

# Curriculum Vitæ et Studiorum

Mattia Calò

## Personal information

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Date and place of birth: October 28<sup>th</sup>, 1993; Galatina (LE), Italy

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## Academic studies and career

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*January 2023 – to date:* **Postdoctoral researcher**

- Institution: Istituto universitario di studi superiori di Pavia (Scuola IUSS Pavia), Classe Scienze, Tecnologie e Società (STS).
- Supervisor: Professor Ricardo Monteiro.

The Research focuses on the following goals: monitor and standardize the application of the Guidelines by roadway managers on selected sections; organize and analyse the results of the verification on the various parts of the Guidelines, in order to provide elements for their eventual revision; organize on a national basis theoretical-numerical and experimental studies on topics that are critical and innovative for existing road bridges.

*October 2019 – May 2023:* **Ph.D. in “Design, Modeling and Simulation in Engineering”, curriculum in Civil Engineering and Architecture**

- Key aspects:
- Institution: full scholarship funded by the University of Pavia, Department of Civil Engineering and Architecture.
  - Supervisor: Professor Rui Pinho, Dr. Giammaria Gabbianelli and Dr. Daniele Malomo as co-advisors.
  - Thesis title: “Esamina dell’Applied Element Method: teoria ed applicazioni”.

Activity: The objective of the current PhD research was that of attempting to implement an Applied Element Method (AEM) algorithm to predict the behaviour of structures till the complete collapse, using both Matlab and Visual Studio (C# programming language), and to employ the process of software implementation and validation as a trigger and tool to further understanding the theoretical development of the AEM method, given that only limited work has so far been carried out to examine this formulation in an in-depth manner. Both analytical and numerical examples from validated Finite Element Method (FEM) programs were compared to validate the proposed approach. Particular attention has been paid to program a specific subroutine to adopt a damage-plasticity concrete model derived from a 3D model. In parallel to the main PhD research activities, a full-scale building specimen, named LNEC-BUILD3 and tested under an incremental uniaxial dynamic loading protocol, was modelled in the closed-source software Extreme Loading for Structures (ELS) and the ensuing results compared against the available test data.

*April 2019 – October 2019:* **Postgraduate fellow**

- Key aspects:
- Institution: University of Pavia, Department of Civil Engineering and Architecture.
  - Supervisor: Professor Rui Pinho.
  - Research project: “Development and validation of an algorithm based on Applied Element Method (AEM)”.

Activity: The research purpose was to retrace the evolution of the Applied Element Method (AEM) by means of an interdisciplinary approach focussing both on the development of an algorithm starting from the literature as well as the scrutinization of the theory through benchmark cases modelled in the closed-source software Extreme Loading for Structures (ELS). In addition, reinforced concrete elements, i.e. R/C beams, poorly reinforced deep beams etc, have also been analysed to clarify and scrutinize aspects of the numerical approach.

*October 2016 – February 2019:* **MEng Degree in Civil Engineering specialisation in Structural Design**

- Key aspects:
- Institution: University of Pavia, Department of Civil Engineering and Architecture.
  - Supervisor: Professor Rui Pinho, co-advisors: Dr. Giammaria Gabbianelli and Dr. Daniele Malomo.
  - Thesis title: “Scrutinising the applicability of open-source discontinuum-based methods for collapse analysis of structural systems”.
  - Grade: 109/110.

Activity: The work of the thesis concerned the utilization of two freely available open-source discontinuum-based software solutions with a view to investigate their applicability to the modelling of structural collapse. The outcome of such study demonstrated that, most regrettably, none of the two methods and tools were mature enough to be employed in generalised structural modelling.

## **Research Projects**

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*January 2019 – December 2019:* Italian Department of Civil Protection Project 5 "Web-GIS platform for seismic hazard and damage scenarios in infrastructure system (traffic, port, airport)".

*January 2019 – December 2019:* Italian Department of Civil Protection Project 12 "Web-GIS platform for seismic hazard and damage risk scenarios in industrial chemical plants".

