



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

XXXIX CICLO

Il sottoscritto prof. Fabio DE ANGELIS

(PO  PA X  RU  RTD

S.S.D. (*indicare codice e nome per esteso*) ICAR/08 – Scienza delle Costruzioni

CHIEDE

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

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

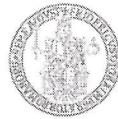
Prof. Fabio De Angelis

Fabio De Angelis graduated in Civil Engineering with full marks (110/110) and Honors (cum Laude) at the Faculty of Engineering of the University of Naples, Italy. He holds a Ph.D. degree in “Structural Engineering” received by the University of Naples. He was recipient of a Post-Doctoral Research Associate Fellowship in 1999-2001 and an International Mobility of Researchers Fellowship in 2008-2009.

He is currently Associate Professor with Tenure in the scientific disciplinary field “Mechanics of Solids and Structures” (Scienza delle Costruzioni) at the Department of Structures for Engineering and Architecture of the University of Naples Federico II. Since 2002 he has been teaching the courses “Structural Mechanics” and “Mechanics of Solids” at the Faculty of Engineering of the University of Naples Federico II, Italy. He is currently teaching “Mechanics of Solids I”, “Mechanics of Solids II” and “Experimental Analysis of Materials and Diagnostics of Structures”.

From 2009 to 2012 he has been Visiting Scientist at the Department of Civil and Environmental Engineering of the University of California at Berkeley (USA), where he worked in collaboration with Professor Robert L. Taylor, co-author of the book “The Finite Element Method” by Zienkiewicz and Taylor.

He is the author of more than 100 papers on indexed recognized and leading peer-reviewed International Journals and International Conferences. His research interests



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

are related to Mechanics of Solids and Structures, Structural Mechanics, Structural Engineering, Inelastic Behaviour of Solids and Structures, Computational Plasticity and Viscoplasticity, Nonlinear Dynamics of Solids and Structures, Innovative Strategies for the Mitigation of Damage for Solids and Structures subject to Dynamic and Seismic Loadings. In his scientific activity he participated to numerous International Conferences, related to the scientific disciplinary field of Structural Mechanics, in which he presented scientific papers. He has been collaborator in research groups C.N.R. (Italian National Research Council) and M.I.U.R. (Ministry of Education, University and Research) since 1995. He is Coordinator of the Research Project "Innovative Strategies for the Mitigation of the Vulnerability of Structures subject to Extreme Seismic Actions". In his research activity he has financed positions of research grants and research scholarships on his research funds.

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

n. _____	_____
----------	-------

**3. Titolo della ricerca proposta**

Nonlinear Dynamic Analysis for the Safety of Solids and Structures subject to Extreme Dynamic Events

**4. Area tematica**

Ingegneria Geotecnica

Ingegneria Strutturale

Rischio Sismico



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

**5. Tipologia di borsa per la quale si propone il progetto**

Ateneo  X

DM 117 (Investimento 3.3)   
*(in questo caso indicare l'azienda co-finanziatrice)*

DM 118 (Investimento 4.1 P.A.)  X

DM 118 (Investimento 4.1 generici)  X

DM 118 (Investimento 4.1 Patrimonio culturale)  X

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

The present research project studies the protection of solids and structures under dynamic loadings and the research of innovative methods for the control of structures subject to dynamic and seismic actions. A numerical and experimental research activity will be devoted to the analysis of innovative devices for the protection of the structural safety and to ensure a degree of structural safety also in case of extreme natural seismic actions. Extreme dynamic actions are the ones which are characterized by exceptional intensity and anomalous frequency content with respect to the ones usually considered in the actual codes. Solids and structures may be particularly at risk in case of extreme dynamic events. The protection of the safety of solids and structures will be analyzed by performing a nonlinear dynamic analysis with the strategy of the limitation of the forces.

A design approach is adopted which intends to confer a protection to the structure which is independent from the intensity and the frequency content of the seismic event. According to this design strategy innovative devices will be studied which are characterized by high damping. These innovative isolation devices agree with the new design approach known as “safety by design” in which structures are designed in such a way to avoid accidental events instead of having to consider a posteriori their effects on the structures. The verification of the reliability of the adopted nonlinear modeling will be performed by comparing the expected results with the results of the numerical simulation.



