

Serena Cattari

Full Professor

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Affiliation: DICCA – Department of Civil, Chemical and Environmental Engineering –
Università degli Studi di Genova

EDUCATION AND TRAINING

- 2007 PhD in Structural and Geotechnical Civil Engineering
Department of Civil, Chemical and Environmental Engineering (DICCA,
ex-DISEG), University of Genova
- 2003 Master Degree in Civil Engineering, 110/110 cum laude
Faculty of Engineering, University of Genova

PROFESSIONAL HISTORY

- From 2023 Full Professor (from 1th November 2023)
DICCA Department, University of Genova
- 2019 –2023 Associate Professor (from 1th November 2019 to 31th October 2023)
DICCA Department, University of Genova
- 2016 – 2019 Researcher RTD-B
DICCA Department, University of Genova (until 30th October)
- 2011 – 2016 Researcher RTD-A
DICCA Department, University of Genova
- 2007 – 2011 Assistant Professor
DICCA Department, University of Genova

FELLOWSHIPS AND AWARDS

- 2015 Fellowship within the International Short Visit program promoted by
SNSF- Swiss National Science Foundation (Grant Number IZK0Z2_158191.
Project: “New models for spandrel elements in existing masonry
buildings”; Istitution: EPFL - École Polytechnique Fédérale de Lausanne;
Supervisor: Prof.K.Beyer; stay duration: 3 month)
- 2004 – 2007 PhD Scholarship, University of Genova

ACADEMIC APPOINTMENTS

- From 2024 Coordinator of the PhD program in Security, Risk and Vulnerability of the University of Genoa.
- 2019-2024 Coordinator of the Curriculum in Risk and Resilience Engineering for the Natural, Industrialized and Built Environments within the PhD program in Security, Risk and Vulnerability of the University of Genoa. SC is also member of PhD Board of such PhD program (<https://sicurezza.unige.net/phd-board>)
- From 2019 Member of the “Commissione Paritetica” (<https://scuolapolitecnica.unige.it/node/155>). SC representative of the “Engineering for Building Retrofitting” master degree.
- From 2019 Member of the “Commissione Ricerca” of DICCA Department
- From 2019 Member of the “AQ-Commissione Gestione dell’Assicurazione della Qualità” of the “Civil Engineering” master degree
- 2016- 2019 Member of PhD committee of the curriculum in Structural and Geotechnical Engineering, Mechanics and Materials within the PhD Program in Civil, Chemical and Environmental Engineering of DICCA Department, University of Genova.

INVITED LECTURES

KEYNOTE LECTURES AT INTERNATIONAL CONFERENCES

- 2025 Invited Keynote Speaker at the Croatian Conference on Earthquake Engineering (3CroCEE), (Split, Croatia). Title: Modelling and analysis for the seismic assessment of existing URM buildings: research challenges and engineering-practice implications
- 2023 Invited Keynote Speaker at the International Conference on Structural Analysis of Historical Constructions - SAHC 2023 (<https://sahc2023.org/keynote-speakers/>). The conference will be held on September 2023 (Kyoto, Japan, 12-15 September 2023). Title of the keynote: “Integration and harmonized use of modelling strategies for the structural assessment of masonry structures: current gaps and future challenges”

INVITED LECTURES AT WORKSHOPS, SEMINARS AND COURSES

- 2023 Invited Keynote Speaker at the 9th INFRARISK-Summer Workshop 2023 (7th July 2023, Lisbon, Portugal). Title of the keynote: “Needs and Challenges in Developing the Italian Seismic Risk Assessment of the School Buildings Stock”

- 2023 Invited Keynote Speaker at the URBASIS-EU Spring School (Urban seismology and risk analysis) (16th May 2023, Porcherolles, France). Title of the keynote: “Development of fragility curves for seismic risk analysis: Comparison and Integration of different approaches”
- 2019 Invited seminar at Lima (Perù). Seminar titles: “Equivalent frame modelling of URM buildings: validation examples on monitored structures and tricky issues”; “Fragility curves for building stocks: derivation from macroseismic and mechanical-based models and calibration through empirical data”
- 2018 Invited seminar at Granada (Spain) within the “Workshop on advanced tools for seismic risk assessment and management” organized by the project “Development and application of advanced tools for seismic risk assessment and management” (coord. Prof. Luis Pujades). Seminar title: “*Seismic assessment of buildings based on ambient vibrations measurements*”
- 2015 Invited seminar at Lousanne on “Seismic Performance of Historical Masonry Structures through Displacement-Based Assessment Procedures”
- 2014 Invited seminars at Canterbury University (*Seismic Assessment of Historical Masonry Structures through Displacement-Based Procedures*) and Auckland University (*Equivalent frame modeling for the seismic assessment of URM buildings through nonlinear analyses*)

