

CURRICULUM VITAE

Alberto Carpinteri

Born in Bologna-Italy on December 23, 1952

<https://staff.polito.it/alberto.carpinteri>

EDUCATION

Doctoral Degree in Nuclear Engineering cum Laude, University of Bologna, Bologna-Italy, 1976

Doctoral Degree in Mathematics cum Laude, University of Bologna, Bologna-Italy, 1981

CURRENT POSITION

“Chang Jiang (Blue River)” Chair Professor of Civil Engineering, Shantou University, Shantou-China, 2023-

FORMER POSITIONS

Chair Professor of the Mechanics of Solids and Structures, Politecnico di Torino, Turin-Italy, 1986-2023

Director of the “A. Castigliano” Fracture Mechanics Laboratory, Politecnico di Torino, Turin-Italy, 1999-2023

Head of the Department of Structural Engineering, Politecnico di Torino, Turin-Italy, 1989-1995

Founding Director, Doctoral School of Structural Engineering, Politecnico di Torino, Turin-Italy, 1990-2014

Head, Engineering Division, European Academy of Sciences, Brussels-Belgium, 2016-2023

President of the National Research Institute of Metrology (INRIM), Turin-Italy, 2011-2013

Vice-president of the National Research Institute of Metrology (INRIM), Turin-Italy, 2006-2011; Acting President, July-November 2009

President, International Congress on Fracture (ICF), 2009-2013

President, European Structural Integrity Society (ESIS), 2002-2006

President, International Association of Fracture Mechanics for Concrete and Concrete Structures (IA-FraMCoS), 2004-2007

President, Italian Group of Fracture (IGF), 1998-2005

Member of the Congress Committee, International Union of Theoretical and Applied Mechanics (IUTAM), 2004-2012

Member of the Executive Board, Society for Experimental Mechanics (SEM), 2012-2014

Assistant Professor of Solid and Structural Mechanics, University of Bologna, Bologna-Italy, 1980-1986

Researcher, Nuclear Power Plants Programme, Consiglio Nazionale delle Ricerche (CNR), Bologna-Italy, 1978-1980

Engineer, Technical Office, Breda Fucine, Milan-Italy, 1977

VISITING POSITIONS

“Zhu Jiang (Pearl River)” Professor of Guangdong Province, Shantou University, Shantou-China, 2019-2022

Visiting Professor, University of São Paulo, São Paulo-Brazil, July-August 2010

Visiting Professor, Tsinghua University, Tongji University, Architectural Institute of Nanjing, China, May-June 1996

Visiting Scientist, Lehigh University, Bethlehem-Pennsylvania, USA, 1982-1983

Visiting Scholar, Universities and Research Institutions across South Africa (Cape Town, Johannesburg, Pretoria, Bloemfontein), sponsored by the International Rotary Foundation, April-May 1981

COMMISSIONS OF TRUST

Chair of the International Committee for the Pascal Medal in Engineering, awarded by the European Academy of Sciences, Brussels-Belgium, 2016- 2023

Chair of the Awards Committee, International Congress on Fracture (ICF), 2013-2017

Member of the Committee for the International Panetti-Ferrari Prize in Applied Mechanics, awarded by the Turin Academy of Sciences, Turin-Italy, 1999-

Nominator, Japan Prize, 2016-

Nominator, Global Energy Prize, 2015-

Editor-in-Chief of the International Journal “Meccanica”, Springer Nature, 2012-2014. In three years, the issues per year were brought from 6 to 12

Member of the Editorial Board of ten International Journals:

Theoretical and Applied Fracture Mechanics, 1984-2013

Numerical and Analytical Methods in Geomechanics, 1995-2013

Strength, Fracture and Complexity, 2003-

Engineering Fracture Mechanics, 2005-2022

Physical Mesomechanics, 2005-

International Journal of Fracture, 2006-2013
Strain – An International Journal for Experimental Mechanics, 2009-2015
Curved and Layered Structures, 2016-
Archive of Mechanical Engineering, 2010-
Engineering Transactions, 2016-

Member of the Expert Panel for the Research Evaluation of the Department of Civil Engineering at the Technical University of Denmark, Lyngby-Denmark, 2007

Member of the Expert Panel for the Scientific and Teaching Evaluation of the School of Civil Engineering at the University of Tianjin, Tianjin-China, 2019

Member of the Evaluation Committee for the attainment of the position of Full Professor at the following Universities:

- (1) Israel Institute of Technology (Technion), Haifa-Israel, 2011**
- (2) Indian Institute of Science, Bangalore-India, 2011**
- (3) University of Athens, Athens-Greece, 2012**

