



DIPARTIMENTO DI STRUTTURE PER L'INGEGNERIA E L'ARCHITETTURA
CORSO DI DOTTORATO DI RICERCA IN
INGEGNERIA STRUTTURALE GEOTECNICA E RISCHIO SISMICO

XXXVI CICLO

I sottoscritti prof. Beatrice Faggiano (RU) e prof. Raffaele Landolfo (PO),
afferenti al Dipartimento di Strutture per l'Ingegneria e l'Architettura S.S.D. ICAR/09
Tecnica delle Costruzioni

CHIEDONO

di essere inseriti tra i possibili tutors di studenti di dottorato per il XXXVI ciclo.

1. Curriculum sintetico dei proponenti (max 500 parole)

Beatrice Faggiano

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.

- Teaching posts in national and international II level masters in the domains of Metallic Structures, Timber constructions, Glass Engineering.
- Tutor for more than 80 degree thesis, 8 PhD thesis and 6 visiting foreign students.
- Member of the professor councils for the II level master courses in the domain of civil engineering, member of the Erasmus Commission for DiSt, tutor inside the Professor Council of the PhD Course in “Construction Engineering” at UNINA; Member of CNR (Research National Council) Committees for design, construction and testing of timber structures and for elements made of glass.
- 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 245 papers in national and international journals, conference proceedings, technical documents, monographs.

OTHER ACHIEVEMENTS:

- 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



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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.

- Organizer and chairman of special sessions and minisimposia, in International Conferences, on submerged floating tunnels (9th International Conference on Bridge Maintenance, Safety and Management, IABMAS 2018, 2020; 14th International Conference on Vibration Problems, ICOVP 2019), as well as on timber structures (5th International Conference on Structural Health Assessment of Timber Structures, SHATIS'19).
- Responsible (with prof. Raffaele Landolfo) of the international trilateral agreement for Cooperation, in the field of Structural Engineering and in particular in the field 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 (Department of Structures for Engineering and Architecture).
- 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. Being 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

Raffaele Landolfo

ACCADEMIC CAREER

Since 2003 Full Professor in Structural Engineering at the University of Naples Federico II.

Main academic roles: among others, member of the Academic Senate, delegate of the rector to real estate, delegate of the dean of the School of Polytechnic and Basic



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Science, member of the Architecture faculty board, coordinator of the PhD course in "Design, retrofitting and control of both conventional and innovative structures" at the University of Chieti Pescara, head of the Department of Constructions and Mathematic Methods in Architecture, head of the Department of Structures for Engineering and Architecture.

RESEARCH ACTIVITY:

- Main research areas: steel structures and seismic engineering.
- Author of more than 600 papers in national and international journals, conference proceedings, technical documents, monographs, books.

OTHER ACHIEVEMENTS:

- Since 2007 Chair of the technical committee TC13 – Seismic design within ECCS.
- 2014 – 2015 Chair of the ECCS (European Convention for Constructional Steelwork).
- Since 2015 Convenor of the Working Group 2 (WG2) – Steel and Composite Structures for the committee CEN/TC250/SC8 of Eurocode 8.
- Member of the Project Team 2 of CEN/TC250/SC8 for the review of EC8 Chapter on steel structures.
- Participation to other committees CEN/TC 250/SC3, CEN/TC 250/SC9, etc..
- Participation as expert to the board for the national standard for constructions NTC2018.
- Member of the CNR Committee for Structural robustness.
- Italian coordinator of the Erasmus Mundus Master "Sustainable Constructions under Natural Hazards and Catastrophic Events ".
- Responsible of several national and international research projects (i.e. HSS-SERF, DI-STEEL, ELISSA, LSV3, DUAREM, EQUALJOINTS, FREEDAM, INNOSEIS, SBRI+, EQUALJOINTS-Plus, etc).
- Invited lecturer in several international universities.
- Participant to national and international conferences as speaker, chairman and invited lecturer
- Editor and member of editorial boards of several scientific journals.
- International patent (in cooperation) for an innovative steel beam-to-column joint.

