

Curriculum Vitae

PERSONAL INFORMATION



RESEARCH INTERESTS

Summary

Salvatore Caddemi

- Dipartimento di Ingegneria Civile e Architettura Università degli Studi di Catania Via Santa Sofia, 2 – 95125 Catania (Italia)
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ORCID ID https://orcid.org/0000-0002-2438-2395

Date of birth 29/11/1960 | Nationality Italy

Current Position full professor at the University of Catania

Salvatore Caddemi received his master degree in Civil Engineering in 1984 and obtained his Ph.D. in Structural Engineering in 1990, from the University of Palermo. His research activity in the period 1988-1991 has been developed at the "FRD/UCT Centre for Research in Computational and Applied Mechanics" of the University of Cape Town, South Africa, as "Visiting Researcher" and "Postdoctoral Research Fellow" contributing to theoretical advances in the integration of nonliner plastic constitutive laws and formulating iterative procedures for the relevant incremental analysis. After being appointed Researcher of Mechanics of Materials in July 1991 at the Department of Structural and Geotechnical Engineering of the University of Palermo, he was "Visiting Researcher" within the program HCM network of the European Community at the Department of Structural Engineering and Materials of the Technical University of Denmark in 1996. In November 1998 he became associate professor of "Strenght of Materials" at the Institute of Structural Engineering of the Engineering Faculty of the University of Catania and since 1 october 2001 he is full professor at the Department of Civil and Architectural Engineering of the University of Catania where he is currently conducting his teaching and research activity.

His research interest has been oriented to deterministic analysis of elasticplastic and no-tension material structures, stochastic dynamic structural analysis, structural and damage identification, static and dynamic analysis of structures with singularities, seismic vulnerability assessment of masonry structures. He is currently involved in the use of generalised functions for the solution of direct and inverse problems of beam-like and frame structure in presence of strong discontinuites and singularities.

Bibliometric Indicators

SCOPUS: h-index 23, citations 1968, documents 87

WORK EXPERIENCE AND RESEARCH TOPICS

From 2001 to today

University of Catania - Full Professor

Dipartimento di Ingegneria Civile e Architettura

- · Constitutive modeling of elastic-plastic and no-tension materials
- Dynamic and stochastic analysis
- Structural and damage identification
- Analysis of structures with singularities: static, dynamic and stability
- Dynamic stability under conservative and non-conservative forces
- Tensile instability
- Unreinforced and reinforced masonry structures modeling and seismic vulnerability assessment
- Discrete Macro-modelling of masonry structures.
- Modelling and vulnerability assessment of masonry bridges
- Seismic protection and retrofitting of monumental structures
- · Vulnerability assessment of art objects and museum contents
- Closed form solutions of inhomogeneous beams in static and dynamics.
- · Closed form solutions of cracked beams in static and dynamics.



Curriculum Vitae

The Dynamic Stiffness method in the context of dynamics and stability of damaged framed
systems.

Inverse solutions and methods of dynamic identification of damage in structures.

From 1998 to 2001	University of Catania – Associate Professor
	Dipartimento di Ingegneria Civile e Architettura
From 1998 to 2001	University of Catania – Associate Professor
	Dipartimento di Ingegneria Civile e Architettura
From 1996 To 1997	Technical University of Denmark, Lingby, Denmark – Visiting Researcher
	Department of Structural Engineering and Materials
From 1991 To 1998	University of Palermo – University Researcher
	Viale delle Scienze 4, Palermo, https://www.unipa.it/
From 1990 To 1991	University of Palermo – Post-Doctoral Research Fellow
	Viale delle Scienze 4, Palermo, https://www.unipa.it/
From 1988 To 1989	University of Cape Town, South Africa - Research Officer
	FRD/UCT Centre for Research in Computational and Applied Mechanics

