

ELIO SACCO

CURRICULUM VITAE

Email : elio.sacco@unina.it
Web-page: <https://www.docenti.unina.it/elio.sacco>

RESEARCH UNIQUE IDENTIFIER

ResearcherID: G-5349-2017
ORCID: <https://orcid.org/0000-0002-3948-4781>

RESEARCH PRODUCTS AND BIBLIOMETRIC DATA (UPDATED AT JUNE 13, 2023)

Scopus	Documents	217
	Citations	5634 (with no self-citations 4840)
	h-index	41 (with no self-citations 38)
Google Scholar	Documents	399
	Citations	8085
	h-index	47

5 MOST CITED PAPERS (SCOPUS)

- Alfano, G., Sacco, E. Combining interface damage and friction in a cohesive-zone model. *International Journal for Numerical Methods in Engineering*, 68 (5), pp. 542-582. (2006) DOI: 10.1002/nme.1728 (246 citations Scopus)
- Auricchio, F., Sacco, E. A one-dimensional model for superelastic shape-memory alloys with different elastic properties between austenite and martensite. *International Journal of Non-Linear Mechanics*, 32 (6), pp. 1101-1114. (1997) DOI: 10.1016/S0020-7462(96)00130-8 (222 citations Scopus)
- D'Altri, A.M. et al. Modeling Strategies for the Computational Analysis of Unreinforced Masonry Structures: Review and Classification. *Archives of Computational Methods in Engineering*, 27(4), pp. 1153–1185. (2020) DOI: 10.1007/s11831-019-09351-x (216 citations Scopus)
- Luciano, R., Sacco, E. Homogenization technique and damage model for old masonry material. *International Journal of Solids and Structures*, 34 (24), pp. 3191-3208. (1997) DOI: 10.1016/S0020-7683(96)00167-9 (215 citations Scopus)
- Valluzzi, M.R., et al. Round Robin Test for composite-to-brick shear bond characterization. *Materials and Structures/Materiaux et Constructions*, 45 (12), pp. 1761-1791. (2012) DOI: 10.1617/s11527-012-9883-5 (184 citations Scopus)

CURRENT POSITION

2017- Professore Ordinario (full professor with tenure) di Scienza delle Costruzioni (Solid and Structural Mechanics), Department of Structures for Engineering and Architecture, University of Naples "Federico II"

CURRENT TEACHING COURSES

- Scienza delle Costruzioni (Solid and Structural Mechanics), Bachelor in Naval Engineering, University of Naples "Federico II"
- Scienza delle Costruzioni 2 (Solid and Structural Mechanics 2), Master in Naval Engineering, University of Naples "Federico II"
- Mechanics of Composite and Advanced Materials, Master in Structural and Geotechnical Engineering, University of Naples "Federico II"

- Virtual Element Method (VEM) for Fracture Mechanics, PhD in Ingegneria Strutturale e Geotecnica, Sapienza University of Rome
- Modeling of cohesive interfaces, PhD in Methods, Modeling and Technologies for the Engineering, University of Cassino and Southern Lazio

PREVIOUS ACADEMIC POSITIONS

2000-2017	Professore Ordinario (full professor with tenure) di Scienza delle Costruzioni (Solid and Structural Mechanics), Department of Civil and Mechanical Engineering, University of Cassino and Southern Lazio
1992-2000	Associate professor of Solid and Structural Mechanics, Dipartimento di Ingegneria Industriale, Università di Cassino
1986-1992	Assistant professor of Solid and Structural Mechanics, Dipartimento di Ingegneria Civile, Università di Roma “Tor Vergata”

EDUCATION

January 1980: Laurea (5 years MS), 110/110 cum laude, Civil Eng., University of Naples “Federico II”, Italy.