2. Dottorandi dei quali il proponente è stato tutor nell'ultimo triennio

<i>n. 1</i>	<p>Beatrice Faggiano <i>Giacomo Iovane</i> <i>tipologia di borsa: ateneo</i></p>
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n. 6	<p>Raffaele Landolfo <i>Alessia Campiche</i> <i>tipologia di borsa: pon.</i> <i>Gaetano Cantisani</i> <i>tipologia di borsa: ateneo.</i> <i>Aldo Milone</i> <i>tipologia di borsa: ateneo.</i> <i>Arash Poursadrollab</i> <i>tipologia di borsa: PRIN.</i> <i>Sarmad Shakeel</i> <i>tipologia di borsa: senza borsa.</i></p>
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3. Titolo della ricerca proposta
Structural design and health monitoring of Submerged Floating Tunnels for waterway crossings

4. Area tematica
<p>Ingegneria Geotecnica <input type="checkbox"/></p> <p>Ingegneria Strutturale <input checked="" type="checkbox"/></p> <p>Rischio Sismico <input type="checkbox"/></p>

5. Sintesi del progetto di ricerca (max 500 parole. Stato dell'arte, obiettivi e breve programma previsto per le attività)
<p>Waterway crossings have always pushed a country socio-economic growth. A step towards the sustainable development of transportation infrastructures is constituted by the Submerged Floating Tunnel (SFT): a tube, submerged at a fixed depth, kept in position through anchorage systems. It evidently meets the H2020 priorities related to societal challenges of smart, green and integrated transport. In fact it is characterized by no visual environmental impact, lower either energy consumption, or air pollution, or land occupation, or noise, as respect to common tunnels and bridges. Moreover, it being a modular structure, SFT is a suitable solution for long span crossings. No SFT has been built yet, however several SFT feasibility and research studies are carried out worldwide since the first idea (A. Grant, 1969, Messina strait,</p>



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Italy). Main focus concerns concept, structural and technological features and dynamic structural behavior against environmental loads. Major outcome is the design of a 100m prototype (not yet built) for the Qiandao Lake in China, by SIJLAB (Sino-Italian Joint Laboratory of Archimedes' Bridge, 2005-2007). At present the attention to SFT from the international scientific and stakeholder communities is very high. A last example is the recent design by the Norwegian Public Road Administration of a SFT for the E39 cross fjord highway under construction.

In this context, the research objective is the evaluation of the technical feasibility of SFTs for waterway crossings, leading to the preparation of guidelines related to both structural design and health monitoring. This is a topical issue for the development of the new technology.

The project can be articulated in the following main tasks:

1. State of the art: comprehensive literature review, to fix the bases for the development of the studies and the definition of the general methodology.
2. Structural conception and design of case studies: innovative materials for underwater applications, tunnel cross sections; tunnel supporting systems; foundations, connections between the tunnel units, shore connections; definition of peculiar loads on SFT; structural design at different scale corresponding to different destination of use.
3. Structural performance evaluation: type of analysis; identification of performance indicators; parametric analysis of the structural behaviour on case studies; structural performance evaluation against service and ordinary environmental loads; analysis of the robustness against accidental loads, both natural (like seism or tsunami) and manmade (like explosions and impacts) hazards.
4. Safety and monitoring systems: development of adequate safety systems and conception of opportune monitoring systems, also integrating new remote-control innovative technologies that implements augmented and/or virtual reality.
5. Definition of criteria for structural design and health monitoring
6. Preparation of guidelines for the structural design and health monitoring of SFT

The study can include also experimental tests on materials, structural systems and new monitoring technologies, to be decided within the shared activity with the partners of the international trilateral agreement with Korea Advanced Institute of Science and Technology (Research Center for Smart Submerged Floating Infrastructural Systems) and Zhejiang University (Research Center for Submerged Floating Tunnel).

Publication in international conferences and indexed journals are planned.

6. Eventuali pubblicazioni dei tutors sul tema di ricerca (max 10)

In press **Faggiano B.**, Iovane G., Toscano I. M., Mazzolani F. M. and **Landolfo R.**. Preliminary study on the behaviour of the SFT Qiandao prototype against explosions and impacts. In Proceedings of



