

# Antonio P. Sberna

## *Curriculum vitæ*

Department of Structural, Geotechnical  
and Building Engineering  
Politecnico di Torino

✉ [antonio.sberna@polito.it](mailto:antonio.sberna@polito.it)

📁 [antoniosberna.github.io](https://antoniosberna.github.io)

## *Research Fellow of Structural Engineering*

---

### Personal information

Language skills	Italian (native), English (fluent)
Citizenship	Italian
Professional qualification	Professional licensed engineer qualified on 2 <sup>nd</sup> national exam 2020 Registered Professional Engineer in Italy (Enna, numb. 856)

---

### Education

Nov 2020 – Sep 2024	<b>PhD in Civil and Environmental Engineering</b> , <i>Politecnico di Torino</i> . Ph.D. thesis: <i>Engineered design frameworks for the seismic retrofitting of existing structures</i> Advisors: Prof. Giuseppe Marano and Prof. Fabio Di Trapani
Oct 2017 – Jul 2020	<b>MS in Civil Engineering</b> , <i>Politecnico di Torino</i> . Master thesis (in english): <i>Optimal seismic retrofitting of reinforced concrete buildings by steel-jacketing using a genetic algorithm-based framework</i> Advisors: Prof. Fabio Di Trapani and Prof. Giuseppe Marano
Oct 2013 – Apr 2017	<b>BS in Civil Engineering</b> , <i>Università degli studi di Catania</i> . Bachelor thesis (in italian): <i>Influenza dello sforzo normale sul collasso plastico di strutture intelaiate (Effect of axial load on the plastic collapse of frame structures)</i> Advisor: Prof. Annalisa Greco

---

## Visiting research experiences

- 2023 *University of California San Diego* (United States)  
Research topic: *Seismic retrofit optimization of non-ductile RC buildings using soft-computing techniques within the framework of probabilistic performance-based earthquake engineering.*  
Advisor: Prof. J. Conte

---

## Publications in international journals

1. Di Trapani F., Malavisi M., Marano G.C., *Sberna A.P.*, Greco R. "Optimal seismic retrofitting of reinforced concrete buildings by steel-jacketing". *Engineering Structures*, 2020; 219:110864.
2. Di Trapani F., *Sberna A.P.*, Marano G.C. "A new genetic algorithm-based framework for optimized design of steel-jacketing retrofitting in shear-critical and ductility-critical RC frame structures". *Engineering Structures*, 2021; 246:112684.
3. Di Trapani F., Vizzino A., Tomaselli G., *Sberna A.P.*, Bertagnoli G. "A new empirical formulation for the out-of-plane resistance of infilled reinforced concrete frames without prior in-plane loading". *Engineering Structures*, 2022; 266:114422.
4. Di Trapani F., *Sberna A.P.*, Marano G.C. "AI-based optimization framework for the design of seismic retrofitting of reinforced concrete frame structures based on direct costs and EAL". *Computers and Structures*, 2022; 271:106855.
5. Di Trapani F., *Sberna A.P.*, Di Benedetto M., Villar S., Demartino C., Marano G.C. "Dynamic progressive collapse response of multi-storey frame structures with masonry infills". *Structures*, 2023; 54:1336-1349.
6. *Sberna A.P.*, Demartino C., Vanzi I., Di Trapani F. "Cost-effective topology optimization of masonry structure reinforcements by a linear static analysis-based GA framework". *Bulletin of Earthquake Engineering*, 2023; *in-press*.
7. Di Trapani F., Oddo M. C., *Sberna A.P.*, La Mendola L. "Structural health monitoring of masonry structures using stress sensors: Experimental induced damage tests and proposed approach for real-time monitoring". *Construction and Building Materials*, 2024; 449:138077

8. Sberna A.P., Deb A., Di Trapani F., Conte J. P. "Reliability-based seismic retrofitting design methodology for non-ductile reinforced concrete frame structures". *Probabilistic Engineering Mechanics*, Under review
9. Di Trapani F., Di Benedetto M., Sberna A.P., Camata G. "Local shear demand correction model for the analysis of infilled frames using equivalent struts". *Journal of Structural Engineering*, Under review
10. Sadeghzadeh S., Sberna A.P., Di Trapani F., Demartino C. "Enhancing seismic site response analyses: tuning soil properties via genetic algorithms and Bayesian model updating from downhole array data". *Soil Dynamics and Earthquake Engineering*, Under review