MEMBER OF EDITORIAL BOARD

- From 2023 Associate Editor of *Earthquake Spectra* (<https://journals.sagepub.com/editorial-board/eqs>). The journal is owned by the Earthquake Engineering Research Institute (EERI)
- From 2022 Member of the Editorial Board of the following international journals: *Earthquake and Structures* (Techno-Press) <http://www.techno-press.org/?journal=eas#>; *Buildings-MDPI*, <https://www.mdpi.com/journal/buildings/editors>

MEMBERSHIPS OF SCIENTIFIC SOCIETIES

- From 2007 Member of the Italian Association for Earthquake Engineering (ANIDIS)

SUPERVISION OF PhD STUDENTS, POST-DOC FELLOWS AND GRADUATE STUDENTS

2011- 2025 18 PhD students + 1 visiting PhD student

University of Genova:

Tommaso Maria Viazzi - XL cycle (ongoing) *T Enhancing the efficiency of structural monitoring in assessing the seismic damage of strategic buildings.* Tutor: S. Cattari

Matteo Bozzano -XL cycle (ongoing) *Automatic crack pattern detection from images: geomatics and machine learning algorithms supporting the seismic damage survey in churches,* Tutors: B.Federici, S. Cattari, L.Oneto

Margherita Gabriella Bruna Merani - XXXIX cycle (ongoing) *Seismic structural monitoring.* Tutors: S. Cattari, S.Barani

Marco Lazzati - XXXIX cycle (ongoing) *The emergency management of urban settlement in a multi-risk perspective.* Tutors: S. Cattari, G.Boni, A. Pirni

Fathiazar Kalkhoran Abbass - XXXVIII cycle (ongoing) *Integrated structural measures for seismic-flood risk reduction and environmental sustainability at the urban scale.* Tutors: S. Cattari, S.De Angeli

Silvia Pinasco - XXXVII cycle (final exam on 2025) *Seismic assessment of URM buildings in aggregate.* Tutors: S. Cattari, S.Lagomarsino.

Soheil Mohammadi - XXXVII cycle (final exam on 2025) *“A resilience-based methodology for the multi-risk assessment of urban settlements to be implemented in sustainable planning and management tools”.* Tutors: G.Boni, S. Cattari, F.Pirlone, S.De Angeli.

Sofia Giusto - XXXVI cycle (final exam on 2024) *“Classification of existing masonry school buildings and development of fragility curves to improve the seismic risk assessment at Regional scale”.* Tutors: S. Cattari, S. Lagomarsino.

Andrea Brunelli – XXXIV cycle (final exam on 2022) *“Soil structure interaction for ordinary masonry buildings”* Tutors: S. Cattari, F. de Silva (University Federico II of Naples)

Daniele Sivori – XXXIII cycle (final exam on 2021) *Ambient vibration tools supporting the model-based seismic assessment of existing buildings.* Tutors: S. Cattari, M.Lepidi.

Daniela Camilletti – XXXI cycle (final exam on 2019) *Equivalent Frame modelling of URM buildings: numerical validation and rules* Tutors: S. Cattari, S. Lagomarsino.

Jamil Haddad – XXX cycle (final exam on 2018) *Seismic assessment of existing buildings: Sensitivity Analysis and Probabilistic-based*

verification method Tutor: S. Cattari, S. Lagomarsino. The fellowship of Jamil Haddad was funded by the European project HERMES.

Salvatore Marino – XXX cycle (final exam on 2018) *Nonlinear static procedures for the seismic assessment of irregular URM Buildings*
Tutors: S. Cattari, S. Lagomarsino.

Stefania Degli Abbati – XXVIII cycle (final exam on 2016) *Seismic Assessment of Single-Block Rocking Elements in Masonry Structures*.
Tutors: S. Cattari, S. Lagomarsino.