ABROAD RESEARCH EXPERIENCES

Sept. – Oct. 2013	Professeur invité, Centre National de la Recherche Scientifique, LMA Marseille (France)
Sept. – Oct. 2012	Professeur invité, Centre National de la Recherche Scientifique, LMA Marseille (France)
Sept. – Oct. 2011	Enseignant invité, École Centrale Marseille, Marseille (France)
Sept. – Nov. 2009	Enseignant invité, École Centrale Marseille, Marseille (France)
Sept. – Oct. 2008	Enseignant invité, École Centrale Marseille, Marseille (France)
Dec. 92 – Feb. 93	Professeur Associée, “Département de Mathématiques”, Conservatoire National des Arts et Métiers (France)
June – July 1991	Visiting Professor at Dept. of Aerospace and Mechanical Engineering, West Virginia University in Morgantown (U.S.A)
Jan. – April 1990	Scientist Visiting at Dept. of Engineering Science and Mechanics, Virginia Polytechnic Institute and State University in Blacksburg (U.S.A.)
Feb. – April 1988	Scientist Visiting at Dept. of Engineering Science and Mechanics, Virginia Polytechnic Institute and State University in Blacksburg (U.S.A.)

MAIN RESEARCH TOPICS

Elio Sacco covered a wide range of subjects in the fields of solids and structural mechanics and of mechanics of materials, with particular reference to theoretical and computational problems relevant to nonlinear material responses. The main scientific results are in the subjects:

- i) Material constitutive modeling: static and dynamic response for cohesive and ductile materials, advanced materials (shape memory alloys).
- ii) Micromechanics and homogenization techniques: analysis of composite materials characterized by nonlinear behavior of the constituents.
- iii) Multiscale analysis of heterogeneous structures: structural analyses developed considering different scales, i.e. the scale of the structure and the scale of the material.
- iv) Mechanics of masonry materials and structures: development of specific constitutive laws, computational procedures for the analysis of masonry structures.
- v) Analysis of plate and shells: development of models and finite elements.

FELLOWSHIPS AND AWARDS

Jan. – April 1990	CNR-NATO (Italian National Research Council) scholarship for abroad research period at Polytechnic Institute and State University in Blacksburg (U.S.A.).
-------------------	---

PLENARY AND SEMI-PLENARY LECTURES (FROM 2013)

- 2019 Keynote Lecture, Virtual Element Method for Inelastic and Fracture Mechanics Problems, VI International Conference on Computational Contact Mechanics - ICCCM 2019, Hannover (Germany) July 3-5 2019.
- 2019 Keynote Lecture, Multiscale formulations for in-plane and out-of-plane analysis of masonry elements, VI International Conference on Computational Modeling of Fracture and Failure of Materials and Structures – CFRAC 2019, Braunschweig (Germany), June 12-14, 2019.
- 2018 Plenary Lecture, Computational Models for Masonry Structures, International Conference on Computational Methods - ICCM 2018, Rome (Italy), August 6-10, 2018.
- 2015 Plenary Lecture, A coupled damage-friction interface model accounting for interlocking effect, Colloquium Lagrangianum 2015, ENSTA ParisTech, Palaiseau, September 24-25, 2015.

INVITED PRESENTATIONS (FROM 2013)

