



PERSONAL DATA

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| Name | LOREDANA CONTRAFATTO |
| Address | Department of Civil Engineering and Architecture (DICAR) Via Santa Sofia,64 - 95123 CATANIA ITALY |
| VAT | CNT LDN 67A65 C351P |
| Phone | ph +39 095 7382250 |
| Fax | +39 095330309 |
| E-mail | loredana.contrafatto@unict.it |
| Nazionalità | Italian |
| Date of birth | 25/01/1967 (CATANIA - ITALY) |
| Current Position | Associate Professor Department of Civil Engineering and Architecture (DICAR) University of Catania |

Prof. Loredana Contrafatto was born in Catania on January 25th 1967.

STUDIES

1991:

Graduated in Civil Engineering with first class honours at the Catania University.

1996:

PhD in Structural Engineering at the Catania University.

1997 – 1999:

Post PhD grant at the Catania University.

2000 – 2002:

Grant for research collaboration at the Catania University.

2018-2024

Italian Scientific Qualification to a position of Full Professor (scientific area ICAR/08)

PREVIOUS POSITION

Since March 1st 2002 Researcher at the Faculty of Engineering of the Catania University at Enna (scientific area ICAR/08).

ACTUAL POSITION

Since November 1st 2006 Associate Professor at the Department of Civil Engineering and Architecture of the Catania University (scientific area ICAR/08).

TEACHING ACTIVITIES

1992 – 2002:

Collaborations in Solid Mechanics and Theory of Structures in the Civil Engineering Master's Degree course and in Solid Mechanics in the Mechanical Engineering Master's Degree course at the Faculty of Engineering of the Catania University.

External teaching activity of Theory of Structures in training courses for seismic risk experts.

2002 – 2006:

Professor of Solid Mechanics in the Civil and Environmental Engineering Bachelor's course at the Faculty of Engineering of the Catania University at Enna.

2005 - 2008

Professor of Analysis and Safety of Structural Systems in the Master's Degree course on Civil Protection Engineering at the Faculty of Engineering of the Kore University at Enna.

2005 - 2011

Professor of Basics of Solid Mechanics in the Master's Degree course on Applied Geology of the Mathematical, Physical and Natural Sciences Faculty of the Catania University.

2006 - 2009

Professor of Mechanics of Masonry Structures in the Master's Degree course on Structural Engineering at the Faculty of Engineering of the Catania University.

2010-2011

Professor of Computational Mechanics in the Master's Degree course on Structural Engineering at the Faculty of Engineering of the Catania University.

2011 - today

Professor of Mechanics of Masonry Structures in the Master's Degree course on Structural and Geotechnical Engineering at the Department of Civil Engineering and Architecture (DICAR) of the Catania University.

ACADEMIC ACTIVITY AT CATANIA UNIVERSITY

2002 – today

Training Course Tutor

Degree Thesis Supervisor

Member of PhD thesis groups

PhD thesis Supervisor

2002 – today

Scientific member of the Official Laboratory for Materials and Structural Testing

2007 – 2011

Secretary of the Structural Engineering PhD Government Board

2009 – 2012

Secretary and member of the Structural and Geotechnical Engineering PhD Government Board (XXV cycle)

2009 – 2012

Secretary and member of the Structural and Geotechnical Engineering PhD Government Board (XXVIII cycle)

2017-2020

2018-2021

2019-2022

2020-2023

Member of the Evaluation and Mitigation of Environmental and Territorial Risks PhD Government Board (XXXIII cycle, XXXIV cycle)

2009

Member of PhD Committee (Programa de Maestria y Doctorado en Ingenieria) at the Universidad Nacional Autonoma de Mexico, Instituto de Ingenieria, Mexico City

2012 – 2016

2016 – 2020

Coordinator of the Master's Degree Program in Structural and Geotechnical Engineering