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- the 14th International conference on vibration problems (ICOVP 2019), 1-4september, Crete, Greece.
- 2018 Jiang B., Liang B., **Faggiano B.**, Iovane G., Mazzolani F. M.. Feasibility Study on a Submerged Floating Tunnel for the Qiongzhou Strait in China. Proceedings of the 9th International Conference on Maintenance, Safety, Risk, Management and Life-Cycle Performance of Bridges (IABMAS 2018), 9-13 July, Powers, Frangopol, Al-Mahaidi & Caprani Eds, © 2018 Taylor & Francis Group, London, ISBN 978-1-138-73045-8, pp. 865-871.
- 2016 Mandara A., Russo E., **Faggiano B.**, Mazzolani F.M.. Analysis of fluid-structure interaction for a submerged floating tunnel. In *PROCEDIA ENGINEERING*, Volume 166, 2016, Pages 397–404, Proceedings of International Symposium on Submerged Floating Tunnels and Underwater Tunnel Structures (SUFTUS-2016), doi: 10.1016/j.proeng.2016.11.572
- 2016 **Faggiano B.**, Panduro J., Mendoza Rosas M. T., Mazzolani F.M.. The conceptual design of a roadway SFT in Baja California, Mexico. In *PROCEDIA ENGINEERING*, Volume 166, 2016, Pages 3–12, Proceedings of International Symposium on Submerged Floating Tunnels and Underwater Tunnel Structures (SUFTUS-2016), doi: 10.1016/j.proeng.2016.11.530.
- 2012 Martire G., **Faggiano B.**, Mazzolani F. M., Zollo A., Stabile T.A. (2012). A comprehensive study on the performance of Submerged Floating Tunnels during severe seismic events. In: F.M. Mazzolani, R. Herrera. Behaviour of Steel Structures in Seismic Areas. p. 523-529, London: CRC Press Taylor & Francis Group, ISBN: 9780415621052.
- 2010 Mazzolani F.M., **Faggiano B.**, Martire G. (2010). Design aspects of the AB prototipe in the Qiandao Lake. *PROCEDIA ENGINEERING*, p. 21-33, ISSN: 1877-7058, doi: 10.1016/j.proeng.2010.08.005.
- 2010 Martire G., **Faggiano B.**, Mazzolani F.M., Zollo A., Stabile T.A. (2010). Seismic analysis of a SFT solution for the Messina Strait crossing. *PROCEDIA ENGINEERING*, vol. 4, p. 303-310, ISSN: 1877-7058, doi: 10.1016/j.proeng.2010.08.034.
- 2009 Martire G., Esposito M., **Faggiano B.**, Mazzolani F.M., **Landolfo R.**, Zollo A., Stabile T.A. (2009). The structural response of submerged floating tunnel to multi-support seismic excitations. In: Federico M. Mazzolani, James M. Ricles, Richard Sause. Behaviour of Steel Structures. p. 19-26, Leiden: CRC-Press/Balkema., ISBN: 9780415563260, Philadelphia, USA, 16-20 June.
- 2008 Mazzolani F.M., **Landolfo R.**, **Faggiano B.**, Esposito M., Perotti F., Barbella G. (2008). Structural analyses of the Submerged Floating Tunnel prototype in Qiandao Lake (P.R. of China). *ADVANCES IN STRUCTURAL ENGINEERING*, vol. 11, p. 439-454, ISSN: 1369-4332, doi: 10.1260/136943308785836862.
- 2007 Mazzolani F.M., **Landolfo R.**, **Faggiano B.**, Esposito M. (2007). A submerged floating tunnel (Archimedes bridge) prototype in the Qiandao Lake (P.R. of China): research development and basic design. *COSTRUZIONI METALLICHE*, vol. 6, p. 45-63, ISSN: 0010-9673

7. Eventuali progetti di ricerca finanziati in cui l'attività si inserisce

The topic is presently developed within the following international trilateral agreement (2018-2021): Agreement for Co-Operation, in the field of Structural Engineering and in particular in the field 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



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Tunnel) and the University of Naples, Federico II (Department of Structures for Engineering and Architecture).

The establishment of an international consortium, founded by the partners of the trilateral agreement plus the Norwegian Public Road Administration is ongoing.

8. Eventuali fondi disponibili a supporto dell'attività del dottorando (escluso finanziamento borse)

In the context of the international agreement, funding opportunities are available for study periods in the partners institutions, specifically South Korea and China, where extensive research activities including experimental campaign are ongoing on topics relevant to the SFT structure, such as structural behavior, design criteria, constructional details, new materials, monitoring, construction methods.

9. Informazioni relative ad un periodo di ricerca all'estero (minimo tre mesi) previsto per il dottorando (indicare Università/ente di ricerca e docente/ricercatore di riferimento con indirizzo mail) (max 300 parole)

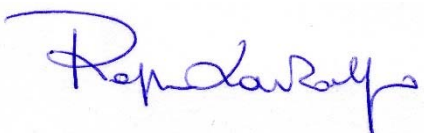
Study periods at the international agreement partner institutions, specifically South Korea, Korea Advanced Institute of Science and Technology (Research Center for Smart Submerged Floating Infrastructural Systems, chaired by prof. HK Lee) and China, Zhejiang University (Research Center for Submerged Floating Tunnel, chaired by prof. Y. Xiang), should be planned.

10. Eventuali collaborazioni con imprese/aziende sul tema di ricerca (max 300 parole)

The establishing international consortium contemplates in the bylaw also the association of companies, institutions, research centers, interested to the development of the innovative technology.

Napoli, 13/02/2020

FIRMA

Beatrice Agnano 

Il presente modulo va compilato in ogni sua parte ed inviato all'indirizzo di posta elettronica phd.dist@unina.it entro e non oltre **venerdì 14/02/2020**.