


## PERSONAL INFORMATION


## Gianrocco Mucedero



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Sex M | Date of birth 22/07/1993 | Nationality Italian

## SUMMARY

He got his Master of Science degree (magna cum laude) in Civil Engineering in 2017 at the University of Pavia (Italy), with a specialization in structural design. The research topic of the MSc thesis, entitled “Progressive collapse: analysis and comparison of different types of buildings”, was the progressive collapse of buildings under low probability-high consequence events. After the conclusion of his MSc degree, he immediately started to work on the study of induced seismicity effects in buildings in Groningen, at Arup in Amsterdam, addressing mainly the seismic risk assessment of Dutch unreinforced masonry buildings and retrofit systems. He then enrolled, in September 2018, in the PhD programme in “Understanding and Managing Extremes”, curriculum earthquake engineering and engineering seismology (ROSE), at IUSS in Pavia (Italy). He was a Tutor Assistant of Structural Engineering and Mechanics at the University of Pavia (2015-2019), a teaching assistant of Fundamentals Seismic Design and an instructor of Integrated assessment and retrofitting of existing buildings at IUSS Pavia. He has been awarded by the QuakeCore for winning the Blind Prediction Competition in 2019 and by MDPI for Editor’s Choice Article. Currently, He is a Graduate Researcher, whose main research activity is focused on seismic risk assessment of existing buildings and integrated seismic and energy retrofitting.

## WORK EXPERIENCE

January 2022  
– April 2022

**Consultancy Service for Design and Supervision of Reconstruction of Public Infrastructures in Cabo Delgado province**

**Company:** A.R.S Progetti SPA, Via Durban, 2, 00144 Roma RM

**Project City:** Cabo Delgado, Mozambique

**Founding:** World Bank

**Role:** Consultant, Member of the Advisors Team (Prof. Ricardo Monteiro and Prof. Carmine Galasso)

**Activity:** Advisor for the vulnerability assessment and for post-cyclone reconstruction of RC infilled and masonry buildings, supporting the design and planning of all the Disaster Resistant Infrastructures and providing guidelines and best practices.

November –  
2018

**Professional Engineer**

**University:** University of Pavia

**Albo:** Ordine degli Ingegneri di Pavia

**City:** Pavia, Italia

**Activity:** Qualification as Professional Engineer (Italian legislation), Settore-A, matricola 3572, Ordine degli Ingegneri di Pavia, Via Indipendenza 11, 27100 Pavia.

01 January  
2018 -  
30 June 2018

**Erasmus Traineeship**

**Company:** ARUP, Naritaweg 118, 1043 CA Amsterdam, Netherlands

**City:** Amsterdam, Netherlands

**Supervisors:** *Eng. Alessandro Marasca, PhD Eng. Michele Palmieri*

**Activity:** Involved in the study of induced seismicity effects in buildings in Groningen, at Arup in Amsterdam, addressing mainly the seismic risk assessment of Dutch unreinforced masonry buildings and retrofit systems. The main topics were to develop a simplified pushover analysis for unreinforced masonry buildings, study on out of plane of masonry wall, seismic risk assessment of unreinforced masonry existing building, studies on different retrofit systems and comparison of different codes.

## EDUCATION AND TRAINING

October 2022-  
present

**Post-Doctoral Researcher**

**University:** University School for Advanced Studies IUSS, Palazzo del Broletto, Piazza della Vittoria 15, 27100 Pavia PV

**Supervisors:** *Prof. Ricardo Monteiro*

**Topic:** Structural response and seismic risk of reinforced concrete buildings considering different types of epistemic uncertainty.

September 2018-present

**PhD Understanding and Managing Extremes (UME)**

**University:** University School for Advanced Studies IUSS, Palazzo del Broletto, Piazza della Vittoria 15, 27100 Pavia PV

**Grade:** -

**Thesis:** Large scale seismic risk assessment of existing masonry-infilled buildings in Italy

**Supervisors:** Prof. Ricardo Monteiro, Dr. Eng. Daniele Perrone

**PhD Research:** The main PhD research topic is the comprehensive seismic assessment of existing RC buildings. A better understanding of the impact of a more accurate characterization of the contribution of masonry infills and other non-structural elements in the seismic behaviour of buildings is sought. Both single buildings and building portfolios are considered. The seismic performance is assessed in a fully integrated manners, considering expected annual losses as the main risk metric.