Daria Ottonelli – XXVIII cycle (final exam on 2016) *Seismic performance assessment of unreinforced masonry buildings: the loss calculation*.
Tutors: S. Cattari, S. Lagomarsino.

Nivine Abbass – XXVI cycle (final exam on 2013) *Non linear Soil-Structure Interaction: Formulation of a macro-element and Application to non-linear static and dynamic analyses of masonry structures*. Tutors: S. Cattari, S. Lagomarsino

In collaboration with other European Universities (2 PhD students)

Francesco Parisse (ongoing) “*Harmonized guidelines for the seismic safety assessment of unreinforced masonry buildings with box-like behavior*”. Tutors: S.Cattari, R. Marques and P.B.Lourenco (University of Guimaraes, Portugal). Now Francesco Parisse is spending the 2nd year at the University of Genova under the supervision of SC.

Jelena Milosevic (final exam on 2019) “*Seismic assessment and vulnerability of “Placa” buildings*” Tutors: R. Bento (ICIST, Instituto Superior Técnico, University of Lisbon, Portugal), S. Cattari.

Visiting PhD student from European Universities (1 PhD student)

Ante Pilipovic – University of Zagreb– 2 months stay (from May to June, 2025).

María Victoria Requena García de la Cruz from the ‘Universidad de Sevilla’ – 3 months stay (from September 30th to December 31st, 2021).

2011 – 2021 6 Post-doc fellows

(2023) ongoing. Andrea Brunelli (D.R. n. 3315 del 29.7.2022 Program n.25 “*Valutazione della sicurezza sismica di edifici in muratura, considerando anche effetti di amplificazione ed interazione suolo struttura*”). Fellow funded by the ReLUIS projects and ReLUIS-DPC project.

(2022) ongoing. Sara Alfano (D.R. 5048 del 28.10.2021 Program n.23 : “*Development of fragility curves for masonry buildings: impact of regionalization studies and strengthening interventions on the seismic*”



risk and losses assessment "). Fellow funded by the ReLUIS projects and the Project with the Municipality of Sanremo.

(2023) Daniele Sivori (D.R. n. 4393 del 14.10.2022 Program n.4 "Model-based data-informed strategies for the seismic safety assessment of monumental and strategic masonry buildings". Fellow funded by the "Bando CARIGE - Assegni di ricerca area "Scientifica" 2021" (<https://www.fondazionecarige.it/wp/wp-content/uploads/2022/07/esiti-bando-ass-ricerca-area-Scientifica-1.pdf>)

(2022) 1 year. Andrea Brunelli (D.R: n. 6065 del 20/12/2021 Consolidator grant: "*Ricognizione sul campo e applicazione di modelli di vulnerabilità sismica su edifici strategici nel territorio ligure*"). Fellow funded by the ReLUIS-DPC project addressed to the seismic assessment of Italian National Police Headquarters.

(2022) 1 year. Daniele Sivori (Prot. 74180 del 23/12/2021 "*Supporto alle valutazioni di vulnerabilità sismica di edifici a carattere strategico a fini comparativi per la redazione di lista di priorità per le politiche di mitigazione a larga scala*"). Fellow funded by the ReLUIS-DPC project addressed to the seismic assessment of Italian National Police Headquarters.

(2021) 1 year. Daniele Sivori (D.R: 4785 del 23/11/2020 Consolidator grant: "*Uso di dati interferometrici satellitari e di identificazione dinamica a supporto della valutazione della sicurezza di costruzioni esistenti in muratura*"). Fellow funded by the ReLUIS projects and GeAMB/Liguria projects.

(2020-2021) 2 years. Sara Alfano (D.R. n. 3943 del 20_09_2019 Program n.3 : "*Uso integrato della modellazione a telaio equivalente di edifici in muratura con dati da monitoraggio strutturale per valutazioni di sicurezza in condizioni operative*"). Fellow funded by the "PRIN 2017 Project DETECT-AGING (Prot. 201747Y73L)".

(2018-2019) 2 years. Daria Ottonelli (D.R. n.1111 del 16.03.2018 - Programma n.21: "*Valutazione della vulnerabilità sismica per analisi di rischio a scala nazionale*".) Fellow funded by the "ReLUIS III 2014-2018 Project" and "ReLUIS IV 2019-2021 Project".