EDUCATION AND TRAINING

1998-2003

1995-1998

1995-1998

Structural mechanics

Reliability of structures

Structural mechanics

1990	PhD in	Structural	Enginee	ering at th	ne Universit	y of Palermo

1985 Civil Engineering, University of Palermo (23 years) Master degree: final mark 110/110 cum laude

PERSONAL SKILLS Mother tongue(s) Italian Other language(s) COMPRENSIONE PARLATO **PRODUZIONE SCRITTA** Ascolto Lettura Interazione Produzione orale English C1 C1 C1 C1 C1 Levels: A1/2: Basic user - B1/2: Independent user - C1/2 Proficient user Common European Framework of Reference for Languages MAIN ROLES AND RESPONSIBILITIES 2003-2005 Coordinator of the Catania Research Unit within the national project PRIN 2003 "Procedures for identification of geometrical and physical parameters of structural systems". Coordinator of the Catania Research Unit within the national project PRIN 2003 "Advanced 2017-2020 mechanical modeling of new materials and structures for the solution of 2020 Horizon challenges" **TEACHING ACTIVITY** 2012-2020 Structural Mechanics 2010-2011 Inelastic analysis of structures 2005-2010 Structural mechanics 2003-2010 Strength of Materials



ORGANIZATION OF SCIENTIFIC MEETINGS (in the last 10 years)	
2018	member of the scientific committee of SER4SC 2018 Seismic and Energy Renovation for Sustainable Cities, International Conference, 1-3 February 2018, Catania, Italy
2007	member of the scientific committee of SEMC2007 The Third International Conference on Structural Engineering, Mechanics and Computations, 10-12 September 2007, Cape Town, South Africa
FURTHER INFORMATION	
National and international acknowledgments	2019. invited keynote presentation titled 'Explicit dynamic solutions of damaged beams' within the 12th International Symposium on Vibrations of Continuous Systems, SportHotel Panorama, Corvara in Badia, Italy
	2015. invited keynote lecture titled 'The role of shear deformation in the tensile instability of beam- columns' within the ISVCS10 10th International Symposium on Vibrations of Continuous Systems, Stanley Hotel, Estes Park, Colorado, USA
	2008. invited keynote lecture titled 'Generalised Functions for Modelling Singularities: Direct and Inverse Problems' within the IUTAM2008 Symposium on Theoretical, Computational and Modelling Aspects of Inelastic Media, Cape Town, South Africa
Other relevant experiences	 2020. Numerical modeling of strategic buildings finalized to dynamic identification, research convention with Italian National Research Council (CNR).
	 2021. Seismic modeling of masonry arch bridges along the CircumEtnea railway of Catania, Scientific consultancy.
	 2018. Support to bridge inspection activity along the CircumEtnea railway of Catania, Scientific consultancy.
	• 2018. INNTECH SRL Patent engineering of a seismic isolator, Scientific consultancy.
Memberships	2015-today. Member of an international group doing and promoting research on the dynamic stiffness method which promotes international workshops based on invited lectures
	Since 2000. Member: Associazione Italiana di Meccanica Teorica e Applicata (AIMETA) Since 2000. Member: Europeans Mechanics Society (EUROMECH)
	Since 2000. Member: Associazione Nazionale Italiana Ingegneria Sismica (ANIDIS)
Evaluation of research results	Since 2013. Editor: Academic Editor of Mathematical Problems in Engineering Since 2015. Editor: Academic Editor of Sound and Vibration
	Since 2000. Reviewer: Applied Mathematical Modeling
	Since 2000. Reviewer: Archive of applied mechanics
	Since 2000. Reviewer: Computer & Structures
	Since 2000. Reviewer: Earthquake Engineering and Structural Dynamics
	Since 2000. Reviewer: Engineering Structures
	Since 2000. Reviewer: International Journal of Solids and Structures
	Since 2000. Reviewer: Journal of Sound and Vibration
	Since 2000. Reviewer: Meccanica
	Since 2000- Reviewer: Structural Engineering and Mechanics
	Since 2000. Reviewer: Structures
Research monographs and chapters in collective volumes	 Caddemi, S., Caliò, I., Cannizzaro, F., Pantò, B., Rapicavoli, D. Discrete macroelement modeling (2019) Numerical Modeling of Masonry and Historical Structures: From Theory to Application, pp. 503-533. DOI: 10.1016/B978-0-08-102439-3.00014-2. Book Chapter
Personal data	According to law 679/2016 of the Regulation of the European Parliament of 27th April 2016, I hereby express my consent to process and use my data provided in this CV

Date: Catania, 21th April 2022

Signature: Salvatore Caddemi

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List of the top publications in the main research field (in the last ten years)

