PERSONAL INFORMATION

Raihan Rahmat Rabi

EDUCATION AND TRAINING

26 Feb 2020 — PhD in Structural Engineering

Organization	Department of Structural and Geotechnical Engineering, Sapienza University of Rome
Thesis title	*Proposal of an energy-based method for the design of passive energy dissipative braces*
Supervisor	Prof. Giorgio Monti
Objectives achieved	A novel energy-based methodology was developed for the optimum design of dissipative devices aimed at retrofitting existing buildings. Through rigorous analysis and case studies, this method demonstrated better efficacy compared to contemporary methodologies documented in the current literature.

28 Feb 2016 — Master of Science (MSc) in Structural Engineering

Organization	Department of Structural and Geotechnical Engineering, Sapienza University of Rome
Thesis title	*Rehabilitation of an irregular reinfoced concrete library building using linear steel bracings*
Supervisor	Prof. Giorgio Monti
Main objectives	Modelling, assessment and rehabilitation of an irregular RC building through linear steel bracing systems located in the city of L'Aquila, Italy, which has suffered damage in the 2009 L'Aquila earthquake. The efficiency of the linear bracing system was shown through both static and dynamic analysis.

30 Oct 2012 — BSc Undergraduate Exchange Student

Organization	*Department of Structural and Geotechnical Engineering* *Sapienza University of Rome*
Project title	Erasumus Mundus Action 2 – Funded by European Union
Project - Coordinator	Prof. Giorgio Monti
Main activities	An extensive coursework on advanced modelling, evaluation, analysis and design of buildings, and bridges was thoroughly followed and a number of projects as a part of final examination of various subjects were successfully submitted.

30 Jul 2013 **Bachelor of Science (BSc) Degree in Civil Engineering**

Organization *Civil Engineering Faculty*
Nangarhar University

Thesis title *Design of a sports complex using composite elements*

Relatore Prof. Bahauddin Jalali

Main objectives Modelling of the complex compostit structure using Opensees and parametric design of various structural elements optimizing structural performance and construction cost.

RESEARCH EXPERIENCE

April 2023 – present **Post-Doctorate Researcher**

Disciplinary Field Structural Analysis and Design (ICAR/09)

Affiliation Department of Structural and Geotechnical Engineering,
Sapienza University of Rome, Italy

Project Title *Structural health monitoring of railway bridges through the use of neural networks and machine learning*

Scientific Director Prof. Giorgio Monti

Main objectives The main objective of the research is to offer railway managers a tool equipped with advanced algorithms, which could promptly identify any anomalies in the structural behavior and can provide indications for any strengthening and/or limitations of use to maintain the infrastructure within predefined safety limits and keep its functionality unaffected.

April 2022 – March 2023 **Post-Doctorate Researcher**

Disciplinary Field Structural Analysis and Design (ICAR/09)

Affiliation Department of Structural and Geotechnical Engineering,
Sapienza University of Rome, Italy

Project Title *Vulenrability assesement of the Italian reinforced concrete building stock through simplified mechanical model*

Scientific Director Prof. Giorgio Monti

Main objectives The research activities focused on developing a simplified mechanical model to assess the stuctural capacity and subsequently develop the analytical numerical fragility curves for various subsets of RC buildings exhibiting column-driven failure.

April 2021 – March 2022 **Post-Doctorate Researcher**

Disciplinary Field Structural Analysis and Design (ICAR/09)

Affiliation Department of Architectural and Civil Engineering,
Univeristy of L'Aquila, Italy

Project Title *Rapid seismic risk assessment of highway bridges using UAV aerial photogrammetric survey*

Scientific Director Prof. Amedeo Gregory

Main objectives The research project aimed at development of a framework for the 3D geometry reconstruction of the bridge using Unmanned Aerial Vehicle (UAV) and automate the extraction of geometric characteristics of bridges from the 3D reconstructed geometry, which aids in the expeditious seismic risk assessment of the infrastructure.

