Antonio P. Sberna

Curriculum vitæ

Department of Structural, Geotechnical
and Building Engineering
Politecnico di Torino
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Research Fellow of Structural Engineering

Personal information

Language skills	Italian (native), English (fluent)
Citizenship	Italian
Professional qualification	Professional licensed engineer qualified on 2nd national exam 2020 Member of the Engineering Chamber of Enna (Italy) numb. 856

Education

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

Visiting research experiences

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

Publications in international journals

1. Di Trapani F., Malavisi M., Marano G.C., <u>*Sberna A.P.*</u>, Greco R. "Optimal seismic retrofitting of reinforced concrete buildings by steel-jacketing". *Engineering Structures*, 2020; 219:110864.

2. Di Trapani F., <u>*Sberna A.P.*</u>, 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., <u>*Sberna A.P.*</u>, 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., <u>*Sberna A.P.*</u>, 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., <u>*Sberna A.P.*</u>, 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. <u>*Sberna A.P.*</u>, 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., <u>*Sberna A.P.*</u>, 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. <u>*Sberna A.P.*</u>, 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., <u>*Sberna A.P.*</u>, 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., <u>*Sberna A.P.*</u>, 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., <u>*Sberna A.P.*</u> "Genetic algorithm-based optimization of RC frame structures retrofitting with steel jacketing". *IWSS2020 – 1st Italian Workshop on Shell and Spatial Structures*, web meeting, June 2020

2. Di Trapani F., <u>*Sberna A.P.*</u>, 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., <u>*Sberna A.P.*</u>, Marano G.C. "Cost and EAL based optimization for seismic reinforcement of RC structures". *IGF26 - 26th International Conference on Fracture and Structural Integrity*, Turin (Italy), May 2021.

4. <u>*Sberna A.P.*</u>, 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 - 8th International Conference on Computational Methods in Structural Dynamics and Earthquake Engineering*, streamed from Athens (Greece), June 2021.

5. Di Trapani F., <u>*Sberna A.P.*</u>, Marano G.C. "Expected Annual Loss oriented seismic retrofitting optimization of RC frame structures using a new AI-based framework". *COMPDYN 2021 - 8th 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 – 1st 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". _2nd 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". _2nd 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". _14th 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". _3rd 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". _19th 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". _19th 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". _2nd 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

Jun 2021 COMPDYN 2021 – 8th International Conference on Computational Methods in Structural Dynamics and Earthquake Engineering, streamed from Athens (Greece), 28th - 30th June 2021

Jul 2021 6th International course on Seismic Analysis of Structures using OpenSees (as tutor), University of Palermo (Italy), 19th - 22nd July 2021.

Nov 2021 2nd FIB Symposium on Concrete and Concrete Structures, Rome (Italy), 18th–19th November 2021.

Jul 2022 2nd Eurasian Conference on OpenSees, Turin (Italy), 7th – 8th July 2022.

Aug 2022 14th International Conference on Computational Structures Technology, Montpellier (France), 23rd – 25th August 2022.

Sep 2022 3rd European Conference on Earthquake Engineering and Seismology, Bucharest (Romania), 4th – 9th September 2022.

Sep 2022 19th Italian Conference on Earthquake Engineering, Turin (Italy), 11th – 15th September 2022.

Aug 2023 Engineering Mechanics Institute International Conference 2023, Palermo (Italy), 27th – 30th August 2023.

Jan 2024 Workshop - Recent research results using OpenSees, University College London (UK), 11th January 2024.

Jul 2024 World Conference of Earthquake Engineering 2024, Milan (Italy), 1st - 5th July 2024.

Jul 2024 3rd Structural Engineering Workshop, University of Palermo (Italy), 16th July 2024.

Jul 2024 6th Eurasian Conference on OpenSees, Beijing (China), 24th - 25th July 2024.

Participation in funded research projects

- Member of Politecnico di Torino research unit for the "*Artificial Intelligence for SUainable seismic risk reduction of STructures*" (AI-SUST) within the PRIN 2022 program - Italian Ministery 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

- Scientific and organizing committee of *7th international course on "Seismic analysis of Structures using OpenSees"* - Politecnico di Torino (Italy), 5th - 6th July 2022.

- Scientific and organizing committee of *"OpenSees Days Eurasia" - 2nd Eurasian Conference on OpenSees* - Turin (Italy), 7th - 8th July 2022.

- Organizing committee of *8th international course on "Seismic analysis of Structures using OpenSees"* - Tsinghua University (China), 22nd - 23rd July 2024.

- Organizing committee of *6th Eurasian Conference on OpenSees* - Beijing (China), 24th - 25th July 2024.

Teaching activities

2020 - 2021 (spring)   Teaching assistance, *Safety assessment and retrofitting of existing structures and infrastructures* (in english), graduate class - School of Engineering, Politecnico di Torino (Italy)

2023 - 2024 (spring)   Teaching assistance, *Safety assessment and retrofitting of existing structures and infrastructures* (in english), graduate class - School of Engineering, Politecnico di Torino (Italy)

Invited lectures and workshops

Jul 2024   *8th International Course on "Seismic Analysis of Structures using OpenSees"*, Thematic lecture on: *Linear and non-linear dynamic analyses of structures using OpenSees*, 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

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

Turin, November 20$^{\text{th}}$, 2024   *Antonio P. Sberna*