---

## Conference proceedings

1. Di Trapani F., Malavisi M., Marano G.C., Sberna A.P. "Genetic algorithm-based optimization of RC frame structures retrofitting with steel jacketing". *IWSS2020 – 1<sup>st</sup> Italian Workshop on Shell and Spatial Structures*, web meeting, June 2020
2. Di Trapani F., Sberna A.P., Tomaselli G., Marano G.C. "Cost-based and EAL based optimization algorithms for seismic retrofitting of RC frame structures". *Italian Concrete Days 2020 - Costruire in calcestruzzo realizzazione, ricerca, attualità e prospettive*, web meeting, April 2021.
3. Di Trapani F., Sberna A.P., Marano G.C. "Cost and EAL based optimization for seismic reinforcement of RC structures". *IGF26 - 26<sup>th</sup> International Conference on Fracture and Structural Integrity*, Turin (Italy), May 2021.
4. Sberna A.P., Di Trapani F., Marano G.C. "Optimization of steel-jacketing retrofitting of shear-critical and ductility-critical RC frame structures by a novel genetic algorithm framework". *COMPDYN 2021 - 8<sup>th</sup> International Conference on Computational Methods in Structural Dynamics and Earthquake Engineering*, streamed from Athens (Greece), June 2021.
5. Di Trapani F., Sberna A.P., Marano G.C. "Expected Annual Loss oriented seismic retrofitting optimization of RC frame structures using a new AI-based framework". *COMPDYN 2021 - 8<sup>th</sup> International Conference on Computational Methods in Structural Dynamics and Earthquake Engineering*, streamed from Athens (Greece), June 2021.

6. Di Trapani F., Tomaselli G., Sberna A.P., Rosso M.M., Marano G.C., Cavaleri L., Bertagnoli G. "Dynamic response of infilled frames subject to accidental column losses". *EUROSTRUCT 2021 – 1<sup>st</sup> Conference of the European Association on Quality Control of Bridges and Structures*, Padua (Italy), September 2021.
7. Sberna A.P., Di Trapani F., Marano G.C. "A novel framework based on Expected Annual Loss for optimizing seismic retrofitting in reinforced concrete structures". *2<sup>nd</sup> fib Symposium on Concrete and Concrete Structures*, Rome (Italy), November 2021.
8. Sberna A.P., Di Trapani F., Marano G.C. "A novel framework based on Expected Annual Loss for optimizing seismic retrofitting in reinforced concrete structures". *2<sup>nd</sup> fib Symposium on Concrete and Concrete Structures*, Rome (Italy), November 2021.
9. Di Trapani F., Sberna A.P., Marano G.C. "Genetic algorithm-based optimization procedure for the seismic retrofitting of existing masonry structures". *14<sup>th</sup> International Conference on Computational Structures Technology*, Montpellier (France), August 2022.
10. Di Trapani F., Sberna A.P., Demartino C., Marano G.C. "Genetic algorithm-based seismic retrofitting optimization for existing masonry structures". *3<sup>rd</sup> European Conference on Earthquake Engineering and Seismology*, Bucharest (Romania), September 2022.
11. Sberna A.P., Di Trapani F., Marano G.C. "A new genetic algorithm framework based on Expected Annual Loss for optimizing seismic retrofitting in reinforced concrete frame structures". *19<sup>th</sup> ANIDIS Conference - Seismic Engineering in Italy*, Turin (Italy), September 2022.
12. Di Trapani F., Sberna A.P., Marano G.C. "A novel genetic algorithm-based optimization framework for minimizing seismic retrofitting interventions costs in existing masonry structures". *19<sup>th</sup> ANIDIS Conference - Seismic Engineering in Italy*, Turin (Italy), September 2022.
13. Di Trapani F., Bogatkina V., Di Benedetto M., Sberna A.P., Petracca M., Camata G. "Simplified Evaluation of the Additional Shear Demand Due to Masonry Infills". *2<sup>nd</sup> Eurasian Conference on OpenSees Days, EOSD 2022* Turin (Italy), July 2022. Published in *Lecture Notes in Civil Engineering*, 2023, 326:1-132023

---

## Presentations at conferences and workshops

- Jul 2024 6<sup>th</sup> Eurasian Conference on OpenSees, Beijing (China), 24<sup>th</sup> - 25<sup>th</sup> July 2024.
- Jul 2024 3<sup>rd</sup> Structural Engineering Workshop, University of Palermo (Italy), 16<sup>th</sup> July 2024.
- Jul 2024 World Conference of Earthquake Engineering 2024, Milan (Italy), 1<sup>st</sup> - 5<sup>th</sup> July 2024.
- Jan 2024 Workshop - Recent research results using OpenSees, University College London (UK), 11<sup>th</sup> January 2024.
- Aug 2023 Engineering Mechanics Institute International Conference 2023, Palermo (Italy), 27<sup>th</sup> – 30<sup>th</sup> August 2023.
- Sep 2022 19<sup>th</sup> Italian Conference on Earthquake Engineering, Turin (Italy), 11<sup>th</sup> – 15<sup>th</sup> September 2022.
- Sep 2022 3<sup>rd</sup> European Conference on Earthquake Engineering and Seismology, Bucharest (Romania), 4<sup>th</sup> – 9<sup>th</sup> September 2022.
- Aug 2022 14<sup>th</sup> International Conference on Computational Structures Technology, Montpellier (France), 23<sup>rd</sup> – 25<sup>th</sup> August 2022.
- Jul 2022 2<sup>nd</sup> Eurasian Conference on OpenSees, Turin (Italy), 7<sup>th</sup> – 8<sup>th</sup> July 2022.
- Nov 2021 2<sup>nd</sup> FIB Symposium on Concrete and Concrete Structures, Rome (Italy), 18<sup>th</sup>–19<sup>th</sup> November 2021.
- Jul 2021 6<sup>th</sup> International course on Seismic Analysis of Structures using OpenSees (as tutor), University of Palermo (Italy), 19<sup>th</sup> - 22<sup>nd</sup> July 2021.
- Jun 2021 COMPDYN 2021 – 8<sup>th</sup> International Conference on Computational Methods in Structural Dynamics and Earthquake Engineering, streamed from Athens (Greece), 28<sup>th</sup> - 30<sup>th</sup> June 2021