Sep 2020 – Dec 2021

Research Grant

Disciplinary Field: Structural Analysis and Design (ICAR/09)

Affiliation: Department of Structural and Geotechnical Engineering,
Sapienza University of Rome, Italy

Project Title: *Study of the analytical/numerical aspects of different intervention strategies on existing buildings*

Scientific Director: Prof. Giorgio Monti

Main objectives: The main objective of the research included the in-depth study of the existing methods in the literature focused on strengthening the structural capacity of the existing buildings and explore the advantages and shortcomings of these methods through a comprehensive application on several existing buildings. The effort was made to propose an effective and innovative approach in the field of structural rehabilitation through hysteretic energy dissipative braces.

PROFESSIONAL WORK EXPERIENCE

June 2023– present

EleO2 Engineering Srl

Rome, Italy

Project: *Seismic analysis of liquid storage tanks and development of simplified models for developing fragility curves through incremental non-linear dynamic analysis*

Main activites: Research oriented project focused on developing a simplified surrogate model for the assessment of 45 liquid storage tanks owned by Tupras Trading Ltd located in Izmir province of Turkey. Following objectives are completed thus far:

Development of a simplified model for the seismic analysis of liquid storage tanks

Programming the entire framework in Python language that is able to derive fragility curves of liquid storage tanks at various liquid heights using incremental dynamic analysis through a surrogate simplifed model

Calculation of seismic risk

Oct 2017 – present

Seico Srl Engineering Consultancy

Rome, Italy

Main activites:

Modelling, Analysis and Design of new structures such as buildings, bridges, culverts,
Performance assessment of existing steel, reinforced concrete, timber and/or masonry structures
Design of strengthening/rehabilitation systems through FRP, Steel Jacketing, EDIL CAM, etc.

Notable projects:

Seismic assessment and retrofitting of Santa Lucia train station main building in Milan

Design of extension steel building of departures Terminal at Ciampino Airport in Rome.

Seismic assessment and retrofitting of RAI radio television main building in Rome.

Seismic assessment and retrofitting of 9 storey condominium building in central Rome.

TEACHING AND TUTORING EXPERIENCE

Oct 2019 – July 2020

Thesis Co-Supervisor

Thesis title: *Territorial seismic risk assessment of buildings considering local site characteristics*

Course: BSc in Sustainable Building Engineering

Faculty of Civil and Environmental Engineering,
Sapienza University of Rome

Main role: Support and assistance in Python programming and structural calculation in the evaluation of seismic risk of reinforced concrete buildings. Furthermore, assistance was provided in revision and organization of the thesis.

Oct 2017 – present

Teaching Assistance

Course: BSc in Sustainable Building Engineering
Sapienza Univeristy of Rome, Italy

Subject: *Seismic design of structures (9 credits)*

Organization: Civil Engineering Faculty
Sapienza Univeristy of Rome

Main responsibilities: Assistance in the structural design of buildings subject to seismic and wind actions and assistance in the use of structural modeling and calculation programs.

ADVACNED COURSES

9, 16, 23 Apr 2018

Finite Element Analysis (16 hours)

Lecturer: Prof. Daniela Addessi

Department of Structural and Geotechnical Engineering,
Sapienza University of Rome, Italy

17 Feb 2017

Seismic Analysis of RC Structures using OpenSees (28 hours)

Lecturer: Prof. Cristoforo Demartino, Francesco Marmo, Davide Lavorato, Giuseppe Quaranta

Organizing body: Faculty of Architecture

University of Roma Tre

7 – 8 July 2017

Fundamentals of structural optimization, the design of structures through the analysis of critical cases (16 hours)

Lecturer: Prof. Franco Bontempi

Organizing body: Department of Structural and Geotechnical Engineering,
Sapienza University of Rome, Italy

