

UNIVERSITA' DEGLI STUDI DI NAPOLI FEDERICO II



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

XXXVI CICLO

Il sottoscritto prof. Ottavia Corbi, (PO PA RU RTD) afferente al Dipartimento di Strutture per l'Architettura e l'Ingegneria, S.S.D. ICAR08- Scienza delle Costruzioni

CHIEDE

di essere inserito tra i possibili tutor di studenti di dottorato per il XXXVI ciclo.

1. Curriculum sintetico del proponente

Ottavia Corbi is associate professor of Scienza delle Costruzioni at the Department of Structural Engineering and Architecture of the University of Naples Federico II since 2003, with qualification as full professor. Since 2001, she is professor with a full-time appointment of more than 70 university fundamental courses at the University of Naples Federico II about "Statics", "Theory of Structures", "Science of Constructions", "Complements of Theory of Structures", "Complements of Science of Constructions", "Structural Refurbishment", "Behaviour of Materials", "Bridges and Viaducts", "Structural Stability and Dynamics of Monumental Constructions".

As regards the research activity, she has managed a number of financial contributions for individual projects from the Campania Region, joined some international networks and organized international conferences. Besides, she has joined a number of financial contributions for individual projects from M.I.U.R. (the Ministry for University and Scientific and Technological Research), from C.N.R. (the Italian Council for National Researches), and from the European Community. She has joined national and international research networks, and is at present the co-ordinator of a research project financed by the Italian Civil Protection on the subject of structural control of dynamic vibrations in civil constructions subject to seismic events. She is involved in the scientific working groups for the Italian and International guidelines about masonry and monumental constructions, arches, panels, vaults, bridges, retrofit through FRP, FRCM, structural control, etc.

She has presented scientific memoirs, hold seminars and attended more than 300 international and national scientific meeting, workshops and conferences all over the world, on topics relevant to structural engineering and mechanics topics. She is author of more than 200 papers published in international scientific journals, volumes and proceedings (with almost 1000 total citations in Scopus), and of 7 books.

She has developed scientific research activity on a number of themes: i) Mechanics of solids and structures; ii) Modelling of mechanical behaviour of materials (masonry, Shape Memory Alloys, Magneto-rheological Fluids, Fibre Reinforced Polymers); iii) Analysis of structures made by no-tension material or brittle low-

tension material with tensile decay and theoretical contributions including original set up, modelling, topology, and duality theorems; iv) Analysis of structural response under dynamic loads in the linear /nonlinear range; iv) Passive, active, semi-active and hybrid dynamic control of structures; v) Fracture Mechanics.

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

n. 1 Francesca Tropeano

tipologia di borsa: ATENEO

3. Titolo della ricerca proposta

Modelling of structures with non linear mechanical behaviour

4. Area tematica

Ingegneria Geotecnica

Ingegneria Strutturale

Rischio Sismico

5. Sintesi del progetto di ricerca

The tutoring will cover classic structural engineering issues, with specific reference to Construction Science, in particular with reference to linear and non-linear analysis and modeling of the behavior of materials and 2D and 3D structures. The problem of the interpretation of the masonry material through suitable and appropriately simplified models, useful for the purposes of the structural investigation, as well as the development of models and tools, including mathematical ones that are easy to handle but capable of reproducing their behavior and mechanical characteristics with an adequate degree of complexity, constitutes to date a primary objective in the analysis and prediction of the structural behavior of monumental constructions, mostly consisting of masonry. The centrality of the theme is on the one hand attributable to its great relevance connected to the circumstance that the world architectural heritage and the requests for protection and preservation against actions and environmental conditions lead to the analysis of structures that are mainly made of masonry, but also, on the other hand, it is due to the complexity of the theme that collects, under the unique denomination of masonry, a wide variety of variations that involve materials, texture, construction aspects and technological details, and that make the final performance of the product in reality very varied, and certainly dependent on the technical construction detail.

In this context, the activities to be carried out in the research project are aimed at developing tools to support the numerical modeling of masonry elements, with attention to the most widespread construction types, also connected to the creation of resisting structures capable of activating mostly tensional states of pure compression through the realization within the masonry fabric of resistant membranes that exploit the properties of the material itself.

The collapse mechanisms that can be activated derive from the adequate identification of the critical issues developed within the masonry body caused as an effect of external agents, with the result of a degradation of the mutual bonds between the individual masonry elements, and a substantial overall degradation of the structural strength .

In the field of modeling, reinforcements can also be considered through innovative materials and classic techniques for the improvement of structural performance with the development of the related theoretical analyses and the formulation of analytical and numerical tools.

6. Pubblicazioni del tutor sul tema di ricerca

“Combinational optimization for shaping discrete tensile boost elements in continuum structures”; J. Acta Mechanica, 2018, 229 (9), pp 3575–3584,.

“Theorems for masonry solids with brittle time-decaying tensile limit strength”, J. Acta Mechanica, 2017, Vol. 228(3), pp.837-849.

“Stability of evolutionary brittle-tension 2D solids with heterogeneous resistance”, J. Computers and Structures, 2016, Vol. 174, pp. 133-138.

“Closed-form solutions for FRP strengthening of masonry vaults”, J. Computers and Structures, 2015, Vol. 147, pp. 244-249.

“Bounds on the Elastic Brittle solution in bodies reinforced with FRP/FRCM composite provisions”, J. Composites Part B: Engineering, 2015, Vol. 68, pp. 230-236,

“Contribution of the fill to the static behaviour of arched masonry structures: Theoretical formulation”, J. Acta Mechanica, 2014, Vol. 225 (1), pp. 53 – 66.

“An approach to the positioning of FRP provisions in vaulted masonry structures”, J. Composites Part B: Engineering, 2013, Vol. 53, pp.334 – 341,

“An Approach to Masonry Structural Analysis by the No-Tension Assumption—Part II: Load Singularities, Numerical Implementation and Applications” Applied Mechanics Reviews , ASME International. Appl. Mech. Rev., July 2010, Vol.63(4), pp.040803-1/21.

“An Approach to Masonry Structural Analysis by the No-Tension Assumption—Part I: Material Modeling, Theoretical Setup, and Closed Form Solutions” Applied Mechanics Reviews , ASME International. Appl. Mech. Rev., July 2010, Vol.63(4), pp.040802-1/17-

“On the Equilibrium and Admissibility Coupling in NRT Vaults of General Shape”. Int. J. Solids and Structures, 2010, Vol. 47(17), pp. 2276-2284.

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

Progetto Reluis del WP.14 - Contributi normativi relativi a Materiali Innovativi per Interventi su Costruzioni Esistenti.

Progetto Reluis del WP.15 - Contributi normativi relativi a Isolamento e Dissipazione

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

Fondi relativi ai progetti riportati

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)

Prof Rui Carneiro de Barros,

Prof of Civil Engineering, Structural Division, Faculdade Engenharia - Universidade do Porto (FEUP)

Email rbarros@fe.up.pt

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

Napoli, 10 Febbraio 2020_____

FIRMA


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.