- 2022 Virtual Element Method for inelastic and fracture mechanics problems, DICAR Politecnico di Bari, May 19, 2022
- 2022 Computational Modeling of Masonry Constructions, Dipartimento di Ingegneria Civile e Meccanica, Università di Cassino e del Lazio Meridionale, May 26, 2022
- 2022 Virtual Element Method: foundation and applications to linear and nonlinear mechanics; Virtual Element Method: nonlinear fracture mechanics. PhD Course, Sapienza University of Rome, April 20, 2022
- 2021 Virtual Element Method: applications to nonlinear mechanics, homogenization and fracture mechanics. PhD Course, Sapienza University of Rome, March 17, 2021
- 2021 Modeling of cohesive interfaces. Short Course PhD in Civil Engineering, Università di Cassino e del Lazio Meridionale, June 21-23, 2021
- 2021 Virtual Element Method for (2D) structural mechanics, Dipartimento di Ingegneria, Università di Roma Tre, October 21, 2021.
- 2020 Virtual Element Method: applications to nonlinear mechanics, homogenization and fracture mechanics, Workshop “VEM and elasticity”, Politecnico di Milano, February 5, 2020
- 2019 Modeling and analysis of masonry arches and strengthening techniques, Corso di Alta Formazione in: diagnostica e verifica strutturale di costruzioni storiche e monumentali "Marcello Ciampoli". DTC Lazio, Distretto Tecnologico Beni e Attività Culturali Centro di Eccellenza. Università di Cassino e del Lazio Meridionale, May 31, 2019
- 2018 Multiscale Models for Masonry, Dottorato di Ricerca in Ingegneria Strutturale e Geotecnica Corso sulle Costruzioni Esistenti in Muratura, Sapienza Università di Roma, June 16, 2018
- 2018 Micromechanical Models for Masonry, Dottorato di Ricerca in Ingegneria Strutturale e Geotecnica Corso sulle Costruzioni Esistenti in Muratura, Sapienza Università di Roma, June 15, 2018
- 2018 Homogenization of nonlinear composites based on FTA approach, 1st GACM-GIMC workshop “Common Research Interests in Computational Mechanics”, CISM Udine February 28 - March 1 2018.
- 2017 Computational modeling of masonry structures, Università degli Studi “Niccolò Cusano” Telematica Roma, November 14, 2017.
- 2017 Researches on the Mechanics of Materials and Structures: yesterday, today and ..., University of Naples “Ferdinando II”, October 27, 2017.
- 2017 Homogenization of heterogeneous beam, Università di Pavia, June 20, 2017.
- 2017 Computational modeling of masonry structures, Università di Roma “Sapienza”, June 15, 2017.
- 2017 Computational homogenization of composites subjected to plasticity, fracture and unilateral contact, Università di Firenze, April 4, 2017.
- 2016 Computational homogenization of composites subjected to plasticity, fracture and unilateral contact, Leibniz Universität Hannover, MUSIC Multiscale Methods for Interface Coupling, February 24, 2016.

- 2016 Computational homogenization of composites subjected to plasticity, fracture and unilateral contact, Technische Universität Braunschweig, February 22, 2016.
- 2016 Mechanics of Masonry Structures: Micro, Multiscale and Macro Models, Politecnico di Bari – PhD School, January 8, 2016.
- 2015 An interface model coupling damage friction and unilateral effect, IMT Institute for Advanced Studies, Lucca, September 18, 2015.
- 2015 An interface model coupling damage friction and unilateral effect, Laboratoire de Mécanique et Génie Civil - CNRS/UM2, Montpellier, February 5, 2015.
- 2015 A corotational shell element for SMA devices, Centro Italiano Ricerche Aereospaziali CIRA, Capua, March 17, 2015.
- 2014 A Nonlinear Homogenization Technique for NiTi based Composite Materials, Brunel University, London, February 4, 2014.
- 2014 Mechanics of Masonry Structures: Micro, Multiscale and Macro Models. Master in Earthquake Engineering, L'Aquila, January 24, 2014.
- 2013 Mechanics of Masonry Structures. University of Leeds (UK), Leeds, September 23, 2013.
- 2013 Mechanics of Masonry Structures: Micro, Multiscale and Macro Models. First French-Italian meeting on masonry, Laboratoire de Mécanique et d'Acoustique CNRS, Marseille October 24, 2013.
- 2013 A nonuniform TFA homogenization technique based on piecewise interpolation functions of the inelastic field, University of Palermo (Italy) April 22, 2013.

ORGANIZATION OF CONFERENCES AND SCIENTIFIC EVENTS (FROM 2013)

