



DEPARTMENT OF STRUCTURES FOR ENGINEERING AND ARCHITECTURE
PHD PROGRAM IN
STRUCTURAL, GEOTECHNICAL ENGINEERING AND SEISMIC RISK

CYCLE XXXIX

The undersigned prof. Beatrice Faggiano

(Full ☐ Associate X Researcher ☐) Department of Structures for
Engineering and Architecture, S.S.D. ICAR/09 Structural Engineering

ASKS

to be included in the list of tutors for cycle XXXIX.

1. Curriculum vitae (max 500 words)

ACADEMIC CAREER:

2001 Doctoral degree in Structural engineering at UNINA.

Since 2005 Assistant professor in Structural Engineering.

Since 2013 Qualified as Associate professor in Structural Engineering.

2021 Associate professor in Structural Engineering.

- Teaching posts in national and international II level masters in the domains of Metallic Structures, Timber constructions, Glass Engineering.
- Tutor for more than 90 degree theses, 9 PhD theses and 8 visiting foreign students.
- Responsible of 8 Erasmus bilateral agreements with European universities.

RESEARCH ACTIVITY:

- Research areas: Structural Engineering, Submerged Floating Tunnel, steel, timber structures, Earthquake engineering, vulnerability of historical and monumental buildings against exceptional actions.
- Author of more than 275 papers in national and international journals, conference proceedings, technical documents, monographs.

OTHER ACHIEVEMENTS:

- Tutor inside the Professor Council of the PhD Course DISGERS at UNINA;
Member of: professor councils for the II level master courses in the domain of civil engineering, the Erasmus Commission for DiSt; CNR, Committees for design, construction and testing of timber structures and for elements made of glass; IIWC – Italian ICOMOS Wood Committee; the Intern. Associations for Bridge Maintenance and Safety (IABMAS) and for Life Cycle Civil Engineering (IALCCE); Fib, Task Group 1.2 Concrete Structures in marine environment., WP 1.2.4
'Submerged/floating bridges in seismic areas'.



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- Member of organizing and scientific committees of International Conferences, also co-editor of proceedings; Behaviour of Steel Structures in Seismic Areas STESSA; Earthquake Protection of Historical Buildings by Reversible Mixed Technologies PROHITECH; COST Action C26 Urban Habitat Constructions under Catastrophic Events; Steel and Composite Structures EUROSTEEL; SHATIS Structural health assessment of timber structures; SUFTUS Submerged Floating Tunnels and Underwater Tunnel Structures; WCTE World Conference on Timber Structures.
- Organizer and chairman of special sessions and minisimposia, on submerged floating tunnels (9th Intern. Conf. on Bridge Maintenance, Safety and Management, IABMAS 2018, 2020; 2022, 2024, 14th Intern. Conf. on Vibration Problems, ICOVP 2019), as well as on timber structures (SHATIS'19, XIX Convegno ANIDIS 2022 - L'ingegneria sismica in Italia; WCTE2023, IALCCE2023 8th Intern. Symposium on Life-Cycle Civil Engineering).
- Responsible (with prof. Raffaele Landolfo) of the international trilateral agreement for Cooperation, in the field of Structural Engineering and in particular of Submerged Floating Tunnel, among Korea Advanced Institute of Science and Technology (Research Center for Smart Submerged Floating Infrastructural Systems), Zhejiang University (Research Center for Submerged Floating Tunnel) and the University of Naples, Federico II (Dist).
- Participant to national and international research projects, also as research responsible.
- Participant to national and international conferences as speaker, chairman and invited lecturer.
- Lecturer within national and international specialized courses.
- Referee for national and international journals, research projects and conference proceedings.

EXHIBITION

05/2017 Engineering: Archimedes Bridge, a submerged floating tunnel. TDW2017 Tianjin International Design Week 2017: The future is now. Beijing cultural creative center, Italian Pavilion.