2012 – 2016

Member of the Departmental Joint Committee

2020 - 2024

Member of the Departmental Board

MAIN PHD THESIS

1. XIX cycle 2003-2006 – Maria Lina Micciché – Modellazione dei processi di frattura coesiva mediante discontinuità intraelemento – PhD Thesis in Ingegneria delle Strutture, Università di Catania. (Member of the PhD Thesis Board)
2. XX cycle 2004-2007 Leopoldo Greco - Tesi di Dottorato di Ricerca in Ingegneria delle Strutture, Università di Catania. (Member of the PhD Thesis Board)
3. XXIII cycle 2007-2010 Giuseppe Tommaso di Venti - Modellazione numerica della nascita e dello sviluppo di interfacce mediante il metodo delle discontinuità forti intraelemento - PhD Thesis in Ingegneria delle Strutture, Università di Catania. (PhD Thesis Supervisor)
4. XXIV cycle 2008-2011 Francesco Fazio - Metodi di analisi non lineare di strutture in calcestruzzo armato - PhD Thesis in Ingegneria delle Strutture, Università di Catania. (PhD Thesis Supervisor)

5. XXV cycle 2011-2014 Carmelo Caggeggi - Experimental analysis of the efficiency of carbon fiber anchors applied over CFRP to firebrick bonded joints – Cotutelle PhD Thesis in Ingegneria Strutturale e Geotecnica, Università di Catania- Ecole Doctorale Science, Inénierie at Environnement, Université Paris-Est (Member of the PhD Thesis Board)

6. XXXI cycle 2015-2018 Attilio Antonio Mondello - Tra conoscenza e sicurezza. Torri campanarie degli edifici ecclesiastici tradizionali allo specchio: casi emblematici in Sicilia Orientale ed in Castiglia e León. Uno strumento conoscitivo di supporto alle analisi e verifiche strutturali per le fabbriche tradizionali a prevalente sviluppo verticale a rischio di stabilità - PhD Thesis in Valutazione e Mitigazione dei Rischi Urbani e Territoriali (Member of the PhD Thesis Board)

7. XXXI cycle 2015-2018 Salvatore Gazzo – A numerical model for the description of the mechanical behaviour of woven fabrics -, Cotutelle PhD Thesis in Valutazione e Mitigazione dei Rischi Urbani e Territoriali, Università di Catania - l'Ecole Nationale des Travaux Publics de l'Etat – Lyon (Member of the PhD Thesis Board)

7. XXXIII cycle 2017-2020 Roberto Ruggeri – In progress, PhD Thesis in Valutazione e Mitigazione dei Rischi Urbani e Territoriali (PhD Thesis Supervisor)

MAIN SCIENTIFIC RESEARCH TOPICS

Computational mechanics: numerical techniques for the optimisation of non linear functionals subjected to inequality constraint: Penalty method, Lagrangian method, Augmented Lagrangian method, Multiplier method.

Thermo-dynamical models for damaging elastic plastic materials and for concrete in the context of Continuum Damage Mechanics.

Studies about the efficiency of viscid plastic regularisation for the computational analysis of damage localisation phenomena.

Numerical implementation in FEM codes of algorithms for the solution on non-convex problems in elastoplasticity coupled with damage.

Modelling of cohesive fracture processes by intra-element discontinuities.

Numerical modelling of growth and propagation of interfaces in a continuum medium by means of the Strong Discontinuity Approach. Variational formulation.

Finite Elements with Embedded Discontinuities. Interface elements.

Sustainable concrete. Concrete with recycled aggregate from C&D waste.

Sustainable materials. Cement, mortar and concrete with recycled volcanic ash.

Innovative technology of polymer added concrete.

Confinement of reinforced concrete structure by means of FRP. Analysis and experimental testing.

Structural glass. Numerical simulation of failure mechanisms and experimental testing.

Behaviour and design of chemically bonded anchors.

Meso-scale simulation of concrete multi-axial behaviour.

Homogenization techniques for the description of woven fabrics behaviour.

Iso-geometric analysis of space rods and shells. B-spline interpolations.

G¹-conforming FE interpolations for the analysis of Kirchhoff plate.

COMPONENT of LOCAL, NATIONAL AND INTERNATIONAL RESEARCH PROJECTS

15/12/1998 - 14/12/2000 PRIN 1998

"Analysis of masonry vaults of the baroque building Sicilian tradition and retrofitting techniques by means of fibers" (Project "The vaults in the building tradition") . Local Coordinator Prof. Massimo Cuomo, National Coordinator prof. S. Di Pasquale, Prof.ssa S. Briccoli Bati).