- 2020 Minisymposium on “New trends in the homogenization of nonlinear composites” in 14th World Congress in Computational Mechanics and ECCOMAS Congress, Paris (France), July 19-24, 2020.
- 2020 Minisymposium on “Masonry Constructions” in 14th World Congress in Computational Mechanics and ECCOMAS Congress, Paris (France), July 19-24, 2020.
- 2019 Minisymposium on “Interface models and phase-field approaches for fracture and damage mechanics” in AIMETA (Italian Association of Theoretical and Applied Mechanics), Rome (Italy), September 15-19, 2019.
- 2019 Minisymposium on “Masonry constructions: from material to structures, modelling and analysis approaches” in AIMETA (Italian Association of Theoretical and Applied Mechanics), Rome (Italy), September 15-19, 2019.
- 2018 Minisymposium on “Computational Modeling of Masonry Structures” in International Conference on Computational Methods - ICCM 2018, Rome (Italy), August 6-10, 2018.
- 2018 Minisymposium on “Computational Modeling of Masonry Structures” in 13th World Congress in Computational Mechanics - WCCM 2018, New York (USA), July 22-27, 2018.
- 2018 Minisymposium on “Computational Homogenization of Nonlinear Composites” in 10th European Solid Mechanics Conference – ESMC 2018, Bologna (Italy), July 2-6, 2018.
- 2017 Minisymposium on “Mechanical response of masonries: modeling and numerical procedure” in AIMETA (Italian Association of Theoretical and Applied Mechanics), Salerno (Italy), September 4-7, 2017.
- 2017 Minisymposium on “Fracture: interface models and phase field approaches” in AIMETA (Italian Association of Theoretical and Applied Mechanics), Salerno (Italy), September 4-7, 2017.
- 2017 FIMM4 French-Italian meeting on masonry, Rome “Sapienza”, January 27, 2017.
- 2016 Conference on the “Seismic Risk in the Southern Lazio”, Cassino, October 7, 2016.
- 2016 MCM 2016 Workshop on “Mechanics of Masonry Constructions”, Cassino, July 4 2016.
- 2015 Minisymposium on “Masonry modeling: from theory to numerical and simplified approaches”, in AIMETA (Italian Association of Theoretical and Applied Mechanics), Genova (Italy), September 14-17, 2015.
- 2014 GIMC-GMA 2014 – Cassino, June 11-13, 2014
- 2013 FIMM1 French-Italian meeting on masonry, Marseille, October 24-25, 2013.

MEMBER OF SCIENTIFIC CONGRESS COMMITTEES (FROM 2013)

- 2022 XXV Convegno AIMETA, Italian Association of Theoretical and Applied Mechanics, Palermo, September 4 -9, 2022
- 2021 MURICO 7, Mechanics of masonry structures strengthened with composite materials, November 24-26, 2021
- 2018 The Thirteenth International Conference on Computational Structures Technology. Sitges, Barcelona (Spain) September 4-6, 2018
- 2018 Contact Mechanics International Symposium – CMIS 2018. Biella (Italy), May 16-18, 2018
- 2017 MuRiCo5, Mechanics of Masonry Structures Strengthened with Composite Materials. Bologna, June 28-30, 2017
- 2017 ICCCM17, International Conference on Computational Contact Mechanics, July 5-7 2017, Lecce, Italy
- 2015 ICCCM15, International Conference on Computational Contact Mechanics, 27-29 May 2015, Hannover, Germany
- 2014 MuRiCo4, Mechanics of Masonry Structures, Ravenna, September 9-11, 2014.
- 2013 International Workshop Multi-Scale Modeling and Characterization of Innovative Materials and Structures Cetara, Amalfi Coast - May 1-5, 2013

MEMBERSHIPS OF SCIENTIFIC SOCIETIES

- 2022- Member of the Steering Committee of the Italian Association of Theoretical and Applied Mechanics AIMETA
- 2014-17 Member of the Steering Committee of the Italian Association of Theoretical and Applied Mechanics AIMETA
- 2009-13 Member of the National Secretariat of the Scientific Disciplinary Sector ICAR/08 “Scienza delle Costruzioni”
- 2007-13 Member of the General Council IACM (International Association of Computational Mechanics)
- 2001-16 Member of the “Laboratoire Lagrange/Laboratorio Lagrange” Italo-Francese
- 2000-05 Member of the Steering Committee of the Italian Group of Computational Mechanics GIMC-AIMETA
- 1990- Member of the Italian Group of Computational Mechanics GIMC-AIMETA

MEMBER OF EDITORIAL ADVISORY BOARD OF INTERNATIONAL JOURNALS

- 2022- Mechanics of Advanced Materials and Structures
- 2018- International Journal of Mathematical Physics
- 2018- Frattura ed Integrità Strutturale (Fracture and Structural Integrity)
- 2015- International Journal of Masonry Research and Innovation IJMRI
- 2013- European Journal of Computational Mechanics/Revue Européenne de Mécanique Numérique
- 2012-16 Journal of Structures
- 2011-22 Associate Editor of Meccanica
- 2009- Annals of Solid and Structural Mechanics
- 2005- International Journal for Computational Methods in Engineering Science and Mechanics