## Publications

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- Calò, M., Malomo, D., Gabbianelli, G. *et al.* Shake-table response simulation of a URM building specimen using discrete micro-models with varying degrees of detail. *Bull Earthquake Eng* 19, 5953–5976 (2021). <https://doi.org/10.1007/s10518-021-01202-0>. Typology: Journal-article.
- “How detailed should your masonry model be?” M. Calò, D. Malomo, G. Gabbianelli, R. Pinho. 14<sup>th</sup> Canada Masonry Symposium (CMS). Typology: Conference paper.
- “Axially equilibrated displacement-based fibre beam element for bidirectional response modelling” F. Cavalieri, M. Calò, J.P. Almeida, R. Pinho. 6<sup>th</sup> edition The new Boundaries of Structural Concrete. Typology: Conference paper.
- “Time dependent assessment corrosion impact on R/C members”, M. Calò, G. Gabbianelli. 8<sup>th</sup> international symposium on life-cycle civil engineering (IALCCE2023). Typology: Conference paper.

## Teaching activities

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*April 2020:* Invited lecturer for the seminar “Analysis and Seismic vulnerability of Silos and Tank”, Mosayk Ltd.

*March 2019 – March 2020:* Teaching assistant for the course “Theory and design of steel constructions”, delivered to fourth year students of the MEng degree in Civil Engineering at University of Pavia held by Professor Roberto Nascimbene.

*March 2019 – March 2020:* Teaching assistant for the course “Design of shell structures”, delivered to final year students of the MEng degree in Civil Engineering at University of Pavia held by Professor Roberto Nascimbene.

*A.Y. 2018 – 2019:* supervisor for one undergraduate student thesis in Civil Engineering at the University of Pavia entitled: “Valutazione di vulnerabilità sismica di serbatoi industriali: comparazione fra metodologie di analisi e verifica” A. Trabatti. Advisor: Professor Roberto Nascimbene and Dr. Giammaria Gabbianelli as co-advisor.

## Honours and awards

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- September 2018 – August 2021:* Study place at Collegio Borromeo in Pavia, a university college of merit recognised and accredited by the Ministry of Education, Universities and Research (MIUR).
- September 2014 – March 2015:* Fully-funded exchange program for research activity (ERASMUS plus) at Universitat Politècnica de Catalunya (UPC), Barcelona (Spain).

## Attended conferences and editorial activities

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- June 2022:* Paper Reviewer for the 12th National Conference on Earthquake Engineering (NCEE), Salt Lake City, Utah.
- May 2021:* Participation to the 14th Canadian Masonry Symposium (CMS), Virtual Congress (originally organized in Montreal).
- January 2021:* Participation to the 14th World Congress in Computational Mechanics (WCCM-ECCOMAS) Congress, Virtual Congress (originally organized in Paris).
- May 2019:* Participation in the “Shear capacity of two simple poorly reinforced deep concrete beams” contest at Norwegian University of Science and Technology (NTNU), Trondheim (Norway).

## Professional consulting and collaborations

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- Since February 2021:* Member of the Province of Alessandria Order of Engineers (A-2362).
- July 2020:* Licensed to practice as a professional engineer with grade: 58/60.
- March 2019 – November 2019:* Development of a software in C# language programming for analysis of Tanks according to Eurocode and other international regulations, Mosayk Ltd.
- March 2019:* Structural analyses and verifications of silos supported by braced steel frames and an iron ARMCO pipe of an industrial plant, Mosayk Ltd.

## Languages and computer knowledge

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*Languages:* Italian (mother language), Spanish and English with proper expertise; curious about Chinese and French cultures.

*Computer knowledge:* good command of programming languages like Python, Matlab, C# and C++, proficient use of software programs as MS Office, SeismoStruct, SeismoSignal, OpenSees, Extreme Loading for Structures, Paraview and Autocad.