26/11/1999 - 25/11/2001 PRIN 1999

"Mechanical modelling and identification of high performance concrete reinforced with micro-fibers", national project "Analysis and experimental investigation of special concrete structures ", Local Coordinator Prof. Massimo Cuomo, National Coordinator prof. G. Romano.

12/12/2001 - 11/12/2003 PRIN 2001

"Continuum damage models and interface models for high strength fiber-reinforced concrete" , National project "High performance concrete: computational and design methods ", Local Coordinator Prof. Massimo Cuomo, National Coordinator prof. G. Romano.

16/12/2002 - 15/12/2004 PRIN 2002

"Non linear dynamics for the strength and vulnerability analysis of structures subjected to exceptional

loads", national project "Non linear dynamics for the strength and vulnerability analysis ", Local and National Coordinator Prof. G.Oliveto.

20/11/2003 - 19/11/2005 PRIN 2003

"A chemo-mechanical model for the analysis of damaged concrete members under triaxial stress states", nell'ambito del Progetto "Damage mechanics and durability of standard and high strength concrete", Local Coordinator Prof. Massimo Cuomo, National Coordinator prof. G. Romano.

15/04/2012 - 14/04/2015 PAPIIT 2012

PAPIIT 2012 - IN108512 PROGRAMA DE APOYO A PROYECTOS DE INVESTIGACIÓN E INNOVACIÓN TECNOLÓGICA. "Simulación numérica de proceso de falla en elementos de concreto reforzado considerando el efecto del calor de hidratación del cemento en las propiedades de concretos jóvenes", Coordinator Prof. Amado Gustavo Ayala Milian, Universidad Nacional Autónoma de México, Instituto de Ingeniería, Mexico City, 2012-2015.

COORDINATOR OF LOCAL, NATIONAL and INTERNATIONAL RESEARCH PROJECTS

UNIVERSITY OF CATANIA FUNDING:

2002 - 2003:

"Constitutive models for the analysis of high confined concrete structures".

2004 - 2006:

"Behaviour of concrete columns wrapped with fiber-reinforced polymer".

2006 - 2007:

"Statics of thin shells subjected to wrinkling".

2007 - 2008:

"Curvature effect on the stability of thin shells".

2009:

"Behaviour of laminated glass beams: theoretical and experimental investigation"

2014-2017:

Scientific coordinator of WorkPackage n.3 Catania University Project FIR 2014 "Valutazione delle Alternative End-of-Waste, nei settori dell'Ingegneria Civile e Ambientale, delle Ceneri Vulcaniche dell'Etna" - VALICA-ETNA, Principal investigator Prof. Paolo Roccaro.

2016-2018:

Scientific coordinator of the research project "Riciclo di Piroclasti dell'Etna nella produzione di materiali e manufatti edili - RiPE" , three-year plan for the Academic Research of the University of Catania.

2020-2022:

PIAAno di inCENTivi per la Ricerca di Ateneo (PIACERI)

Scientific Coordinator for the Department of Civil Engineering and Architecture research project "CH²V – Cultural Heritage Hazard and Vulnerability"

UNIVERSITY OF CATANIA , DEPT. OF CIVIL ENGINEERING AND ARCHITECTURE FUNDING:
2017:

"Recycled aggregates and sustainable materials for construction and building applications"

MINISTERIAL FUNDING:

2008-2010: PRIN 2007

Scientific coordinator of Catania University research group for the Government funding PRIN project "Structural joints, physical discontinuities and material interfaces: analysis and experimental testing" (National Coordinator Prof. N. Valoroso), sub-project: "Numerical modelling of growth and propagation of interfaces by means of the strong embedded discontinuities approach".

2018-2020:

Scientific coordinator of workgroup WP6, Project "REcupero e Utilizzo delle Ceneri vulcaniche ETnee (REUCET)", "Bando per il cofinanziamento di progetti di ricerca finalizzati allo sviluppo di nuove tecnologie di recupero, riciclaggio e trattamento dei rifiuti non rientranti nelle categorie già servite dai consorzi di filiera, all'ecodesign dei prodotti ed alla corretta gestione dei relativi rifiuti" del Ministero dell'Ambiente e della Tutela del Territorio e del Mare.

