



**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. Giorgio Serino

(PO X      PA ☐      RU ☐      RTD ☐) afferente al Dipartimento di Strutture per l'Ingegneria e l'Architettura S.S.D. (*indicare codice e nome per esteso ICAR 09 Tecnica delle Costruzioni*)

**CHIEDE**

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

**1. Curriculum sintetico del proponente (max 500 parole)**

**ACADEMIC POSITIONS**

Full Professor of Structural Engineering and Design (Univ. Naples Federico II: since 11/01), Associate Professor (Third Univ. Rome: 11/98 to 10/01), Assistant Professor (Univ. Naples Federico II: 07/92 to 10/98), Research Assistant (Univ. California Berkeley, USA: 06/88 to 01/89).

**PROFESSIONAL STATUS**

Registered professional engineer in Italy: 9703 (Albo Ingegneri Napoli); Engineer in Training in California: XE075052 (Board of Registration for Professional Engineers and Land Surveyors).

**HONORS AND AWARDS**

Finalist, Philips Morris Prize for Scientific and Technological Research, Italy, 1997  
1-year post-doc scholarship, University of Naples Federico II, Naples, Italy, 1991  
1-year scholarship, Institute for Applied Mathematics, CNR, Naples, Italy, 1990  
Winner of a 1-year grant, Research Ideas Competition, ISMES, Bergamo, Italy, 1990  
Fulbright complete travel and study fellowship, Italy/USA, 1987-88  
IBM Summer Stage Prize, Novedrate, Italy, 1984

**RESEARCH EXPERIENCE**

Dr. Serino has maintained a balance between academic and practical experience. Dr. Serino is interested in structural dynamics and earthquake engineering, structural testing and innovative control systems. In the past 15 years, he has obtained experience in passive and semi-active structural control systems as the principal investigator of projects sponsored by Italian and European agencies and the private sector (ISMES, ENEL). He is an active member in the technical committees of GLIS (Italian Working Group for Seismic Isolation) and ANIDIS (Italian Association of Earthquake Engineering). In 1998, he was elected Member of CUN (Italian National University Council, the consulting organism of the Italian Ministry of Education and Research) for the Civil Engineering and Architecture sector.



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**EXPERIENCE AS RESEARCH TEAM CO-ORDINATOR**

- Team Leader in an experimental research financed by EU on semi-active control with magnetorehological devices (Euro 200,000, 2000 to 2003)
- Principal Investigator in 3 national research contracts financed by the Italian Ministry of University and Research on wind and earthquake control of structures (Euro 75,000, 1999 to 2003)
- Team Leader in an experimental research financed by EU on semi-active control (Euro 250,000, 1997-98)
- Principal Investigator in 3 research contracts between ENEL and Univ. of Naples on seismic protection of HV equipment (Lit. 140.000.000+VAT, 1994 to 1999)
- Principal Investigator in 2 research contracts between ISMES and Univ. of Naples on passive control of structures (Lit. 120.000.000+VAT, 1992 to 1996)

**2. Dottorandi dei quali il proponente è stato tutor nell'ultimo triennio***n. 1 + 3**specificare tipologia di borsa: ateneo, pon, por, senza borsa, ecc.*

**XXXIV ciclo:** GALANO Simone, con Borsa Industriale POR nell'ambito del progetto coordinato di 4 borse dal titolo: "Progettazione integrata e realizzazione di sistemi di isolamento sismico innovativo anche a basso costo e ridotta manutenzione per edifici di pregio" di cui il sottoscritto è responsabile scientifico – altri dottorandi: ARGENZIANO Mario (tutor: Massimiliano Fraldi ed Elena Mele), NATALE Andrea (tutor: Marco Di Ludovico), SOMMA Fausto (tutor: Alessandro Flora)

**3. Titolo della ricerca proposta**

INVESTIGATION ON LOW-COST FIBRE REINFORCED BASE ISOLATED NON-ENGINEERED CONSTRUCTIONS

**4. Area tematica**

Ingegneria Geotecnica ☐

Ingegneria Strutturale ☒

Rischio Sismico ☐



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**5. Sintesi del progetto di ricerca (max 500 parole. Stato dell'arte, obiettivi e breve programma previsto per le attività e)**

Despite the advances in the fields of structural and construction engineering, many buildings in developing and under-developed nations are still being constructed on past traditional knowledge and thumb rules. The collapse of such non-engineered and semi-engineered constructions during the major earthquakes in the recent past confirms the fact that the structural components of these buildings are inadequate to withstand lateral inertia loads caused by earthquakes. As the replacement of these non-engineered constructions with modern earthquake resistant constructions consisting of prefabricated or modular elements is not feasible, the present need is to improve the performance of such buildings with certain structural elements with the aim of avoiding collapse and limiting damage during earthquakes.

The most common type of non-engineered constructions seen all over the world are the Adobe buildings, unreinforced masonry buildings and non-engineered reinforced concrete buildings. One of the effective strategies to reduce the earthquake induced damage in these buildings is the seismic base isolation technique which decouples the superstructure from the ground. This concept is most effective for rigid (relatively stiff) structures; low to medium rise buildings with sufficient high column load, resting on hard soil. But the cost of these systems restricts their use to buildings with greater importance and makes them unviable for use in less important common structures. Thus, the focus is now moving towards the development of low-cost fibre reinforced isolation devices suitable for implementation even in residential buildings. These devices being light weight, durable and cost effective with simple manufacturing process is capable of overcoming the complications associated with conventional rubber bearings. There is also a possibility of further reducing the cost by replacing the natural rubber with recycled elastomer.