- Occhipinti, G., Cannizzaro, F., Caddemi, S., Caliò, I. A discrete macro element method for modelling ductile steel frames around the openings of URM buildings as low impact retrofitting strategy (2021) Sustainability (Switzerland), 13 (17), art. no. 9787. DOI: 10.3390/su13179787
- 2. Benfratello, S., Caddemi, S., Palizzolo, L., Pantò, B., Rapicavoli, D., Vazzano, S. Targeted steel frames by means of innovative moment resisting connections (2021) Journal of Constructional Steel Research, 183, art. no. 106695. DOI: 10.1016/j.jcsr.2021.106695
- 3. Pantò, B., Caddemi, S., Caliò, I., Spacone, E. A 2D beam-column joint macro-element for the nonlinear analysis of RC frames (2021) Earthquake Engineering and Structural Dynamics, 50 (3), pp. 935-954. DOI: 10.1002/eqe.3375
- 4. Cannizzaro, F., Impollonia, N., Caddemi, S., Caliò, I. Explicit dynamic response of damaged beams with application to uncertain and identification problems (2020) Journal of Sound and Vibration, 487, art. no. 115608. DOI: 10.1016/j.jsv.2020.115608
- Greco, A., Fiore, I., Occhipinti, G., Caddemi, S., Spina, D., Caliò, I. An equivalent non-uniform beam-like model for dynamic analysis of multi-storey irregular buildings (2020) Applied Sciences (Switzerland), 10 (9), art. no. 3212. DOI: 10.3390/app10093212
- Greco, A., Pluchino, A., Caddemi, S., Caliò, I., Cannizzaro, F. On profile reconstruction of Euler–Bernoulli beams by means of an energy based genetic algorithm (2020) Engineering with Computers, 36 (1), pp. 239-250. DOI: 10.1007/s00366-018-00693-x
- Pantò, B., Rapicavoli, D., Caddemi, S., Caliò, I. A Fibre Smart Displacement Based (FSDB) beam element for the nonlinear analysis of reinforced concrete members (2019) International Journal of Non-Linear Mechanics, 117, art. no. 103222. DOI: 10.1016/j.ijnonlinmec.2019.07.007
- 8. Caddemi, S., Caliò, I., Cannizzaro, F., Morassi, A. A procedure for the identification of multiple cracks on beams and frames by static measurements (2018) Structural Control and Health Monitoring, 25 (8), art. no. e2194. DOI: 10.1002/stc.2194
- 9. Cannizzaro, F., Pantò, B., Caddemi, S., Caliò, I. A Discrete Macro-Element Method (DMEM) for the nonlinear structural assessment of masonry arches (2018) Engineering Structures, 168, pp. 243-256. DOI: 10.1016/j.engstruct.2018.04.006
- 10. Cannizzaro, F., De Los Rios, J., Caddemi, S., Caliò, I., Ilanko, S. On the use of a roving body with rotary inertia to locate cracks in beams (2018) Journal of Sound and Vibration, 425, pp. 275-300. DOI: 10.1016/j.jsv.2018.03.020
- 11. Greco, A., Pluchino, A., Cannizzaro, F., Caddemi, S., Caliò, I. Closed-form solution based genetic algorithm software: Application to multiple cracks detection on beam structures by static tests (2018) Applied Soft Computing Journal, 64, pp. 35-48. DOI: 10.1016/j.asoc.2017.11.040
- Cannizzaro, F., Pantò, B., Lepidi, M., Caddemi, S., Caliò, I. Multi-directional seismic assessment of historical masonry buildings by means of macro-element modelling: Application to a building damaged during the L'Aquila earthquake (Italy) (2017) Buildings, 7 (4), art. no. 106. DOI: 10.3390/buildings7040106
- 13. Caddemi, S., Calio, I., Cannizzaro, F. The dynamic stiffness matrix (DSM) of axially loaded multi-cracked frames (2017) Mechanics Research Communications, 84, pp. 90-97. DOI: 10.1016/j.mechrescom.2017.06.012
- 14. Pantò, B., Cannizzaro, F., Caddemi, S., Caliò, I., Chácara, C., Lourenço, P.B. Nonlinear modelling of curved masonry structures after seismic retrofit through FRP reinforcing (2017) Buildings, 7 (3), art. no. 79. DOI: 10.3390/buildings7030079