AWARD

2018 Wibe Prize - best ranked 30 Papers among 200. Paper title The submerged floating tunnel: a new frontier for strait crossings, B. Faggiano, G. Iovane, R. Landolfo, F. M. Mazzolani

2. PhD students of whom the undersigned has been a tutor in the last three years

n. 1	Dante Marranzini (XXXVI cycle) type of scholarship: none
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3. Topic of the proposed research

Seismic resistant heavy timber structures

4. Field of study

Geotechnical Engineering ☐

Structural Engineering ☒

Seismic Risk ☐

5. Type of Scholarship for the project proposal

Ateneo ☒

DM 117 (Investimento 3.3)

(in questo caso indicare l'azienda co-finanziatrice)

DM 118 (Investimento 4.1 P.A.) ☐

DM 118 (Investimento 4.1 generici) ☒

DM 118 (Investimento 4.1 Patrimonio culturale) ☐

6. Summary of the research project (max 500 words. State of the art, short program planned for the activities, etc.)

The interest of the scientific community to timber structures in seismic areas is enhanced nowadays, as it is testified by the research activities carrying on worldwide, like in Italy, Portugal, Canada, New Zealand, Japan, devoted to either experimental test campaigns on timber structural systems and nodal assemblages, or numerical modelling and structural capability evaluation. The acquired knowledge and technology of timber engineering allows to introduce seismic resistant timber multistory multispan buildings, with moment resisting frames and concentric or eccentric braced frames, as well as shear wall, concrete wall and concrete core frames. These structural systems are widely used and consolidated in the anti-seismic steel constructions, which have the similarity with timber constructions to be assemblage of members through appropriate joints, even though steel and timber are different materials for origins and mechanical properties. In fact timber material has an elastic and fragile behavior up to failure, so that, in order to comply with the current approach to the seismic design of dissipative structures, the common view is that joints should be dissipative through plastic deformations of metallic connectors. This is up to now indicated in the present anti-seismic regulations, such as in Europe the Eurocode 8. However, joints are primary structural elements, with a crucial role in bearing the design loads, therefore the dissipation function should be assumed by ad hoc conceived dissipation devices, as an alternative to connections.



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In line with this, capacity design concepts, for seismic moment resisting and bracings timber frames, both not dissipative and dissipative ones, can be adapted and applied to timber structures. In particular, the capacity design rules can be applied by means of the component method, through the definition of collapse hierarchy criteria, allowing to preserve the timber beam and the joint subcomponents from damage. Moreover the dissipation capabilities of structures equipped with seismic devices can be evaluated, aiming at the determination of the corresponding behaviour q-factors. It is also noted that reliable estimations of the structural behaviour of timber buildings is possible through a full understanding of the joint behaviour. At present, there is not a standard method for identifying the mechanical behaviour of timber connections. To fill this gap, a joint classification method inspired by Eurocode 3 can be used. This is the object of the research study, with the aim to define structural types, constructional details and design criteria for timber seismic resistant structures, as a background study for the preparation of design guidelines. In particular the focus is on heavy timber frames equipped with ductile steel links and fluid viscous dampers. The project can be articulated in the following main tasks:

1. State of art
2. Joints: conception of archetypes, design, modelling, mechanical classification, numerical vs experimental tests
3. Timber frames with steel links: conception of archetypes, design, modelling, parametric seismic analysis of multistory frames
4. Timber frames with FVD: conception of archetypes, design, modelling, parametric seismic analysis of multistory frames
5. Definition of the design criteria
6. Preparation of guidelines for the design of seismic resistant heavy timber structures.