19 December 2017

**Master's Degree Civil Engineering – Structures**

**University:** University of Pavia, Via Adolfo Ferrata, 5, 27100 Pavia PV

**Grade:** 110/110 cum laude

**Thesis:** Progressive collapse. Analysis and comparison of different building typologies

**Supervisors:** Prof. Eng. Roberto Nascimbene, Dr. Eng. Emanuele Brunesi

**Abstract:** In the last couple decades, several numerical studies and limited experimental tests have investigated progressive collapse resistance of the structures, since an event of low-probability high consequence could represent potential human life and economic losses. In this study, after numerical model validation through experimental tests, progressive collapse resistance of different types of frame buildings were carried out and compared to the common reinforced concrete frame buildings. The results presented could be a reasonable facility for a preliminary progressive collapse resistance of existing buildings, especially if they were designed for only vertical loads, for preliminary design of which cross section might be adopted, taking into account in quantitative terms of possible local failure, for checking new buildings when the Direct Method was not applied.

24 September 2015

**Bachelor's Degree Civil/Environmental Engineering**

**University:** University of Pavia

**Grade:** 104/110

**Thesis:** Topology optimization with mixed method Hu-Washizu and implementation of the process in Matlab.

**Supervisors:** Prof. Eng. Paolo Venini

PERSONAL SKILLS

Mother tongue Italian

Other language

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
Inglese	B2	B2	B2	B2	B2

Computer skills

FEM Softwares	Programming Softwares	Other Softwares
Midas	Matlab	Autocad 2D-3D
SeismoStruct	Visual basic	Microsoft Office
SeismoBuild	Tcl	OpenQuake
SAP 2000		SeismoSelect
3 MURI		SeismoMatch
ProSap		
ProCinem		
OpenSees		

Driving licence

AM (10/01/2013)  
B (24/10/2011)

## ADDITIONAL INFORMATION

## Publications

## January- December 2022

1. **Mucedero G**, Perrone D, Monteiro R. Infill Variability and Modelling Uncertainty Implications on the Seismic Loss Assessment of an Existing RC Italian School Building. *Applied Sciences*. **2022**; 12(23):12002. <https://doi.org/10.3390/app122312002>
2. **Mucedero, G.**, Perrone, D. & Monteiro, R. Seismic risk assessment of masonry-infilled RC building portfolios: impact of variability in the infill properties. *Bull Earthquake Eng* (**2022**). <https://doi.org/10.1007/s10518-022-01563-0>
3. **Mucedero, G**, Perrone, D, Monteiro, R. Epistemic uncertainty in poorly detailed existing frames accounting for masonry infill variability and RC shear failure. *Earthquake Engng Struct Dyn*. **2022**; 51: 3755– 3778. <https://doi.org/10.1002/eqe.3748>

## January- December 2021

4. **Mucedero G.**, Perrone D., Monteiro R., Nonlinear static characterisation of masonry-infilled RC building portfolios accounting for variability of infill properties. *Bull Earthquake Eng* 19, 2597–2641 (**2021**). <https://doi.org/10.1007/s10518-021-01068-2>
5. **Mucedero G.**, Brunesi E., Parisi F., Progressive collapse resistance of framed buildings with partially encased composite beams, *Journal of Building Engineering*, Volume 38,**2021**,102228, ISSN 2352-7102, <https://doi.org/10.1016/j.jobe.2021.102228>.

## January- December 2020

6. **Mucedero G.**, Perrone, D., Brunesi, E., Monteiro, R. Numerical Modelling and Validation of the Response of Masonry Infilled RC Frames Using Experimental Testing Results. *Buildings* **2020**, 10, 182. <https://doi.org/10.3390/buildings10100182>.
7. **Mucedero G.**, Brunesi E., Parisi F., Nonlinear material modelling for fibre-based progressive collapse analysis of RC framed buildings, *Engineering Failure Analysis*, Volume 118,**2020**,104901,ISSN 1350-6307, <https://doi.org/10.1016/j.engfailanal.2020.104901>.

## Conferences

## January- December 2023

1. **Mucedero G.**, Couto R., Clemett N., Gabbianelli G., Monteiro R. Implications of masonry infill-related uncertainty on the optimal seismic retrofitting of existing buildings. 14<sup>th</sup> International conference on application of statistics and probability in civil engineering (ICASP 14) 9<sup>th</sup> -13<sup>th</sup> July **2023**, Trinity College Dublin, Dublin, Ireland (abstract accepted, oral presentation: **Mucedero G.**).
2. **Mucedero G.**, Perrone D., Monteiro R. Developing storey loss functions for evaluation of seismic risk in Italian residential building typologies. COMPDYN 2023, 9<sup>th</sup> ECCOMAS Thematic Conference on Computational Methods in Structural Dynamics and Earthquake Engineering M. Papadrakakis, M. Fragiadakis (eds.) Athens, Greece, 12-14 June 2023 (abstract accepted, oral presentation: **Mucedero G.**).
3. Couto R., **Mucedero G.**, Monteiro R., Bento R. On the influence of climate and seismic hazard conditions in the identification of optimal retrofitting strategies for RC buildings. COMPDYN 2023, 9<sup>th</sup> ECCOMAS Thematic Conference on Computational Methods in Structural Dynamics and Earthquake Engineering M. Papadrakakis, M. Fragiadakis (eds.) Athens, Greece, 12-14 June 2023 (abstract accepted, oral presentation: Couto R.).