In this context, the current project is focussed on the investigation of low-cost fibre reinforced base isolated non-engineered constructions. With the main aim of improving the seismic performance of the non-engineered constructions, this research also aims at providing a cost-effective solution suitable for developing nations.

**AIM & OBJECTIVE**

- To carry out detailed survey on the current status of non-engineered constructions primarily in developing and under-developed nations
- To develop a numerical model of identified non-engineered buildings
- To design and develop low-cost fibre reinforced base isolators suitable for non-engineered constructions
- To perform linear and nonlinear time history analyses of fixed base and base isolated buildings and comparison of results
- To estimate the additional cost involved in the proposed base isolated building

**POTENTIAL IMPACT OF RESEARCH OUTCOME**

The capability of base isolation technique has already been well demonstrated through real life applications in many developed nations. The investigation of this efficient technique with reduced cost and especially its implementation on seismically vulnerable non-engineered constructions will help in avoiding severe casualties during earthquake in developing nations. The outcome of this project will provide a reasonable earthquake resistant construction technique for non-engineered buildings all over the world.

**6. Eventuali pubblicazioni del tutor sul tema di ricerca (max 10)**

1. Design charts for eurocode-based design of elastomeric seismic isolation systems, Losanno, D., Hadad, H.A., Serino, G., 2019 Soil Dynamics and Earthquake Engineering, 119, pp. 488-498
2. Dynamic behaviour in compression and shear of low shape factor rubber blocks, Cilento, F., Vitale, R., Spizzuoco, M., Serino, G., Muhr, A., 2019 Ingegneria Sismica, 36(2), pp. 86-102



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3. A mixed explicit–implicit time integration approach for nonlinear analysis of base-isolated structures, Greco, F., Luciano, R., Serino, G., Vaiana, N., 2018 *Annals of Solid and Structural Mechanics* 10(1-2), pp. 17-29
4. A Base Isolation System for Developing Countries Using Discarded Tyres Filled with Elastomeric Recycled Materials, Hadad, H.A., Calabrese, A., Strano, S., Serino, G., 2017 *Journal of Earthquake Engineering* 21(2), pp. 246-266
5. Seismic behavior of isolated bridges with additional damping under far-field and near fault ground motion, Losanno, D., Hadad, H.A., Serino, G., 2017 *Earthquake and Structures* 13(2), pp. 119-130
6. Experimental investigation of a low-cost elastomeric anti-seismic device using recycled rubber, Calabrese, A., Serino, G., Strano, S., Terzo, M., 2015 *Meccanica* 50(9), pp. 2201-2218
7. Shaking table investigation of a novel, low-cost, base isolation technology using recycled rubber, Calabrese, A., Spizzuoco, M., Serino, G., Corte, G.D., Maddaloni, G., 2015 *Structural Control and Health Monitoring* 22(1), pp. 107-122
8. Innovative low-cost recycled rubber-fiber reinforced isolator: Experimental tests and Finite Element Analyses, Spizzuoco, M., Calabrese, A., Serino, G., 2014 *Engineering Structures* 76, pp. 99-111
9. Mechanical characterization of a Tire Derived Material: Experiments, hyperelastic modeling and numerical validation, Montella, G., Calabrese, A., Serino, G., 2014 *Construction and Building Materials* 66, pp. 336-347

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

ReLUI5 2019-2021 – WP15 “Codes contribution for Isolation and Energy Dissipation” (Budget: € 84.000 – end: 31/12/2021)

Research Contract between Industry AMS e DiSt-Unina titled: “Scientific support for the development of: a) composite steel-r.c. structural systems using cold-formed steel profiles; b) devices for seismic protection of structures with added energy dissipation” (Budget: € 16.000 + IVA – end: 31/12/2020)

STAR 2017 - Sostegno Territoriale Alle Attività Di Ricerca - Linea d'Intervento 1 –Project Title: “LOW COst ISolators for Engineered and Non-Engineered Costructions of Developing Countries”, Evaluation institution: European Science Foundation, Outcome: Top Propriety, Principal investigator: Dr. Daniele Losanno; Sponsors: University of Naples Federico II and Compagnia di San Paolo; budget: € 100.000; duration: febbraio 2018 – Aprile 2020.

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

ReLUI5 2019-2021 – WP15 (see § 7 above)

Convenzione tra Industry AMS e DiSt-Unina (see § 7 above)

**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)**



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Universities to be involved as hosting institutions for a period abroad are listed below:

- Indian Institute of Technology Madras, Professor Srinivasan Chandrasekaran - [drsekaran@iitm.ac.in](mailto:drsekaran@iitm.ac.in)
- Universidad del Valle, Colombia, Professor Johannio Marulanda - [johannio.marulanda@correounivalle.edu.co](mailto:johannio.marulanda@correounivalle.edu.co)
- University California State Long Beach, Assistant Professor Andrea Calabrese - [Andrea.Calabrese@csulb.edu](mailto:Andrea.Calabrese@csulb.edu)

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

The following companies could be involved for the development of the Project:

- ItalGum srl (Zanè, Vicenza): leading company in rubber processing
- Isolgomma srl (Albettone, Vicenza): leading company in producing recycled rubber mats
- FIP MEC srl (Selvazzano Dentro, Padova): leading company in design and trade of seismic protection systems

Napoli, 14 febbraio 2020

FIRMA

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