Prof. Loredana Contrafatto
Curriculum vitae

PERSONAL INFORMATION
Family name: CONTRAFATTO
First name: LOREDANA
ORCID: 0000-0002-6468-9746
Scopus Author ID: 8510851800
Date of birth: 25/01/1967
Nationality: Italy

EDUCATION
1996:
PhD in Structural Engineering at the Catania University.
1991:
Graduated in Civil Engineering with first class honours at the Catania University.

CURRENT POSITION(S)
2006 – present
Associate Professor (Area CEAR-06/A, GSD 08/CEAR-06), PhD, Post-Doc
Department of Civil Engineering and Architecture (DICAR)
University of Catania – Italy

ASN 2016/2018
National scientific qualification for the position of full professor (area 08/B2 - SCIENZA DELLE COSTRUZIONI)

PREVIOUS POSITIONS
2002 – 2006 University Researcher at the Faculty of Engineering of the Catania University at Enna

FELLOWSHIPS AND AWARDS
2000 – 2002 Grant for research collaboration at the Catania University.
1997 - 1999 Postdoc grant at the Catania University.
1993 - 1996 PhD in Structural Engineering at the Catania University.
2020, 2021
Top 2% scientists of the world (single year 2020, 2021)
https://elsevier.digitalcommonsdata.com/datasets/btchxktzyw/3
https://elsevier.digitalcommonsdata.com/datasets/btchxktzyw/4

TEACHING ACTIVITIES

1992 – 2002:
Collaborations in Solid Mechanics and Theory of Structures in master's degree course, Faculty of Engineering, Catania University.
External teaching activity of Theory of Structures in training courses for seismic risk experts.
2002 – 2006:
Professor of Solid Mechanics, Faculty of Engineering, Catania University at Enna.
2005 - 2008
Professor of Analysis and Safety of Structural Systems, 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, Catania University.
2006- present
Professor of Mechanics of Masonry Structures in the master's degree course in Structural and Geotechnical Engineering, Catania University.
2010-2011
Professor of Computational Mechanics in the master's degree course in Structural and Geotechnical Engineering, Catania University.
2021-2023
Professor of Laboratory of nonlinear Analysis of Structures in the master's degree course in Structural and Geotechnical Engineering, Catania University.
2021- present
Professor of Laboratory of Diagnostics and Testing of Structures in the master's degree course in Structural and Geotechnical Engineering, Catania University.
2023-2024
Teacher training course A060 Technology in secondary school, Alta Scuola per la Formazione degli Insegnanti of the University of Catania.

SUPERVISION OF GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS

2007 – present
n. 15 PhD Thesis Supervising, n. 12 Membership of the PhD Thesis Board, more than 60 supervisions of master's degree students, more than 80 supervisions of internship students.

MAIN SCIENTIFIC RESEARCH TOPICS

1. Modelling of concrete cohesive fracture processes by Finite Elements with Embedded Discontinuities
2. Concrete with recycled aggregate from C&D waste
3. Polymer added concrete
4. Behaviour and design of chemically bonded anchors
5. Meso-scale simulation of concrete multi-axial behaviour
6. Homogenization techniques for woven fabrics modeling
7. Iso-geometric analysis of space rods, shells, Kirchhoff plate
8. Cement, mortar and concrete with recycled volcanic ash
9. Alkali activated materials with recycled volcanic ash and glass powder
10. Structural monitoring and dynamic identification using OMA
11. Modelling of reinforcement systems for seismic vulnerability analysis of masonry structures

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 exceptionsal 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 National Autonoma de Mexico, Istituto de Ingenierìa, Mexico City, 2012-2015.

SCIENTIFIC COORDINATOR (PI) OF LOCAL, NATIONAL and INTERNATIONAL RESEARCH PROJECTS

<u>UNIVERSITY OF CATANIA FUNDING:</u>

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:
PIAno di inCEntivi per la RIcerca di Ateneo (PIACERI)
Scientific Coordinator for the Department of Civil Engineering and Architecture research project "CH^2V – 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 Interventation 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 C-5-3.1-17 - Méthodologies Innovantes et Actions de Renforcement pour protéger l'environnement Méditerranéen

ORGANISATION OF SCIENTIFIC MEETINGS

2014

X-DMS 2015 XFEM, GFEM, Non Conforming, Patches and Non Standard Finite Elements, Ferrara, Italy, September 9-11, 2015. ECCOMAS/IACM thematic.

2011

Special Session of XX AIMETA 2011: Structural joints, physical discontinuities and material interfaces: modeling, experimental and numerics. Bologna, Italy, September 12-15, 2011.

2011

The Thirteenth International Conference on Civil, Structural and Environmental Engineering Computing (CC2011) - Chania, Crete, Greece 6-9 September 2011.

2010

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

2008

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

INSTITUTIONAL RESPONSIBILITIES (University of Catania – Italy)

2002 – present

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 and XXVIII cycle).

2017 - present

Member of the Evaluation and Mitigation of Environmental and Territorial Risks PhD Government Board (from XXXIII to XXXVIII cycle).

Member of the National Defense Against Natural Risks and Ecological Transition of Built Environment PhD Government Board (XXXVIII, XXXIX cycle).

2009

Member of PhD Committee (Programa de Maestria y Doctorado en Ingenieria) at the Universidad National Autonoma de Mexico, Istituto de Ingenierìa, 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.

2021- present

Scientific coordinator of the Spin-off Company Giniu Ingegneria e Architettura s.r.l, University of Catania.