4. **Mucedero G.**, Perrone D., Monteiro R. Improved seismic fragility and vulnerability curves for Italian existing masonry-infilled buildings SECED 2023 Conference Earthquake Engineering & Dynamics for a Sustainable Future 14-15 September 2023, Cambridge, UK (abstract accepted, oral presentation: **Mucedero G.**).
- January- December 2022**
5. **Mucedero G.**, Perrone D., Monteiro R. Variability in the seismic demand of non-structural elements in existing RC infilled buildings. Fifth International Workshop on the Seismic Performance of Non-Structural Elements (SPONSE), Stanford University in Palo Alto, California (USA), December 5 to 7, **2022** (oral presentation: **Mucedero G.**).
  6. Calò M., **Mucedero G.**, Nicoletti V., Gabbianelli G. Wooden infills influence on the seismic performance of steel structures. Fifth International Workshop on the Seismic Performance of Non-Structural Elements (SPONSE), Stanford University in Palo Alto, California (USA), December 5 to 7, **2022** (oral presentation: **Mucedero G.**).
  7. **Mucedero G.**, Perrone D., Monteiro R. Epistemic uncertainty impact on seismic loss estimates of an Italian RC existing school building. The 3<sup>th</sup> European Conference on Earthquake Engineering & Seismology, Bucharest, Romania, **2022** (oral presentation: **Mucedero G.**).
  8. **Mucedero G.**, Carrofilis W., Perrone D., Monteiro R. Impact of masonry infill properties and modelling uncertainty on the seismic risk assessment of existing Italian school buildings. The 13th International Conference on Structural Safety and Reliability (ICOSSAR 2021-2022), 13-17 September **2022**, Tongji University, Shanghai, China J. Li, Pol D. Spanos, J.B. Chen & Y.B. Peng (Eds) (oral presentation: Mucedero G.).
  9. **Mucedero G.**, Brunesi E., Parisi F., Performance-oriented regression models for progressive collapse assessment of buildings with partially encased composite beams. The 13th International Conference on Structural Safety and Reliability (ICOSSAR 2021-2022), 13-17 September **2022**, Tongji University, Shanghai, China J. Li, Pol D. Spanos, J.B. Chen & Y.B. Peng (Eds) (video presentation: **Mucedero G.**).
- January- December 2021**
10. **Mucedero G.**, Perrone D., Brunesi E., Monteiro R. Impact of masonry infill variability on the estimation of floor response spectra in RC buildings. 8<sup>th</sup> ECCOMAS Thematic Conference on Computational Methods in Structural Dynamics and Earthquake Engineering M. Papadrakakis, M. Fragiadakis (eds.) Streamed from Athens, Greece, 27–30 June **2021** (oral presentation: **Mucedero G.**).
  11. **Mucedero G.**, Perrone D., Monteiro R. Nonlinear static response of a masonry infilled RC building stock considering the variability of infill parameters. 17th World Conference on Earthquake Engineering, 17WCEE Sendai, Japan, September 27 to October 2, **2021**.

## Research Projects

2022 - 2024

**Research Project:** ReLUISS WP5 2022-2024

**Principal Investigator:** Prof. Ricardo Monteiro

**University:** University School for Advanced Studies IUSS, Palazzo del Broletto, Piazza della Vittoria 15, 27100 Pavia PV

**Project:** Interventi di rapida esecuzione a basso impatto ed integrati

**Activity:** Following the analysis of the structural deficiencies of a case-study school building using nonlinear static analysis, different retrofit alternatives are proposed and evaluated through a MCDM framework to select the closest-to-ideal, i.e. optimal solution. The MCDM results are

analyzed in detail, highlighting the implications of considering the variability in the masonry infill properties, an uncertainty source that is commonly discarded, on the expected annual loss estimation and on the retrofitting alternatives ranking.