INSTITUTIONAL RESPONSABILITY

- 2019- Deputy Head of the Department of Structures for Engineering and Architecture, University of Naples “Federico II”
- 2019- Member of the PhD College of Ingegneria strutturale, geotecnica e rischio sismico, University of Naples “Federico II”
- 2016 Member of the Evaluation Team Group GEV appointed by ANVUR for Area 08b VQR 2011-2014
- 2015- Member of the **Evaluation Team** for the University of Cassino and Southern Lazio

- 2013- **Dean of the PhD College** of Civil Engineering, Mechanics and Biomechanics, University of Cassino and Southern Lazio
- 2013-15 **President of the Teachers-Students Joint Committee**, Department of Civil and Mechanical Engineering, University of Cassino and Southern Lazio
- 2012- Deputy Head of the Department of Civil and Mechanical Engineering dell'University of Cassino and Southern Lazio
- 2009-12 Member of the **Academic Senate**, University of Cassino and Southern Lazio
- 2005-12 **Head of the Department** of Mechanics, Structures and Environment, University of Cassino and Southern Lazio
- 2005-13 Member of the PhD College of Civil Engineering of the University of Cassino and Southern Lazio
- 2000-04 **Dean of the PhD College** of Civil Engineering, Mechanics and Biomechanics, University of Cassino and Southern Lazio
- 1999-05 **Dean of the bachelor and master College of Civil Engineering**, University of Cassino and Southern Lazio

RESEARCH GRANTS ON COMPETITIVE CALLS (FROM 2013)

- 2023-25 “Lattice Structures for Energy Absorption: advanced numerical analysis and optimal design (LASTEB)” funded by MIUR/PRIN (Italian Ministry of Education Research Program); Principal Investigator.
- 2022-24 “Technological innovation in earthquake engineering” founded by ReLUIS (Network of University Laboratories of Seismic Engineering) Department of Civil Protection, title of the research “Modeling of strengthening interventions” local unit leader
- 2019-21 “Technological innovation in earthquake engineering” founded by ReLUIS (Network of University Laboratories of Seismic Engineering) Department of Civil Protection, title of the research “Modeling of strengthening interventions” local unit leader
- 2017-20 “Multi-scale mechanical models for the design and optimization of micro-structured smart materials and metamaterials”, funded by MIUR/PRIN (Italian Ministry of Education Research Program); local unit leader.
- 2014-18 “Technological innovation in earthquake engineering” founded by ReLUIS (Network of University Laboratories of Seismic Engineering) Department of Civil Protection, title of the research “Modeling of strengthening interventions” local unit leader.

JOURNAL PAPERS 2020-2023 (LAST THREE YEARS)