2021-present

Member of the Register of Evaluation Experts (AVA system) of the National Agency for the Evaluation of the University System and Research as Disciplinary Expert for the initial and periodic accreditation of courses of study and university sites.
2024-Present
Director of training course A060 Technology in secondary school, member of the Board and Technical-Scientific Committee of the High School for Teacher Training of the University of Catania.

THIRD MISSION ACTIVITIES

2021
Co-founder Giniu Ingegneria e Architettura s.r.l. - Spinoff company of University of Catania - http://www.giniu.it/

2022
Scientific coordinator Agreement Protocol between University of Catania (Dept. of Civil Engineering and Architecture) and the engineering company ETS s.r.l.

2022
Scientific coordinator Agreement Protocol between University of Catania (Dept. of Civil Engineering and Architecture) and the international group Buzzi S.p.a.

2023
Member of the Technical Committee “Volcanic Ash - from Waste to Resource”, Sicilian Region, Regional Department of Energy and Public Utilities for the enactment of Decree D.A. No. 8/GAB 22/02/2024 of the Sicilian Region.

REVIEWING ACTIVITIES
2016- present
Editorial Boards Membership Nanomechanics Science and Technology: An International Journal, Begell House. (SCOPUS and WOS indexed)
2009- present
Reviewer Activity for more than 50 International Scopus Indexed journals.

MEMBERSHIPS OF SCIENTIFIC SOCIETIES
EUROMECH
AIMETA
SISCo
IGF
GIMC
M&MoCS
CIMAT

SCIENTIFIC PUBLICATIONS
https://www.iris.unict.it/

RECENT SCIENTIFIC PUBLICATIONS (SOURCE: Scopus)

Calderoni, D., Gastaldi, D., Merlo, V., Pellino, L., Canonico, F., Contrafatto, L.
Etna volcanic ash as new sustainable supplementary cementitious material
(2024) Journal of Building Engineering, 95, art. no. 110264
DOI: 10.1016/j.jobe.2024.110264

Cuomo, M., Contrafatto, L., Greco, L.
A COHESIVE INTERFACE MODEL WITH DEGRADING FRICTION COEFFICIENT
(2024) Mathematics and Mechanics of Complex Systems, 12 (2), pp. 113-133.
DOI: 10.2140/MEMOCS.2024.12.113

Imposa, S., Cuomo, M., Contrafatto, L., Mineo, S., Grassi, S., Li Rosi, D., Barbano, M.S., Morreale, G., Galasso, M., Pappalardo, G.
Engineering Geological and Geophysical Studies Supporting Finite Element Analysis of Historical Buildings after Dynamic Identification
(2023) Geosciences (Switzerland), 13 (3), art. no. 84,
DOI: 10.3390/geosciences13030084

Bernardo, E., Elsayed, H., Mazzi, A., Tameni, G., Gazzo, S., Contrafatto, L.
Double-life sustainable construction materials from alkali activation of volcanic ash/discarded glass mixture
(2022) Construction and Building Materials, 359, art. no. 129540,
DOI: 10.1016/j.conbuildmat.2022.129540

Contrafatto, L., Lo Faro, A., Gazzo, S., Purrazzo, A.
Factors Affecting the Seismic Analysis of Historical Masonry Structures: Case of a Single-Nave Church Damaged during the 2009 L'Aquila Earthquake
(2022) Journal of Architectural Engineering, 28 (4), art. no. 04022032,
DOI: 10.1061/(ASCE)AE.1943-5568.0000556

Cuomo, M., Boutin, C., Contrafatto, L., Gazzo, S.
Effective anisotropic properties of fibre network sheets
(2022) European Journal of Mechanics, A/Solids, 93, art. no. 104492,
DOI: 10.1016/j.euromechsol.2021.104492

Contrafatto, L.
(2021) In: Sustainable Concrete Made with Ashes and Dust from Different Sources: Materials, Properties and Applications – Editors Rafat Siddique, Rafik Belarbi - Elsevier Book
Chapter 8 – Volcanic ash
DOI: 10.1016/B978-0-12-824050-2.00011-5
ISBN: 978-0-12-824050-2

Gazzo, S., Cuomo, M., Boutin, C., Contrafatto, L.
Directional properties of fibre network materials evaluated by means of discrete homogenization
(2020) European Journal of Mechanics, A/Solids, 82, art. no. 104009,
DOI: 10.1016/j.euromechsol.2020.104009

Contrafatto, L., Lazzaro Danzuso, C., Gazzo, S., Greco, L.
Physical, mechanical and thermal properties of lightweight insulating mortar with recycled Etna volcanic aggregates
(2020) Construction and Building Materials, 240, art. no. 117917,
DOI: 10.1016/j.conbuildmat.2019.117917

Greco, A., Tsallis, C., Rapisarda, A., Pluchino, A., Fichera, G., Contrafatto, L.
Acoustic emissions in compression of building materials: q-statistics enables the anticipation of the breakdown point
(2020) European Physical Journal: Special Topics, 229 (5), pp. 841-849.
DOI: 10.1140/epjst/e2020-800232-7

Contrafatto, L., Gazzo, S., Purrazzo, A., Gagliano, A.
Thermo-mechanical characterization of insulating bio-plasters containing recycled volcanic pyroclasts
(2020) Open Civil Engineering Journal, 14 (1), pp. 66-77.
DOI: 10.2174/1874149502014010066