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

Dynamic nonlinear analyses will be performed on base isolated structures protected by innovative devices with the objective of determining the structural response in the time domain for a dynamic input characterized by natural accelerograms with anomalous intensity and frequency content. The characterization of the model in the nonlinear regime will be developed. Experimental tests will be realized on the components of the prototype of the isolator to validate the results of the numerical analysis.

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

International Journals (Peer-Reviewed):

[1] De Angelis, F., Cancellara, D., Dynamic analysis and vulnerability reduction of asymmetric structures: Fixed base vs base isolated system, COMPOSITE STRUCTURES, (ISSN: 0263-8223), Vol. 219, pp. 203-220, 2019.

<https://doi.org/10.1016/j.compstruct.2019.03.059>

[2] Cancellara, D., De Cicco, S., De Angelis, F., Assessment and vulnerability reduction of under-designed existing structures: Traditional vs innovative strategy, COMPUTERS AND STRUCTURES, (ISSN: 0045-7949), Vol. 221, pp. 44-64, September 2019.

<https://doi.org/10.1016/j.compstruc.2019.05.016>

[3] Cancellara, D., De Angelis, F., Dynamic assessment of base isolation systems for irregular in plan structures: Response spectrum analysis vs nonlinear analysis, COMPOSITE STRUCTURES, (ISSN: 0263-8223), Vol. 215, pp. 98-115, 2019.

<https://doi.org/10.1016/j.compstruct.2019.02.013>

[4] Cancellara, D., De Angelis, F., Assessment and dynamic nonlinear analysis of different base isolation systems for a multi-storey RC building irregular in plan, COMPUTERS AND STRUCTURES, (ISSN: 0045-7949), Vol. 180, pp. 74–88, February 2017.

<http://dx.doi.org/10.1016/j.compstruc.2016.02.012>

[5] Cancellara, D., De Angelis, F., A base isolation system for structures subject to extreme seismic events characterized by anomalous values of intensity and frequency content, COMPOSITE STRUCTURES, (ISSN: 0263-8223), Vol. 157, pp. 285–302, 2016.



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

<http://dx.doi.org/10.1016/j.compstruct.2016.09.002>

[6] Cancellara, D., De Angelis, F., Nonlinear dynamic analysis for multi-storey RC structures with hybrid base isolation systems in presence of bi-directional ground motions, COMPOSITE STRUCTURES, (ISSN: 0263-8223), Vol. 154, pp. 464–492, 2016.

<http://dx.doi.org/10.1016/j.compstruct.2016.07.030>

[7] De Angelis, F., Cancellara, D., Multifield variational principles and computational aspects in rate plasticity, COMPUTERS AND STRUCTURES, (ISSN: 0045-7949), Vol. 180, pp. 27–39, February 2017. <http://dx.doi.org/10.1016/j.compstruc.2016.05.011>

[8] De Angelis, F., On the structural response of elasto/viscoplastic materials subject to time-dependent loadings, STRUCTURAL DURABILITY & HEALTH MONITORING (ISSN 1930-2983), Tech Science Press, Vol. 8, No. 4, pp. 341-358, 2012.

<https://doi.org/10.32604/sdhm.2012.008.341>

[9] De Angelis, F., Taylor, R.L., An Efficient Return Mapping Algorithm for Elastoplasticity with Exact Closed Form Solution of the Local Constitutive Problem, ENGINEERING COMPUTATIONS, (ISSN 0264-4401), Vol. 32, Issue 8, pp. 2259 - 2291, 2015. <http://dx.doi.org/10.1108/EC-06-2014-0138>

[10] De Angelis, F., Taylor, R.L., A Nonlinear Finite Element Plasticity Formulation without Matrix Inversions, FINITE ELEMENTS IN ANALYSIS AND DESIGN, (ISSN: 0168-874X), Vol. 112, pp. 11-25, 2016.  
<http://dx.doi.org/10.1016/j.finel.2015.12.007>

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

ISMIVUS - Innovative Strategies for the Mitigation of the Vulnerability of Structures subject to Extreme Seismic Actions (Ricerca di Ateneo).

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

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

**10. 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)**

The research project will be developed by considering a research period abroad (minimum three months) in which the research activity is realized in collaboration with Prof. Robert L. Taylor, at the Department of Civil and Environmental Engineering, University of California Berkely (Usa).

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

Napoli, 29/06/2023

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 **il 30/06/2023**.