engineering. He has a strong background in participation to research projects, focused on seismic behavior of elements/structures and seismic vulnerability and risk assessment of buildings at large scale, funded by the Italian Department of Civil Protection, Ministry of University and Research and Regional Administration. He participated to the activities of Extended Partnership RETURN Multi-risk science for resilient communities under a changing climate (120 Mln €) for what concerns the Spoke Metropolitan and Urban Settlement, where is member of Scientific Council. He also participated to the working group ito support the Italian Department of Civil Protection in the derivation of the "National Risk Assessment 2018" (EU decision 1313/2013). He is member of Academic Senate of University of Napoli Federico II since 2025.

Fabio Di Carlo is Associate Professor of Structural Engineering at the Department of Civil Engineering and Computer Science Engineering of the University of Rome Tor Vergata. He is Professor of "Existing RC structures" and "Seismic design". He is member of the fib CEB-FIP TG3.2 "Modeling of structural performance of existing concrete structures". He is member of the CNR working group "Valutazione della sicurezza di opere in c.a. e c.a.p. soggette a corrosione".His research activity mainly focuses on degradation phenomena affecting reinforced concrete and prestressed concrete structures, use of fiber reinforced concrete for structural applications, and structural assessment and health monitoring of the built-up environment with digital image correlation methods and satellite radar interferometry.

Ilaria Giannetti received her Laurea degree in Architecture (*summa cum laude*) from the Sapienza University of Rome and her Ph.D. degree in Civil Engineering from University of Rome Tor Vergata. She is Associate Professor of Architectural Engineering at the Department of Civil and Computer Science Engineering (DICII) of the University of Rome Tor Vergata. Her research interests focus on the history of construction, history of engineering and the safeguard and valorization of the 20th Century building heritage via advanced digital tools, including parametric 3D and informative modelling and extended reality environment. She is editor of the Scientific Journals "Patrimonio Industriale" and "Tema: Technologies, Engineering, Materials, Architecture". She is responsible for national research projects and research agreements with public and private bodies charged of the safeguard and valorization of the 20th building heritage.

Giacomo Iovane received the master's degree (*summa cum laude*) in Building Engineering from the University of Naples Federico II (UNINA) in 2014 and the Ph.D. degree in Structural Engineering, Geotechnical and Seismic Risk from UNINA in 2020. He is Assistant Professor in Structural Engineering at UNINA and teacher of Timber Engineering. Memberships: national scientific committee Timber of ICOMOS (International Council of Monuments and Sites - IIWC); international technical committee IABMAS (International Association for Bridge Maintenance and Safety); international technical-scientific committee ITA (International Tunnelling and Underground Space Association), Working Group 11 "Immersed and Floating Tunnels"; international technical committee ECCS (European Convention for Constructional Steelwork), TC11 "Composite Structures", Working Group 6 "Steel-Timber Composite Structures"; international technical-scientific committee Fib Task Group 1.2 - WP 1.2.4 "Submerged/Floating Bridges in Seismic Areas". Author of more than 62 papers on the following research areas: timber, steel and hybrid structures, seismic engineering, vulnerability of existing buildings against exceptional actions, Submerged Floating Tunnel. His contribution to scientific research is also evident from the participation in national and international projects.

Riccardo Lanari received his Laurea degree in electronic engineering (summa cum laude) from the University of Napoli Federico II in 1989. He joined the CNR that same year, working at IRECE and later at IREA, where he was the Director (2010-2021) and is currently Director of Research. He was Visiting Scientist at DLR (Germany), ISAS (Japan), and JPL (USA). He was Adjunct Professor at the University of Sannio and main Lecturer at the Institute of Geomatics in Barcelona (2000–2008). He holds national habilitation as a Full Professor of telecommunications and of geophysics. He is a GRSS IEEE Distinguished Speaker, and has contributed to numerous scientific committees and advisory groups for major space missions. With over 30 years of experience, he holds two patents, coauthored a book, and published more than 600 papers. His awards include NASA recognitions, the Dorso Prize, the Huygens Medal, the Ulaby Award, and the title of Knight of the Order of Merit of the Italian Republic.

