

Serena Cattari

Associate professor

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Family name, First name: Cattari, Serena (SC)

Date of birth: August 28, 1978

Researcher unique identifier: ORCID - <http://orcid.org/0000-0001-9459-5989>

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

MAIN RESEARCH FIELDS

- 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.

BIBLIOMETRIC INFORMATION

(updated to July 10th, 2023)

h index - SCOPUS: 27

total number of citations – SCOPUS: 3020

total products indexed in SCOPUS: 117

EDUCATION

- 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

CURRENT POSITION

- 2019 – Associate Professor (from 1th November 2019)
DICCA Department, University of Genova
- 2020 – National scientific qualification for the role of Full Professor
(validity from 17/11/2020 to 17/11/2029)

PREVIOUS POSITIONS

- 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”; Institution: EPFL - École Polytechnique Fédérale de Lausanne; Supervisor: Prof.K.Beyer; stay duration: 3 month)
- 2004 – 2007 PhD Scholarship, University of Genova

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

- 2011- 2021 14 PhD students + 1 visiting PhD student

University of Genova (12 PhD students):

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 (ongoing) Seismic assessment of URM buildings in aggregate. Tutors: S. Cattari, S.Lagomarsino.

Soheil Mohammadi - XXXVII cycle (ongoing) “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.

Sofia Giusto - XXXVI cycle (ongoing) “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 modeling 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)

María Victoria Requena García de la Cruz from the ‘Universidad de Sevilla’ – 3 months stay (from September 30th to December 31st, 2021). The research topic was addressed to the comparison of different equivalent frame modelling approaches for the seismic assessment of a masonry case study building, representative of a typical pre-code masonry neighborhood in Spain.

2011 – 2021 6 Post-doc fellows

(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>)

(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.

(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

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|-----------|---|
| 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. |
| 2021-2023 | 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”. |
| 2015 | Teacher of the PhD course “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

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|------|---|
| 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.

INSTITUTIONAL RESPONSIBILITIES

- From 2019 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.

COMMISSIONS OF TRUST

- From 2019 Member of the Scientific Committee of the “Conference on Computational Methods in Structural Dynamics and Earthquake Engineering”
- 2019-2021 External Reviewers of 5 PhD thesis
- 2022 Member of the PhD Jury of the Candidate Elisa Saler – University of Trento, Italy
- 2022 Member of the PhD Jury of the Candidate Holger Mario Lovon Quispe – Department of Biology and CESAM” Campus Universitario de Santiago, Universidade de Aveiro
- 2021 Member of the PhD Jury of the Candidate Anna Chiara Piro – University of Naples, Italy
- 2019 Member of the PhD Jury of the Candidate Corrado Marano – University of Chieti-Pescara, Italy
- 2016 Member of the PhD Jury of the Candidate Cristophe Mordant – University of Liege, Belgium
- 2014 Member of the PhD Jury of the Candidate Alessandro Paparo – EPFL –Ecole Polytechnique, Switzerland
- From 2011 Reviewer for the following international journals: Bulletin of Earthquake Engineering, Engineering Structures, Journal of Earthquake Engineering, International Journal of Architectural Heritage, Structures, Journal of Seismology, Natural Hazards.
- From 2012 Reviewer for the following international conferences: WCEE, ECEE, SAHC

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)

INVITED LECTURES

- 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"
- 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)

NATIONAL RESEARCH Projects

1. Title: RAISE - (2022-2024)

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 (2022-2024 agreement)

Period: ongoing 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- (ongoing project)

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 (ongoing project) 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- ongoing 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, ReLUIIS, 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

Genova

July 10, 2023