- Meriggi, P., Nerilli, F., Fares, S., Fugger, R., Marfia, S., Sacco, E., De Felice, G. Shear Mechanisms in Fabric-Reinforced Cementitious Matrix Overlays: Experimental and Numerical Investigation (2023) *Journal of Composites for Construction*, 27.
- Addressi, D., Di Re, P., Gatta, C., Sacco, E. Non-Uniform TFA reduced multiscale procedure for shell-3D modeling of periodic masonry structures (2023) *Mechanics Research Communications*, 130.
- Castellano, A., Fraddosio, A., Oliveira, D.V., Piccioni, M.D., Ricci, E., Sacco, E. An effective numerical modelling strategy for FRCM strengthened curved masonry structures (2023) *Engineering Structures*, 274.
- Cutolo, A., Palumbo, S., Carotenuto, A.R., Sacco, E., Fraldi, M. A class of periodic lattices for tuning elastic instabilities (2022) *Extreme Mechanics Letters*, 55.
- Marfia, S., Monaldo, E., Sacco, E. Cohesive fracture evolution within virtual element method (2022) *Engineering Fracture Mechanics*, 269
- Sacco, E., Marfia, S., Parodo, G., Sorrentino, L. Experimental study and numerical modeling of ENF scheme: Comparison of different beam approaches (2022) *Engineering Fracture Mechanics*, 262.
- Esposito, L., Minutolo, V., Fraldi, M., Sacco, E. Stress peaks, stiffening and back-flow in bilayer poro-elastic metamaterials (2022) *International Journal of Solids and Structures*, 236-237.
- Addressi, D., Di Re, P., Gatta, C., Sacco, E. Shell-3d Multiscale Modeling of Masonry Vaults Based on the TFA Procedure (2022) *International Journal for Multiscale Computational Engineering*, 20 (6), pp. 13-42.
- D'Altri, A.M., Patruno, L., de Miranda, S., Sacco, E. First-order VEM for Reissner–Mindlin plates (2022) *Computational Mechanics*, 69 (1), pp. 315-333.
- Bellini, A., Aiello, M.A., Bencardino, F., de Carvalho Bello, C.B., Castori, G., Cecchi, A., Ceroni, F., Corradi, M., D'Antino, T., De Santis, S., Fagone, M., de Felice, G., Leone, M., Lignola, G.P., Napoli, A., Nisticò, M., Poggi, C., Prota, A., Ranocchiai, G., Realfonzo, R., Sacco, E., Mazzotti, C. Influence of different set-up parameters on the bond behavior of FRCM composites (2021) *Construction and Building Materials*, 308, art. no. 124964.
- Nerilli, F., Marfia, S., Sacco, E. Nonlocal damage and interface modeling approach for the micro-scale analysis of FRCM (2021) *Computers and Structures*, 254, art. no. 106582.
- Castrogiovanni, A., Marfia, S., Auricchio, F., Sacco, E. TFA and HS based homogenization techniques for nonlinear composites (2021) *International Journal of Solids and Structures*, 225, art. no. 111050.
- Esposito, L., Fraldi, M., Ruocco, E., Sacco, E. A shape memory alloy helix model accounting for extension and torsion (2021) *European Journal of Mechanics, A/Solids*, 89, art. no. 104281.
- Ruocco, E., Reddy, J.N., Sacco, E. Analytical solution for a 5-parameter beam displacement model (2021) *International Journal of Mechanical Sciences*, 201, art. no. 106496.
- Addressi, D., Di Re, P., Gatta, C., Sacco, E. Multiscale analysis of out-of-plane masonry elements using different structural models at macro and microscale (2021) *Computers and Structures*, 247, art. no. 106477.
- D'Altri, A.M., de Miranda, S., Patruno, L., Sacco, E. An enhanced VEM formulation for plane elasticity (2021) *Computer Methods in Applied Mechanics and Engineering*, 376, art. no. 113663.
- Rizzoni, R., Dumont, S., Lebon, F., Sacco, E. Higher order adhesive effects in composite beams (2021) *European Journal of Mechanics, A/Solids*, 85, art. no. 104108.
- D'Altri, A.M., Sarhosis, V., Milani, G., Rots, J., Cattari, S., Lagomarsino, S., Sacco, E., Tralli, A., Castellazzi, G., de Miranda, S. Modeling Strategies for the Computational Analysis of Unreinforced Masonry Structures: Review and Classification (2020) *Archives of Computational Methods in Engineering*, 27 (4), pp. 1153-1185.
- Minutolo, V., Esposito, L., Sacco, E., Fraldi, M. Designing stress for optimizing and toughening truss-like structures (2020) *Meccanica*, 55 (8), pp. 1603-1622.
- Artioli, E., Marfia, S., Sacco, E. VEM-based tracking algorithm for cohesive/frictional 2D fracture (2020) *Computer Methods in Applied Mechanics and Engineering*, 365, art. no. 112956.
- Addressi, D., Di Re, P., Sacco, E. Micromechanical and multiscale computational modeling for stability analysis of masonry elements (2020) *Engineering Structures*, 211, art. no. 110428.

- Nerilli, F., Marfia, S., Sacco, E. Micromechanical modeling of the constitutive response of FRCM composites (2020) *Construction and Building Materials*, 236, art. no. 117539.
- Sorrentino, L., Marfia, S., Parodo, G., Sacco, E. Laser treatment surface: An innovative method to increase the adhesive bonding of ENF joints in CFRP (2020) *Composite Structures*, 233, art. no. 111638.
- Addressi, D., Gatta, C., Marfia, S., Sacco, E. Multiscale analysis of in-plane masonry walls accounting for degradation and frictional effects (2020) *International Journal for Multiscale Computational Engineering*, 18 (2), pp. 159-180.