Michele Manunta received the Laurea degree in electronic engineering and the Ph.D. degree in informatics and electronic engineering from the University of Cagliari, Cagliari, Italy, in 2001 and 2009, respectively. Since 2002, he has been with the IREA-CNR of Napoli, Italy, where he is currently a Director of Research. He was a Visiting Scientist with the Institut Cartografic de Catalunya, Spain, in 2004 and with the Rosenstiel School of Marine and Atmospheric Science of the University of Miami, USA, in 2006. His research interests include high-resolution SAR and DInSAR data processing. More specifically, he works on developing SAR/DInSAR algorithms and techniques for studying deformation affecting surface and man-made structures. More recently, he focused on Cloud and GRID computing exploitation for SAR interferometry applications. He has contributed to various national and international initiatives to exploit satellite SAR techniques. He is currently coordinating the satellite component of the pan-European EPOS research infrastructure.

Francesco Mauro is a PhD candidate at the ICEA Department of the University of Padua.. He graduated in Building Engineering and Architecture in 2023 and began his research activity in 2024, integrating technical

expertise with GIS and WebGIS tools. Within the FSE-funded SchoolNET project, he contributed to research and outreach activities and developed a digital tool for managing and evaluating school building assets. He has also collaborated on projects such as SMUH (Safeguard of Modern Urban Heritage) and LINUS (Living the University City), supporting mapping, data collection, and communication. He is currently involved as teaching assistant in the Urban Planning Techniques and Lab course of the master of Building Engineering and Architecture at University of Padua.

Alberto Meda is Full Professor of Construction Techniques at the Department of Civil Engineering and Computer Science Engineering. He is Professor of Bridge Construction Engineering and Supplementary Techniques. He is the Coordinator of the TERC Research Centre (Tunnelling Engineering Research Centre) at the University of Rome "Tor Vergata". He is Deputy Chair of the fib (federation international du beton) Technica Council, Chairman of the fib Commission 1 "structures" and Convener of the fib Task Group 1.4 "Tunnels. He is member of the Editorial Board of the Journal "Tunnelling and Underground Space Technology".

Andrea Miano is currently an Associate Professor at Pegaso Digital University in Naples (Italy). He obtained his Master's degree in Structural and Geotechnical Engineering in 2014 and his PhD in Structural, Geotechnical and Seismic Risk Engineering in 2018 from the University of Naples Federico II. His main research interests can be summarized as follows: structural health monitoring of existing constructions (buildings and infrastructures); combined use of remote sensing techniques and artificial intelligence for large-scale monitoring of urban environments; safety assessment of existing structures; performance-based approaches and derivation of fragility curves for existing constructions. Moreover, he is involved in numerous international collaborations and participates in several research projects coordinated by national or international institutions or private companies. He is the author of numerous publications in international journals focusing on his research topics.

Francesco Sartore: PhD candidate at the ICEA Department of the University of Padua. His doctoral research focuses on the possible uses of game engine software on the analysis, visualization and design assessments of built environment. He graduated in Building Engineering and Architecture (UniPD) in 2024. He participated to the Erasmus+ project at "Ion Mincu" University in Bucharest and he did his master thesis in collaboration with Duke University Department of Art, Art History & Visual Studies, where he developed his project with Unity. After graduation, he started his research activity on the T.E.A.C. Project (iNEST founded) where, through an interdisciplinary approach, he helped to develop a methodology for data interpretation and relate them to the urban representation of pre-Alpine area. He is also currently working on I_BRIDGE and SMUH projects in ICEA Department and Verona Municipality for the digitalization of documentary heritage using BIM tools.