(2016) 1 year. Stefania degli Abbati (D.R. n.9658 del 16.11.2015 - Program n.23: "*Affidabilità delle procedure basate su approccio in spostamenti nell'analisi di elementi murari sollecitati fuori dal piano*"). Fellow funded by the "ReLUIS III 2014-2018 Project".

(2014) 1 year. Margherita Cecchinelli (D.R. n.61 del 24.1.2014 - Program n.23: “*Valutazione della sicurezza sismica di edifici monumentali in muratura complessi e in aggregato*”). Fellow funded by the “ARCUS-MiBACT project”.

2011 – 2021 60 master students

TEACHING ACTIVITIES – MASTER LEVEL

- From 2022 Management and monitoring of infrastructures (Code: 80628-Civil Engineering) University of Genova, together with Prof.ssa L.C.Pagnini
- From 2018 Earthquake Engineering (Code: 84534 - Civil Engineering), University of Genova
- From 2018 Structural Assessment and Safety of Existing Buildings (Code: 97204 - Engineering for Building Retrofitting)- University of Genova
- 2014- 2017 Building Retrofitting II, University of Genova
- 2013-2018 Structural Design, University of Genova
- 2009 – 2013 Laboratory of Structural Engineering, University of Genova

TEACHING ACTIVITIES – PhD COURSES

- 2021-2025 Organisation of the PhD course on “THE RESILIENCE ASSESSMENT OF COMPLEX SYSTEMS AS A MULTIDISCIPLINARY APPROACH FOR THE PREVENTION AND DISASTER MANAGEMENT “ (PhD Program in Security, Risk and Vulnerability). Within the course, teacher of the lesson on “*A reference framework for addressing disaster resilience studies*”.
- 2021-2023 Co-teacher of the PhD Course on “*Seismic loss assessment: basics on fragility and consequence functions*” (PhD Program in Security, Risk and Vulnerability). The course has been organized together with Prof.M.Di Ludovico from the University Federico II of Naples.
- 2015 Teacher of the PhD course on “*Probabilistic seismic assessment of masonry existing buildings*” (DICCA – University of Genoa).
- 2010 Co-teacher of the PhD course on “*Modelling and analysis of existing masonry structures*” (DICCA – University of Genoa).

ORGANISATION OF MISISYMPOSIA

- 2024 Co-organizer of the Technical Sessions SDM-10 SEISMIC NONLINEAR MODELLING OF BUILDINGS IN THE ENGINEERING PRACTICE: DESIGN AND



- ASSESSMENT (with Prof. G. Magenes and S.Antoniou) and ASR11 - ADVANCES AND OPEN CHALLENGES IN SEISMIC VULNERABILITY ASSESSMENT OF URM BUILDINGS IN AGGREGATE (with Prof. R.Bento and M.T.Ferreira) at the WCEE 2024 (World Conference on Earthquake Engineering) - Milan
- 2023 Co-organizer of the Special Session MS32 "Multi-hazard risk management of the built environment: recent advances and open challenges" (<https://2023.compdyn.org/content/accepted-minisymposia>) within the 9th International Conference on Computational Methods in Structural Dynamics and Earthquake Engineering (COMPDYN 2023 Athens). The conference will be held on June 2023.
- 2022 Co-organizer of the Special Session "Integration of SHM and numerical simulations for enhancing the seismic resilience of architectural heritage" within the XIX ANIDIS Conference (Associazione Nazionale Italiana di Ingegneria Sismica) 2022 (<http://convegno.anidis.it/index.php/anidis/2022/schedConf/trackPolicies>). (Torino 11-15 September 2022)
- 2021 Co-organizer of the minisymposium MS34 "Fragility curves for existing buildings: open challenges in their definition and use for seismic risk analyses" within the 8th International Conference on Computational Methods in Structural Dynamics and Earthquake Engineering (COMPDYN 2021 Athen, Greece, June 28th-30th 2021).
- 2019 Co-organizer of the minisymposium MS18 "Potential of vibrations monitoring for improving the reliability of buildings seismic assessment" within the 7th International Conference on Computational Methods in Structural Dynamics and Earthquake Engineering (COMPDYN 2019 Crete, Greece, June 24th-26th 2019).
- 2018 Co-organizer of the Special Session 18 "Seismic modelling of masonry buildings: present knowledge and open challenges for research and practice " within the 16th European Conference on Earthquake Engineering, Thessaloniki, Greece, June 18th-21th 2018.
- 2017 Co-organizer of the minisymposium MS25 " Computational Strategies for the seismic assessment of Cultural Heritage Masonry" within the 6th International Conference on Computational Methods in Structural Dynamics and Earthquake Engineering (COMPDYN 2017, Rhode, Greece, June 15th-17th 2017.