25 March 2020 - 24 July 2020

**Partnership Contract:** RELUIS WP18

**University:** University of Pavia, Via Adolfo Ferrata, 5, 27100 Pavia PV

**Principal Investigator:** Prof. Carlo Lai

**Project:** Valutazione sismica di strutture esistenti tramite metodi semplificati e avanzati

**Activities:** The research activity aimed at the seismic evaluation of existing RC infilled structures through simplified and advanced methods, including nonlinear static and nonlinear dynamic analysis, has allowed to highlight the impact of masonry infills on both global and local response of reinforced concrete existing buildings, as well as their impact on the related expected annual losses (evaluated with both advanced and simplified methods).

2019 - 2022

**Research Project:** ReLUIS WP5 2019-2022

**Principal Investigator:** Prof. Ricardo Monteiro

**University:** University School for Advanced Studies IUSS, Palazzo del Broletto, Piazza della Vittoria 15, 27100 Pavia PV

**Project:** Interventi di rapida esecuzione a basso impatto ed integrati

**Activities:** Investigation and quantification of the effect of masonry-infill variability on the expected annual losses (EALs) of existing infilled reinforced concrete frames of different configurations. EALs are computed and analysed in a statistical fashion in order to quantify, in a simplified manner, the uncertainty induced by the variability of the masonry infill properties, as a function of the number of storeys and masonry infill typology.

2018 - 2022

**Research Project:** Dipartimenti di Eccellenza - Revision of Seismic Action and Design Methods

**Principal Investigator:** Prof. Gian Michele Calvi

**University:** University School for Advanced Studies IUSS, Palazzo del Broletto, Piazza della Vittoria 15, 27100 Pavia PV

**Project:** New Methods for Seismic Design and Risk Assessment of Structures

**Activities:** A macro-classification based on different available databases of experimental tests on infilled RC frames has been proposed to understand the variability in the infill properties and the corresponding numerical modelling uncertainties. Then, numerical modelling validation using experimental testing results have been performed, considering and comparing the main formulations available in the literature for the definition of the hysteretic behaviour of infills, allowing to identify the model that minimizes the prediction error, according to specific features of the selected masonry infill.

Teaching  
activities/Seminars

November-  
December 2022

**PhD Course**

**University:** University School for Advanced Studies IUSS, Palazzo del Broletto, Piazza della Vittoria 15, 27100 Pavia PV

**Course:** Integrated Assessment and Retrofitting of Existing Buildings, 6 CFU

**Instructors:** Rui Pinho, Ricardo Monteiro, Giammaria Gabbianelli, Martina Caruso, Francesco Cavalieri, Gianrocco Mucedero

**Topic:** Numerical modelling of existing RC infilled structures; Seismic retrofitting strategies for R.C. structures; Seismic loss assessment methodologies (engaged for 12/56 hours)

04-July 2022

**Seminar MSc / PhD Course**

**University:** University School for Advanced Studies IUSS, Palazzo del Broletto, Piazza della Vittoria 15, 27100 Pavia PV

**Course:** Fundamental of Seismic Design, 6 CFU

**Advisor:** Prof. Ricardo Monteiro

**Instructors:** Ricardo Monteiro and Giammaria Gabbianelli

**Topics:** Numerical modelling of existing and new RC infilled frames (engaged for 2 hours)

June – July 2020

**Teaching assistant MSc / PhD Course**

**University:** University School for Advanced Studies IUSS, Palazzo del Broletto, Piazza della Vittoria 15, 27100 Pavia PV

**Course:** Fundamental of Seismic Design, 6 CFU

**Instructor:** Prof. Ricardo Monteiro and PhD Gerard O'Reilly

**Teaching topics:** Force-deformation characteristics of RC elements, Elastic and inelastic response spectra, Seismic design methods, Performance-based seismic design, Direct displacement-based seismic design (DDBD), Conceptual seismic design, Inelastic analysis and seismic assessment methods, Seismic loss assessment (engaged for 54 hours)

October 2019 - February 2020

**Teaching assistant Bachelor's degree Course**

**University:** University of Pavia, Via Adolfo Ferrata, 5, 27100 Pavia PV

**Course:** Structural mechanics, 6 CFU

**Advisor:** Prof. Carlo Cinquini, Prof. Eng. Paolo Venini

**Teaching topics:** Finite elements methods, Trusses, Eulero-Bernoulli beam, Timoshenko beam, Basic knowledge of structural dynamics, Theory of Instability, Implementation in Matlab (engaged for 14 hours)