Luigi Siviero, architect, PhD. He is a Researcher at the Department of Civil, Architectural, and Environmental Engineering at the University of Padua, where he taught Architectural and Urban Design (Master's Degree in Architectural Engineering) and teaches Landscape Protection and Design (Master's Degree in Environmental Engineering). A member of the UniPD-ReLOAD – REsearch Lab of Architecturban Design laboratory, he focuses his research on strategies and scenarios for transformation of cities and landscapes, particularly those characterized by the presence of mobility infrastructure, and on the transformation of the urban and rural landscape as a result of the decommissioning and abandonment of buildings and infrastructure, investigating potential related intervention and regeneration actions. He approaches this topic at all project scales, experimenting and validating theoretical experiences during numerous workshops, seminars, and conferences, and participating in national and international research groups.

Pasquale Striano received the B.Sc. and M.Sc. degrees in telecommunications engineering from the University of Naples Federico II, Naples, Italy, in 2011 and 2014, respectively, and the Ph.D. degree in signal processing from the University of Strathclyde, Glasgow, U.K., in 2021. Since 2021, he has been with the IREA-CNR, Naples, Italy, where he is currently a Research Scientist. His main research interests include the development of methodologies for synthetic aperture radar (SAR) signal and data processing, as well as advanced differential SAR interferometry (DInSAR) algorithms for monitoring surface displacements associated with natural and anthropogenic hazard phenomena. He has also been involved in the development of automatic tools and parallel processing chains for efficiently generating advanced DInSAR products by exploiting a huge amount of SAR data acquired by multi-frequency SAR constellations.

Zila Rinaldi is Full Professor of Construction Techniques at the Department of Civil Engineering and Computer Science Engineering of the University of Rome "Tor Vergata". She is Professor of Construction Techniques and of Bridge Construction Engineering. She is Co- Convener of the fib Task Group 1.1.7 ": Performance Evaluation and Service Life Extension of Existing Bridges". She is member of the CNR working group "Valutazione della sicurezza di opere in c.a. e c.a.p. soggette a corrosione". Her research activity mainly focuses on the following topics: modelling and analysis of RC structural elements; evaluation of the behaviour of FRC elements; retrofitting interventions of RC and masonry structures with innovative materials (FRP, FRC); residual life of structures affected by corrosion of the steel reinforcement; RC structures subjected to fire action; behaviour of RC and FRC tunnel segments.

Diego Talledo is associate professor of Structural Analysis and Design at IUAV University of Venice. He graduated in 2009 in Civil Engineering from the University of Padua, and in 2013 he obtained his PhD in "Mitigation of Risk Due to Natural Hazards on Structures and Infrastructures" as part of the joint PhD program between the University of Florence and Technische Universität Braunschweig. He has been a member of the CNR (National Research Council) working group for the preparation and analysis of technical standards related to constructions: Guidelines for Assessing Structural Robustness. He is currently the Co-Convener of the Task Group "TG 2.14 Open-source Code Development by the fib" within the COM2 Analysis & Design Commission of the Fédération Internationale du Béton (fib). His research interests mainly focus on: coupled mechanical-environmental damage models for reinforced concrete structures, seismic analysis of reinforced concrete and masonry structures, vulnerability of historical buildings, behavior of wooden buildings: study of the biaxial behavior of connections and walls, robustness of buildings, and the use of satellite data for structural monitoring. He is a member of the IUAV research unit involved in the satellite interferometry technology for structural monitoring and assessment, and he has contributed to the drafting of the "Guidelines for the Use of Satellite Interferometric Data for the Interpretation of Structural Behavior of Constructions".

Ivana Zinno received the Laurea degree (summa cum laude) in telecommunication engineering and the Ph.D. degree in electronic and telecommunication engineering from the University of Naples Federico II, Naples, in 2008 and 2011, respectively. In 2011, she received a grant from the University of Naples for research in the Department of Electronic and Telecommunication Engineering. Since 2012, she has been with the IREA-CNR of Napoli, where she is currently a Senior Researcher. In 2017, she was a Visiting Scientist with the Jet Propulsion Laboratory, USA. Her work is mainly focused on the development of advanced DInSAR techniques for the generation of time series of surface displacement aimed at monitoring Earth surface deformation due to both natural and anthropic phenomena. Over the last years, her activity has also concerned the exploitation of distributed computing architectures (GRID and Cloud Computing platforms) for the parallel, automatic, large-scale processing of Big SAR data.