2 Mar – 4 May 2017

Introduction to continuum thermomechanics (30 hours)

Lecturer: Prof. Davide Bernardini

Organizing body: Department of Structural and Geotechnical Engineering,
Sapienza University of Rome, Italy

29 Feb – 6 June 2017

Dynamics of Structures (60 hours)

Lecturer: Prof. Maurizio De Angelis

Organizing body: Department of Structural and Geotechnical Engineering, Sapienza University of Rome, Italy

29 Feb – 26 May 2016

Structural modelling for the design of complex structures (75 hours)

Lecturer: Prof. Francesco Romeo

Organizing body: Department of Structural and Geotechnical Engineering, Sapienza University of Rome, Italy

29 Jan – 26 Feb 2017

Information literacy support and research strategy skills (10 hours)

Lecturer: Prof. Mary Joan Crowley

Organizing body: Department of Structural and Geotechnical Engineering, Sapienza University of Rome, Italy

29 Jan – 26 Feb 2017

Numerical implementation of inelastic constitutive equations (8 hours)

Lecturer: Prof. Claudio Tamagnini

Organizing body: Department of Structural and Geotechnical Engineering, Sapienza University of Rome, Italy

SCHOLARSHIPS, AWARDS AND CERTIFICATES

Nov 2016 –2019

MAE grant for Doctoral Research

winner of grant offered by Ministry of Foreign Affairs of Italy for doctoral research

Field of research: Structural engineering

Organization: Department of Structural and Geotechnical Engineering, Sapienza University of Rome, Italy

EDITORIAL COMMITTEE AND SERVICE AS REVIEWR

Oct 2023 - present

Guest Editor

Journal: *Designs (MDPI)*

Special Issue: Seismic Retrofitting of Buildings and Infrastructures

Designs | Special Issue: Seismic Retrofitting of Buildings and Infrastructures (mdpi.com)

Dec 2022 - Present

Review services

Journals

1. *Measurement*
2. Engineering Structures
3. Mechanical Systems and Signal Processing

4. MDPI (Buildings, Applied Sciences, Infrastructure

Mar 2021 – present
Member of the editorial board as Review Editor

Web Journal: Frontiers in Built Environment

MEMBER OF RESEARCH ENTITIES

2022 – present
Project DPC – ReLUIS (2022 - 2024)

Project Title: *Vulnerability of residential buildings: fragility curves for reinforced concrete and aggregate buildings*

Scientific Director: Prof. Giorgio Monti

Financial Support: Consorzio della Rete dei Laboratori Universitari di Ingegneria Sismica e Strutturale (ReLUIS)

Main activities: Development of fragility curves for reinforced concrete and aggregate buildings through simplified mechanical model, and the transformation of the develeoped fragility curves across the territory considering local site characteristics such as soil and topography.

2021 –2022
Project CRUI (2021 - 2022)

Project Title: *Rapid seismic risk assessment of highway bridges*

Scientific Director: Prof. Giorgio Monti

Financial Support: Conferenza dei Rettori delle Universita Italiane (CRUI)

Main activities: In phase 1 the Unmanned Aerial Vehicles were used to extract the 3D geometry of the highway bridges. In phase 2 the extracted geometry was used to produce fragility curves of the highway bridges through a simplified analytical model. In phase 3 the seismic risk was evaluated through the convolution of the produced fragility curves and the local seismic hazard curve.

2020 - 2021
Project DPC — ReLUIS (2020 - 2021)

Project title: *The influence of local site chracteristics and spectral shape in the transformation of fragility curves*

Scientific Director: Prof. Giorgio Monti

Financial Support: Consorzio della Rete dei Laboratori Universitari di Ingegneria Sismica e Strutturale (ReLUIS)

Main activities: The influence of spectral shape and local site characteristics were thoroughly studied and their role was demonstrated through several case studies. Subsequently, a closef-form procedure was developed for the transformation of peak ground acceleration based fragility curves through out the territory considering local site characteristics and spectral shape.