NATIONAL RESEARCH Projects

1. Title: RAISE - (2022-2025)
Period: ongoing

Funded by: Bando PNRR - Ecosistemi

Role: **Member of the Research Unit of DICCA- University of Genova.** SC contributes to the research addressed to vulnerability models and image-based procedures to estimate seismic damage and consequences and improvement of real time or quasi-real time ground motion scenarios.

2. Title: ReLUIS-DPC (2022-2026 agreement)

Funded by: Italian Department of Civil Protection

Role: **Local Responsible of Research Unit UNIGE-b.** UNIGE-b is involved in the following Work Packages: WP4- *Mappe di rischio e scenari di danno sismico (MARS-2)*; WP5 – *Interventi di rapida esecuzione a basso impatto e integrati*; WP6-*Monitoraggio e Dati Satellitari*; WP10 – *Contributi normativi relativi a costruzioni esistenti in muratura*. SC coordinates the activities of Task 10.3 (URM nonlinear modelling- Benchmark Project) and Task 4.4 (Seismic Vulnerability of Italian Masonry Schools and Hospitals). Moreover, within WP6 (Monitoring and Satellite Data) SC has been appointed coordinator of the research activities addressed to Masonry Buildings.

3. Title: Call on “Acquisto e/o aggiornamento Attrezzature Scientifiche 2021”

Period: 2022

Funded by: University of Genova (D.R. n 6186 del 23/12/2021)

Role: **Principal Investigator.** With the grant, various acquisition units and accelerometers have been acquired to enhance the facilities of DICCA on structural monitoring, also strengthening the collaboration with DISTAV.

4. Title: ReLUIS-DPC projects on “Evaluation of seismic safety of Police Headquarters at National scale”

Period: 2021- 2023

Funded by: ReLUIS – Dipartimento della Polizia di Stato

Role: **Local Responsible of Research Unit UNIGE (together with Prof.S.Lagomarsino)**

5. Title: DETECT-AGING - Degradation Effects on sTructural safEty of Cultural heriTAGE constructions through simulation and health monitoring (Prot. 201747Y73L)

Period: 2019 -2023

Funded by: MIUR

Role: **Local Responsible of Research Unit UNIGE.**

6. Title: ReLUIS IV-DPC (2019-2021 agreement)

Period: 2019-2021

Funded by: Italian Department of Civil Protection

Role: **Local Responsible of Research Unit UNIGE-b.** SC coordinated the activities of Task 10.3 (URM nonlinear modelling- Benchmark Project) and Task 4.7 (Seismic Risk Maps for Italian Masonry Schools). Moreover, within WP6 (Monitoring and Satellite Data) SC was appointed coordinator of the research activities addressed to Masonry Buildings.

7. Title: ReLUIS III – Masonry Structures Line

Period: 2014 - 2018

Funded by: Italian Department of Civil Protection

Role: **Local Responsible of Research Unit UNIGE-c.** SC coordinated the activities of Task 4.1 (from 2017, addressed to the analysis of real building damaged by the 2016 earthquake and

monitored by the Seismic Observatory of Structures of Italian Department of Civil Protection) and Task 4.3 (from 2015, addressed to the analysis of benchmark masonry structures to assess the reliability of URM modelling approaches for nonlinear seismic assessment)

8. Title: Support to the research activity of the Academic Spin-off GEAmb S.r.l. addressed to the application of the SMAV (Seismic Model from Ambient Vibration) in Liguria Region
Period: 2017- 2022
Funded by: Liguria Region
Role: **Principal Investigator**

9. Title: Studies on the seismic vulnerability of Sanremo Municipality with particular reference to the operating conditions of the seismic emergency plan and the safety condition of urban settlement
Period: 2017- 2020
Funded by: Sanremo Municipality
Role: **Principal Investigator**