October 2018 - February 2019

**Teaching assistant Bachelor's degree Course**

**University:** University of Pavia, Via Adolfo Ferrata, 5, 27100 Pavia PV

**Course:** Structural mechanics, 6 CFU

**Advisor:** Prof. Carlo Cinquini, Prof. Eng. Paolo Venini

**Teaching topics:** Finite elements methods, Trusses, Eulero-Bernoulli beam, Timoshenko beam, Basic knowledge of structural dynamics, Theory of Instability, Implementation in Matlab (engaged for 22 hours)

October 2017 - February 2018

**Teaching assistant Bachelor's degree Course**

**University:** University of Pavia, Via Adolfo Ferrata, 5, 27100 Pavia PV

**Course:** Structural mechanics, 6 CFU

**Advisor:** Prof. Carlo Cinquini, Prof. Eng. Paolo Venini

**Teaching topic:** Finite elements methods, Trusses, Eulero-Bernoulli beam, Timoshenko beam, Basic knowledge of structural dynamics, Theory of Instability, Implementation in Matlab (engaged for 22 hours)

October 2016 - February 2017

**Teaching assistant Bachelor's degree Course**

**University:** University of Pavia, Via Adolfo Ferrata, 5, 27100 Pavia PV

**Course:** Structural mechanics, 6 CFU

**Advisor:** Prof. Carlo Cinquini, Prof. Eng. Paolo Venini

**Teaching topic:** Finite elements methods, Trusses, Eulero-Bernoulli beam, Timoshenko beam, Basic knowledge of structural dynamics, Theory of Instability, Implementation in Matlab (engaged for 22 hours)

October 2015 - February 2016

**Teaching assistant Bachelor's degree Course**

**University:** University of Pavia, Via Adolfo Ferrata, 5, 27100 Pavia PV

**Course:** Structural mechanics, 6 CFU

**Advisor:** Prof. Carlo Cinquini, Prof. Eng. Paolo Venini

**Teaching topic:** Finite elements methods, Trusses, Eulero-Bernoulli beam, Timoshenko beam, Basic knowledge of structural dynamics, Theory of Instability, Implementation in Matlab (engaged for **22** hours)

Honours and awards  
October – 2021

**Editor's Choice Article**

**Journal:** *Buildings*, MDPI (Basel, Switzerland)

**Paper:** Mucedero, G.; Perrone, D.; Brunesi, E.; Monteiro, R. Numerical Modelling and Validation of the Response of Masonry Infilled RC Frames Using Experimental Testing Results. *Buildings* 2020, 10, 182. <https://doi.org/10.3390/buildings10100182>.

December 2019

**Winner of the International Blind Prediction Competition**

**University/Promoter:** QuakeCoRE, in collaboration with the National Centre for Research on Earthquake Engineering (NCREE)

**Team members:** Eng. Gianrocco Mucedero, PhD Antonio Silva, PhD Eng. Daniele Perrone, Prof. Ricardo Monteiro.

**Activity:** Prediction of the response of two half-scale 7-story RC structures with torsional irregularities, due to masonry infills, to earthquake shaking.

2017 **Erasmus Traineeship**

**University:** University of Pavia, Via Adolfo Ferrata, 5, 27100 Pavia PV

**Object:** Erasmus Traineeship founded by University of Pavia (UNIPV).

**Founded Period:** 6 months

**City:** Amsterdam, Netherlands

**Company:** ARUP, Naritaweg 118, 1043 CA Amsterdam, Netherlands

2015 **Scholarship**

**Promoter:** EDiSU Pavia - Via Sant' Ennodio, 26, 27100 PAVIA

**Object:** Scholarship for merit requirements and facilitations.

2014 **Scholarship**

**Promoter:** EDiSU Pavia - Via Sant' Ennodio, 26, 27100 PAVIA

**Object:** Scholarship for merit requirements and facilitations.

2013 **Scholarship**

**Promoter:** EDiSU Pavia - Via Sant' Ennodio, 26, 27100 PAVIA

**Object:** Scholarship for merit requirements and facilitations.

Memberships

2020 – to present **Member of the Lab: Research & Innovation in multi-hazard Safety & resilience of civil Engineering systems**

**University:** University of Naples Federico II, Corso Umberto I, 40, 80138 Napoli NA

**Lab Head:** Prof. Fulvio Parisi

**Department:** Structures for Engineering and Architecture

**Topics:** Critical infrastructures; Advanced structural simulation; Quantitative risk and resilience analysis to natural, technological and NaTech hazards.

2019 – 2022 **Joint Professor-Student Committee**

**University:** University School for Advanced Studies IUSS, Palazzo del Broletto, Piazza della Vittoria 15, 27100 Pavia PV

**President:** Prof. Nicola Canessa

**Role:** Representative of PhD Students