PRODUCTS OF RESEARCH ACTIVITIES

I – PhD THESIS

[1] **Rahmat Rabi, R.** (2020). *Proposal of an energy-based method for the design of passive energy dissipative braces. PhD Thesis, Sapienza University of Rome, Italy*

II – PUBLICATIONS IN PEER REVIEWED JOURNALS

[2] **Rahmat Rabi, R**., (2025) Shear Capacity Assessment of Hollow-Core RC Piers via Machine Learning, *Structures*
DOI: https://doi.org/10.1016/j.istruc.2025.108961

[3] **Rahmat Rabi, R**., Monti, G., (2025) Genetic Algorithm-Based Model Updating in a Real-Time Digital Twin for Steel Bridge Monitoring, *Applied Sciences*
DOI: https://doi.org/10.3390/app15084074

[4] **Rahmat Rabi, R**., Monti, G., (2025) Machine Learning-Derived Equations for Seismic Fragility of Hollow-Core Bridge Piers Using Analytical Models and Visible Parameters, *Structures*
DOI: https://doi.org/10.1016/j.istruc.2025.108792

[5] **Rahmat Rabi, R**. M., Monti, G., Seismic Vulnerability Assessment of Existing Ground-Supported Liquid Storage Tanks with Deformed Shells, *Applied Sciences* **2024**, *14*(24), 11948
DOI: https://doi.org/10.3390/app142411948

[6] **Rahmat Rabi, R**., Vailati, M., Monti, G., Effectiveness of Vibration-Based Techniques for Damage Localization and Lifetime Prediction in Structural Health Monitoring of Bridges: A Comprehensive Review, *Buildings* **2024**, *14*(4), 1183
DOI: https://doi.org/10.3390/buildings14041183

[7] **Rahmat Rabi, R**., Monti, G., Fragility curves of hollow-core bridge piers for territorial risk studies using closed-form equations, *Structures, Vol. 61,*

DOI:10.1016/j.istruc.2024.105966

[8] Monti G., **Rahmat Rabi R**., Demartino C. (2024), Spectrum-consistent ag-based fragility curves, *Reliability Engineering and System Safety*
DOI: https://doi.org/10.1016/j.ress.2024.109977

[9] Monti G., **Rahmat Rabi R.**, Vailati M. (2024), Direct displacement-based design of dissipative bracings for seismic retrofit of reinforced concrete buildings, *Journal of Building Engineering 82, no. 108208*
DOI: https://doi.org/10.1016/j.jobe.2023.108208

[10] **Rahmat Rabi R.,** Bianco V, Monti G. (2021) Mechanical-Analytical Soil-Dependent Fragility Curves of Existing RC Frames with Column-Driven Failures, *Buildings* 11, no. 7: 278.
DOI: https://doi.org/10.3390/buildings11070278

[11] **Rahmat Rabi R.,** Bianco V., Monti G. (2021) Energy-based method to design hysteretic bracings for the seismic rehabilitation of low-to-medium rise RC frames, *Bulletin of earthquake engineering*
DOI: https://doi.org/10.1007/s10518-021-01249-z

[12] **Rahmat Rabi R.,** Vailati M., Monti G. (2022), Simplified pushover analysis for the assessment of shear-type RC frames, Appl. Sci. 2021, 11(24), 11711
DOI: https://doi.org/10.3390/app112411711

III PUBLICATIONS IN INTERNATIONAL CONFERENCES

[13] **Rahmat Rabi, R.,** Monti, G., (2024), Energy-based design of dissipative bracing systems for seismic retrofitting of RC buildings, *The 18th World Conference on Seismic Isolation, Antalya, Turkey*

[14] **Rahmat Rabi, R**., M., Monti, G., Energy-based Design of Dissipative Bracing Systems for Seismic Retrofitting of RC 18th World Conference on Seismic Isolation (18WCSI)-Volume 2
DOI: https://doi.org/10.1007/9