10. Title: PRA 2014-The role of geometrical survey on the reliability of structural modelling: use of laser scanner techniques for the analysis of historical masonry structures
Period: 2014-2015
Funded by: University of Genova
Role: **Co-Principal Investigator (together with Prof.C.Battini)**

11. Title: Seismic assessment of Italian Musei – Application to O.P.C.M. 3274/2033
Period: 2013-2015
Funded by: ARCUS-MiBACT
Role: Technical Responsible for the research activity addressed to the San Martino Abbey in Naples

12. Title: PRA 2013-Reliability of nonlinear static analyses for the seismic assessment of masonry buildings in presence of flexible diaphragms
Period: 2013-2014
Funded by: University of Genova
Role: **Principal Investigator**

13. Title: PRA 2011-Theoretical analysis of the role of spandrels on the seismic response of masonry buildings
Period: 2011-2012
Funded by: University of Genova
Role: **Principal Investigator**

2009- 2013 SC participated to several research project (PRIN 2009, ReLUIS, S2 Project)

INTERNATIONAL RESEARCH Projects

1. Title: PERPETUATE Project-PERformance-based aPproach to Earthquake proTection of cUlturAl heriTage in European and mediterranean countries
Period: 2009-2012

Funded by: European Commission (FP7 - Grant Agreement no. 244229)
Role: Participant and WP Leader (WP8)

2. Title: EVSIM Project-Evaluation of seismic vulnerability of masonry constructions
Period: 2009-2010
Funded by: French National Research Agency
Role: Participant

3. Title: RISK-UE Project- An advanced approach to earthquake risk scenarios with applications to different European towns
Period: 2004
Funded by: European Commission (FP5 - EVK4-CT-2000-00014)
Role: Participant

PARTICIPATION TO THE DRAFTING PANEL OF TECHNICAL CODES

- 2012 Participation to the drafting panel of CNR-DT 212 Document- Guide for the probabilistic assessment of the seismic safety of existing buildings issued by Italian National Research Council, Rome, Italy. Coordinator: Prof. P.E.Pinto; Members of the drafting commission: Prof.P.E.Pinto, Prof. P.Franchin, Prof.S.Lagomarsino, Dr.S.Cattari, Prof.I.Iervolino
- 2014 Participation to the drafting panel of updating of NZSEE recommendation – Section 10 Seismic Assessment of Unreinforced Masonry Buildings

OTHER ACTIVITIES

- 2019 Lessons within the “Twinning project MD 13 ENPI OT 01 16 (MD/26)- Activity 3.5 Didactic and applied research activity on Structural Behaviour and Rehabilitation of Historic Masonry Buildings”. Moldavia.
- 2014 Research stay at University of Canterbury (New Zealand) as Visiting Professor within the collaboration related to the project “Vulnerability analysis of unreinforced masonry churches” (funded by the EQC Biennial Grants Programm 2014)
- From 2011 Lessons/scientific seminars to practitioners organized by CIAS, SAIE, Italian Society of Civil Engineering
- 2010 Research stay at BRGM- Bureau de recherches géologiques et minières within the context of PERPETUATE and EVSIM project activities (Supervisor: PhD. Darius Seyed). Topic: definition of damage indexes for masonry panels.
- From 2003 Participation to the post-seismic damage assessment: Piemonte 2003; Lombardia 2004; Abruzzo 2009; Emilia 2012; Central Italy 2016/2017

RESEARCH TOPICS

- Numerical modelling of existing and historical masonry buildings
- Performance-based assessment of existing buildings and masonry cultural heritage
- Seismic risk analysis of the built environment at large scale
- Soil-Structure-Foundation-Interaction on masonry buildings
- Ambient Vibration Tests, Structural monitoring also using satellite interferometry data

With reference to the expertise on numerical modelling, SC has provided significant contributions to the equivalent frame modelling approach. In particular, she is contributing to the development of the software Tremuri, widely used at national and international scale by both researchers and practitioners.

Italian Civil Protection Department for the following earthquakes and is used all over the world (Spain, Portugal, New Zealand)

Development of the program TREMURI for static and dynamic nonlinear analysis of masonry buildings. The program is used for design and assessment (3muri® stadata.com)

Chairman of the XI ANIDIS (Italian Conference on Earthquake Engineering), Genoa, 2004