---

## Participation in funded research projects

- Member of Politecnico di Torino research unit for the "*Artificial Intelligence for Sustainable seismic risk reduction of Structures*" (AI-SUST) project within the PRIN 2022 program - Italian Ministry of University and Research
- Member of Politecnico di Torino research unit for the "*Artificial Intelligence for Environmental impact minimization of Seismic Retrofitting of Structures*" (AI-ENVISERS) project – funded by European Union – Next Generation EU within the PRIN 2022 PNRR program

---

## Member of scientific and organizing committee of international conferences and courses

- Organizing committee of *6<sup>th</sup> Eurasian Conference on OpenSees* - Beijing (China), 24<sup>th</sup> - 25<sup>th</sup> July 2024.
- Organizing committee of *8<sup>th</sup> international course on "Seismic analysis of Structures using OpenSees"* - Tsinghua University (China), 22<sup>nd</sup> - 23<sup>rd</sup> July 2024.
- Scientific and organizing committee of *"OpenSees Days Eurasia" - 2<sup>nd</sup> Eurasian Conference on OpenSees* - Turin (Italy), 7<sup>th</sup> - 8<sup>th</sup> July 2022.
- Scientific and organizing committee of *7<sup>th</sup> international course on "Seismic analysis of Structures using OpenSees"* - Politecnico di Torino (Italy), 5<sup>th</sup> - 6<sup>th</sup> July 2022.

---

## Teaching activities

- |                      |   |
|----------------------|---|
| 2023 - 2024 (spring) | Teaching assistance, <i>Safety assessment and retrofitting of existing structures and infrastructures</i> (in english), graduate class - School of Engineering, Politecnico di Torino (Italy) |
| 2020 - 2021 (spring) | Teaching assistance, <i>Safety assessment and retrofitting of existing structures and infrastructures</i> (in english), graduate class - School of Engineering, Politecnico di Torino (Italy) |

---

## Invited lectures and workshops

- |          |   |
|----------|---|
| Jul 2024 | <i>8<sup>th</sup> International Course on "Seismic Analysis of Structures using OpenSees"</i> , Thematic lecture on: <i>Linear and non-linear dynamic analyses of structures using OpenSees</i> , Tsinghua University (China) |
|----------|---|

---

## Book chapters

- Di Trapani F., *Structural Analysis Methods: Beam and Planar Frame Systems*. Chapter 6 - Performing planar frame structures using MATLAB®, CLUT Editore, Turin 2022. ISBN: 9788879924894

---

## Thesis advisor

- Fabio Fraschini - *Development of a Graphical User Interface for the Analysis of Reinforced Concrete Sections*. Supervisors: Di Trapani F., Sberna A.P., Politecnico di Torino, 2024.
- Cristian Marra - *Definition of reduced structural models for the nonlinear dynamic analysis of framed reinforced concrete structures*. Supervisors: Di Trapani F., Sberna A.P., Politecnico di Torino, 2024.
- Santosh Shrestha - *Calibration of a multi-strut macro model for seismic analysis of infilled reinforced concrete frames*. Supervisors: Di Trapani F., Sberna A.P., Di Benedetto M., Politecnico di Torino, 2024.
- Alexandre Milliet - *Investigation of collapse resistance in tall timber buildings*. Supervisors: Frangi A., Cao A. S., Sberna A.P., ETH Zurich, 2023.
- Dario Coletta - *Optimization of seismic reinforcement for masonry structures using genetic algorithms*. Supervisors: Di Trapani F., Sberna A.P., Politecnico di Torino, 2021.

---

## Reviewer for international journals

- Advances in Structural Engineering. ISSN: 1687-8086
- Journal of Asian Architecture and Building Engineering. ISSN: 1346-7581
- Buildings. ISSN: 2075-5309
- Algorithms. ISSN: 1999-4893
- Modelling. ISSN: 2673-3951
- AI. ISSN: 2673-2688
- Symmetry. ISSN: 2073-8994
- Natural Hazards. ISSN: 0921-0301
- Big Data and Cognitive Computing. ISSN: 2504-2289
- Sustainability. ISSN: 2071-1050

Turin, November 20<sup>th</sup>, 2024

*Antonio P. Sberna*