[15] **Rahmat Rabi, R.,** Monti, G., Non-iterative Hysteretic Bracings Design Procedure for Retrofitting of RC Frames *Building for the Future: Durable, Sustainable, Resilient. fib Symposium 2023. Lecture Notes in Civil Engineering, vol 350. Springer, Cham*.
DOI: https://doi.org/10.1007/978-3-031-32511-3_7

IV PUBLICATIONS UNDER-REVIEW IN PEER REVIEWED JOURNALS

[1] **Rahmat Rabi, R.,** Monti, G, (2025). Seismic Risk Assessment of Code-Noncompliant Reinforced Concrete Frames Using Spectrum-consistent Fragility Fuses and Nonlinear Hazard, Under Review in *Engineering Structures*

[2] Monti, G., **Rahmat Rabi, R,** (2025). Data-Driven Decision Support System for the Safety Management of Railway Bridge Networks, Under Review in *Journal of Reliability Engineering and System Safety*

PRESENTING AUTHOR IN CONFERENCES

1. **Rahmat Rabi, R.** (*Presenting Author*)**,** Monti, G., Non-iterative Hysteretic Bracings Design Procedure for Retrofitting of RC Frames, *fib Symposium 2023. Istanbul Turkey, June 5-9*
2. **Rahmat Rabi, R.** (*Presenting Author*)**,** Monti, G., Energy-based design of dissipative bracing systems for seismic retrofitting of RC buildings, *The 18th World Conference on Seismic Isolation. Antalya, Turkey, November 6-10*
3. **Rahmat Rabi, R.** (*Presenting Author*)**,** Monti, G., Automatic procedure for developing fragility curves of bridge piers using Openseespy, Opensees Days Conference 2022. Torino, Italy. July 7-8

MAIN RESEARCH EXPERTISE

Seismic vulnerability assessment
Simplified modelling
Numerical modelling- linear and nonlinear
Territorial risk assessment

The Candidate's research activity focuses on the typological definition and detailed analysis of refined and simplified models for the assessment of the seismic vulnerability of new and existing buildings, the latter case referring in particular to the Italian residential heritage.
The majority of scientific production is dedicated to the assessment and retrofitting of existing buildings using hsyteretic energy dissipative bracings and base Isolators.
The Candidate has research experience on non-linear, static and dynamic analyses, of structures in 'as-built' and 'retrofitted' configurations using traditional or alternative seismic risk mitigation strategies, such as dissipative devices.

COMPUTER SKILLS

Modelling	AutoCAD, Rhinoceros (Grasshopper, Karamba, TopOpt, Millepede, Octopus, Ameba), Revit
Programming languages	Python, MATLAB
Structural Analysis	SAP2000, Ansys Mechanical, Ansys Workbench, OpenSees, MIDAS

PERSONAL SKILLS

Mother tongue(s) Pashto

Other language(s)	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	

English	C1	C1	C1	C1	C1
	Certificate of Proficiency In English				
Italian	B2	B2	B2	B2	B2
	Certificate In Italian Language				

Levels: A1/2: Basic user - B1/2: Independent user - C1/2 Proficient user
Common European Framework of Reference for Languages

Attachments

- Scan copy of BSc Degree
- Scan copy of Master Degree
- Scan of PhD degree
- Scan copy of research contracts

Dati personali

Autorizzo il trattamento dei miei dati personali ai sensi del Decreto Legislativo 30 giugno 2003, n. 196 "Codice in materia di protezione dei dati personali

Il sottoscritto dichiara di essere consapevole che il presente curriculum vitae sarà pubblicato sul sito istituzionale dell'Ateneo, nella Sezione "Amministrazione trasparente", nelle modalità e per la durata prevista dal d.lgs. n. 33/2013, art. 15.

Data 23/04/2025 *f.to*