- 15. Cannizzaro, F., Greco, A., Caddemi, S., Caliò, I. Closed form solutions of a multi-cracked circular arch under static loads (2017) International Journal of Solids and Structures, 121, pp. 191-200. DOI: 10.1016/j.ijsolstr.2017.05.026
- 16. Caddemi, S., Caliò, I., Cannizzaro, F., Pantò, B. New frontiers on seismic modeling of masonry structures (2017) Frontiers in Built Environment, 3, art. no. 39. DOI: 10.3389/fbuil.2017.00039
- 17. Caddemi, S., Calio, I., Cannizzaro, F. Advances in dynamic instability: Can a beam-column undergo tensile flutter? (2017) JVC/Journal of Vibration and Control, 23 (8), pp. 1309-1320. DOI: 10.1177/1077546315592532
- 18. Pantò, B., Rapicavoli, D., Caddemi, S., Caliò, I. A smart displacement based (SDB) beam element with distributed plasticity (2017) Applied Mathematical Modelling, 44, pp. 1339-1351. DOI: 10.1016/j.apm.2017.01.018
- 19. Caddemi, S., Caliò, I., Cannizzaro, F. On the dynamic stability of shear deformable beams under a tensile load (2016) Journal of Sound and Vibration, 373, pp. 89-103. DOI: 10.1016/j.jsv.2016.03.006
- 20. Pantò, B., Cannizzaro, F., Caddemi, S., Caliò, I. 3D macro-element modelling approach for seismic assessment of historical masonry churches (2016) Advances in Engineering Software, 97, pp. 40-59. DOI: 10.1016/j.advengsoft.2016.02.009
- 21. Caddemi, S., Caliò, I., Cannizzaro, F. Tensile and compressive buckling of columns with shear deformation singularities (2015) Meccanica, 50 (3), pp. 707-720. DOI: 10.1007/s11012-014-9964-3
- 22. Caddemi, S., Caliò, I., Cannizzaro, F. Influence of an elastic end support on the dynamic stability of Beck's column with multiple weak sections (2015) International Journal of Non-Linear Mechanics, 69, pp. 14-28. DOI: 10.1016/j.ijnonlinmec.2014.10.016
- 23. Caddemi, S., Caliò, I. Exact reconstruction of multiple concentrated damages on beams (2014) Acta Mechanica, 225 (11), pp. 3137-3156. DOI: 10.1007/s00707-014-1105-5
- 24. Caddemi, S., Caliò, I., Cannizzaro, F. Flutter and divergence instability of the multi-cracked cantilever beam-column (2014) Journal of Sound and Vibration, 333 (6), pp. 1718-1733. DOI: 10.1016/j.jsv.2013.10.039
- 25. Caddemi, S., Caliò, I., Cannizzaro, F., Rapicavoli, D. A novel beam finite element with singularities for the dynamic analysis of discontinuous frames (2013) Archive of Applied Mechanics, 83 (10), pp. 1451-1468. DOI: 10.1007/s00419-013-0757-2
- 26. Caddemi, S., Caliò, I., Cannizzaro, F. The influence of multiple cracks on tensile and compressive buckling of shear deformable beams (2013) International Journal of Solids and Structures, 50 (20-21), pp. 3166-3183. DOI: 10.1016/j.ijsolstr.2013.05.023
- 27. Caddemi, S., Caliò, I. The exact explicit dynamic stiffness matrix of multi-cracked Euler-Bernoulli beam and applications to damaged frame structures (2013) Journal of Sound and Vibration, 332 (12), pp. 3049-3063. DOI: 10.1016/j.jsv.2013.01.003
- 28. Caddemi, S., Caliò, I. The exact stability stiffness matrix for the analysis of multi-cracked frame structures (2013) Computers and Structures, 125, pp. 137-144. DOI: 10.1016/j.compstruc.2013.05.003



- 29. Caddemi, S., Caliò, I., Cannizzaro, F. Closed-form solutions for stepped Timoshenko beams with internal singularities and along-axis external supports (2013) Archive of Applied Mechanics, 83 (4), pp. 559-577. DOI: 10.1007/s00419-012-0704-7
- Caddemi, S., Morassi, A. Multi-cracked Euler-Bernoulli beams: Mathematical modeling and exact solutions (2013) International Journal of Solids and Structures, 50 (6), pp. 944-956. DOI: 10.1016/j.ijsolstr.2012.11.018
- 31. Caddemi, S., Caliò, I. The influence of the axial force on the vibration of the Euler-Bernoulli beam with an arbitrary number of cracks (2012) Archive of Applied Mechanics, 82 (6), pp. 827-839. DOI: 10.1007/s00419-011-0595-z