7. Research publications

- 2023 Iovane G., Rodrigues L., Branco J., Faggiano B.. Monotonic tests on beam-to-column joint with steel link for timber seismic resistant structures. In World Conference on Timber Engineering(WCTE) 2023. 19-22 Giugno 2023, Oslo, Norvegia.
- 2023 Iovane G., Noviello C., Mazzolani F.M., Landolfo R., Faggiano B.. A proposal for the mechanical classification of beam-to-column joints for timber structures. In World Conference on Timber Engineering (WCTE) 2023. 19-22 Giugno 2023, Oslo, Norvegia.
- 2023 Iovane G., Sandoli A., Marranzini D., Landolfo R., Prota A., Faggiano B.. Timber based systems for the seismic and energetic retrofit of existing structures. In Procedia Structural Integrity,44 (2023) 1870–1876. Online ISSN: 2452-3216. DOI:10.1016/j.prostr.2023.01.239.
- 2023 Iovane G., Oliva V., Faggiano B.. Design and analysis of dissipative seismic resistant heavy timber frame structures equipped with steel links. In Procedia Structural Integrity, 44 (2023) 1864–1869. Online ISSN: 2452-3216. DOI:10.1016/j.prostr.2023.01.238.
- 2022 Faggiano B., Sandoli A., Iovane G., Fragiaco M., Bedon C., Gubana A., Ceraldi C., Follesa M.,



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Gattesco N., Giubileo C., Lauriola M. P., Podestà S., Calderoni B. . The Italian instructions for the design, execution and control of timber constructions (CNR-DT 206 R1/2018). In: Engineering Structures, Publisher: Elsevier. <https://doi.org/10.1016/j.engstruct.2021.113753>

2021 Iovane G., Noviello C., Mazzolani F.M., Landolfo R., Faggiano B.. Beam- to- column joint with steel link for timber structures: system optimization through numerical investigations and design criteria. In World Conference on Timber Engineering (WCTE) 2021. 09-12 Agosto 2021, in streaming da Santhiago, Chile.

2021 Iovane G., Faggiano B.. Timber beam-to-column joint with steel link: design and mechanical characterization through numerical investigation. In 8th International Conference on Computational Methods in Structural Dynamics and Earthquake Engineering (COMPDYN) 2021, 2359-2365, 28-30 Giugno 2021, in streaming da Atene, Grecia. Published by Ecomas Proceedia. ISSN: 262-33347. DOI:10.7712/120121.8642.19355.

2020 Faggiano B., Iovane G., Salzillo D., Mazzolani F. M. & Landolfo R.. Dissipative Bracing Systems for Seismic Upgrading of New and Existing Timber Structures, INTERNATIONAL JOURNAL OF ARCHITECTURAL HERITAGE. doi.org/10.1080/15583058.2020.1830451

2019 Faggiano B., Iovane G., Tartaglia R., Ciccone G., Landolfo R., Mazzolani F.M., Andreolli M., Tomasi R., Piazza M.. Numerical simulation of monotonic tests on beam-column timber joints equipped with steel links for heavy timber seismic resistant MRF. 16th International Conference of Numerical analysis and Applied Mathematics, ICNAAM 2018, AIP Conference Proceedings 2116, 260017 (2019); <https://doi.org/10.1063/1.5114268>

2016 Faggiano B., Iovane G.. First considerations on the design approach and criteria for seismic resistant moment resisting and bracings timber frames. In World Conference on Timber Engineering, WCTE2016, CD-ROM. Publisher: Vienna University of Technology, Austria, ISBN: 978-3-903039-00-1. Full paper ID1094.

8. Funded research projects in which the proposed research fits

The research activity is included in the DPC/RELUIS Project 2022/2024 – WP13. Contribution to standards for timber structures.

9. Funds available for research grants, equipment, missions, etc.

The research activity can be supported by the cooperation with the University of Minho (Portugal) that has already hosted the experimental campaign on timber beam-to-column joints with steel links, partially funded by the Portilame company.

10. Information related to the research period abroad (min. 3 months) provided for the PhD student (please indicate University/research institution and professor/researcher of reference) (max 300 words)

Study periods at the University of Minho aiming at carrying out the experimental activity on joints assemblage or structural systems can be planned during the PhD course. Other opportunities can be also evaluated.



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11. Collaborations with companies on the research topic (if available) (max 300 words)

Several opportunities are being evaluated, such as for example with the following companies leader in the field Rubner Holzbau, Holzbau Sud, Rothoblaas

Naples, 29 June 2023

SIGNATURE

Beatrice Fagnano

Il presente modulo va compilato in ogni sua parte ed inviato all'indirizzo di posta elettronica phd.dist@unina.it entro e non oltre il 30/06/2023.