REGIONAL/EUROPEAN FUNDING

2007-2013: POR FESR Sicilia 2007-2013

Scientific coordinator for Catania University workgroups GL8-GL9 POR FESR Sicilia 2007-2013 Intervention strategy 4.1.1.1., project "Attività di sviluppo sperimentale finalizzata alla riduzione del rischio sismico nella Sicilia orientale".

COOPERATION TRANSFRONTALIERE ITALIA-TUNISIE

2014-2020: European Neighbourhood Instrument ENI 2014-2020

IS_3.1_093

Scientific coordinator for Catania University project MIAREM - Méthodologies Innovantes et Actions de Renforcement pour protéger l'environnement Méditerranéen

INTERNATIONAL AGREEMENTS

Coordination of ERASMUS projects:

2009-2013:

Universidade de Aveiro, Portugal, Departmentos Engenharia Civil.

2011

Research cooperation agreement on "Capacity of unreinforced cement-stabilised rammed earth"
School of Civil and Resource Engineering , The University of Western Australia

MEMBERSHIP

EUROMECH European Mechanics Society

AIMETA Associazione Italiana di Meccanica Teorica e Applicata

SISCo Società Italiana di Scienza delle Costruzioni

IGF Gruppo Italiano Frattura

GIMC Gruppo Italiano Meccanica Computazionale

M&MoCS International Research Center for Mathematics & Mechanics of Complex Systems

CIMAT – Centro Interdipartimentale di Matematica per la Tecnologia - University of Catania

JOURNAL REVIEWER ACTIVITY

1. Advances in Civil Engineering – Hindawi
2. Applied Sciences - MDPI
3. Bulletin of Engineering Geology and the Environment – Springer
4. Composite Structures - Elsevier
5. Computers and Structures - Elsevier
6. Construction & Building Materials - Elsevier
7. Engineering Fracture Mechanics - Elsevier
8. Engineering Structures – Elsevier
9. Finite Elements in Analysis and Design - Elsevier
10. International Journal of Damage Mechanics - Sage journals
11. International Journal of Mechanical Sciences- Elsevier
12. International Journal of Fracture - Springer
13. International Journal of Plasticity - Elsevier
14. Journal of Engineering Mechanics – ASCE
15. Journal of Materials in Civil Engineering – ASCE
16. Journal of Building Engineering - Elsevier
17. Journal of Mediterranean Earth Sciences - Nuova Cultura
18. Journal of Zhejiang University-SCIENCE A - Springer
19. KSCE Journal of Civil Engineering – Springer
20. Materials - MDPI
21. Materials & Design - Elsevier
22. Materials and Structures - Springer
23. Numerical Methods for Partial Differential Equations – Wiley
24. Open Construction and Building Technology – Bentham
25. Proceedings of the Royal Society - A
26. Resources, Conservation & Recycling – Elsevier
27. SN Applied Science-Springer
28. Steel and Composite Structures-TechnoPress

JOURNAL EDITORIAL BOARDS MEMBERSHIP

2016

Nanomechanics Science and Technology: An International Journal, Begell House. (SCOPUS and WOS indexed).

SCIENTIFIC COMMITTEES

2008

Member of scientific committee - 4th International Conference on Structural Defects and Repair, (CINPAR 2008), Department of Civil Engineering, University of Aveiro, Portugal.

2011

Member of the editorial board - The Thirteenth International Conference on Civil, Structural and Environmental Engineering Computing (CC2011) - Chania, Crete, Greece 6-9 September 2011

2011

Member of the editorial Board of the XVIII Italian Meeting of Computational Mechanics (GIMC 2010), Syracuse, Italy.

ORGANIZING COMMITTEES

2010

Member of organizing committee - XVIII Italian Meeting of Computational Mechanics, GIMC 2010, Syracuse, Italy, September 22-24, 2010.

2014

Member of organizing committee - X-DMS 2015 XFEM, GFEM, Non Conforming, Patches and Non Standard Finite Elements, Ferrara, Italy, September 9-11, 2015. Thematic conferences of the European Community in Computational Methods in Applied Sciences (ECCOMAS) and special interest conference of the International Association for Computational Mechanics (IACM).