FELLOWSHIPS

Life Fellow of the American Society of Civil Engineers (ASCE), Reston-Virginia, USA, 1995-; Member 1985-1995

Life Fellow of the European Academy of Sciences, Brussels-Belgium, 2009-

Life Fellow of the Academia Europea, London-UK, 2013-

Fellow of the European Academy of Sciences and Arts, Salzburg-Austria, 2012-

Fellow of the International Academy of Engineering, Moscow-Russia, 2010-

Foreign Member of the Academy of Athens, Athens-Greece, 2023-

Fellow of the Turin Academy of Sciences (founded by G.L. Lagrange in 1783), Turin-Italy, 2005-; Member, 1995-2005

Member of the Istituto Lombardo – Accademia di Scienze e Lettere (founded by A. Volta in 1804), Milan-Italy, 2006-

Member of the Bologna Academy of Sciences, Bologna-Italy, 2011-

Member of the Accademia Teatina per le Scienze, Chieti-Italy, 2006-

Honorary Fellow of the International Congress on Fracture (ICF), Ottawa-Canada, 2009-

Honorary Fellow of the Italian Group of Fracture (IGF), Rome-Italy, 2013-

Founding Fellow, Indian Structural Integrity Society (InSIS), Hyderabad-India, 2018-

Fellow of the European Structural Integrity Society (ESIS), Brno-Czech Republic, 2008-

Fellow of the International Association of Fracture Mechanics for Concrete and Concrete Structures (IA-FraMCoS), Jeju-Korea, 2010-

INTERNATIONAL AWARDS AND RECOGNITIONS

Odone Belluzzi Prize for Structural Mechanics, University of Bologna, Bologna-Italy, 1976

Robert l'Hermite Medal, International Union of Laboratories for Materials and Structures (RILEM), Paris-France, 1982

NATO Senior Research Fellowship, Lehigh University, Bethlehem-Pennsylvania, USA, 1982

NATO Senior Research Fellowship, Northwestern University, Evanstone-Illinois, USA, 1985

Eminent Scientist Award, Wessex Institute of Technology (WIT), Southampton-UK, 2000

Griffith Medal, European Structural Integrity Society (ESIS), Brno-Czech Republic, 2008

Swedlow Memorial Lecture Award, American Society for Testing and Materials (ASTM), Philadelphia-Pennsylvania, USA, 2011

Inaugural Paul Paris Gold Medal, International Congress on Fracture (ICF), Beijing-China, 2013

Guglielmo Marconi Prize, Academy of Sciences, Republic of San Marino, 2014

Frocht Award, Society for Experimental Mechanics (SEM), Indianapolis-Indiana, USA, 2017

Giuliano Preparata Medal, International Society for Condensed Matter Nuuclear Science (ISCMNS), Assisi-Italy, 2022

George Irwin Medal, American Society for Testing and Materials (ASTM), Washington-DC, USA, 2023

INTERNATIONAL HONORS

Doctorate Honoris Causa in Engineering, Russian Academy of Sciences, Moscow-Russia, 2016

Honorary Professorship, Tianjin University, Tianjin-China, 2017

Honorary Professorship, Northeastern University, Shenyang-China, 2024

Honorary Editor of the International Journal “Smart Construction & Sustainable Cities”, Springer Nature, 2023-

SUPERVISION OF PhD AND MSc DISSERTATIONS

Supervisor of 35 PhD Candidates. Presently, several of them are taking University Faculty positions in Italy or abroad (17/35): Seven Full Professors, eight Associate Professors, two Assistant Professors, six Post-doctoral Fellows, whereas the remaining twelve are managers or officers in public or private enterprises

Supervisor of 121 Master Candidates

EDUCATIONAL ACTIVITIES

European Coordinator of the “Innovative Learning and Training On Fracture (ILTOF)” Project, in the framework of the European Union Leonardo da Vinci Programme for Education and Culture (Total financial budget = Euro 480,000), 2006-2008

Courses taught at the Politecnico di Torino (1986-2023):

Structural Mechanics (Electrical Engineering, 14 credits), 1986-1987

Structural Mechanics (Mechanical Engineering, 14 credits), 1987-2002

Statics (Architecture, 8 credits), 1999-2000

Structural Mechanics (Civil Engineering, 10 credits), 2001-2002

Advanced Structural Mechanics (Civil Engineering, 10 credits), 2002-2010

Theory of Structures (Civil Engineering, 5 credits), 2004-2010

Fracture Mechanics (Civil Engineering, 5 credits), 2004-2010

Static and Dynamic Instability of Structures (Civil Engineering, 6 credits), 2010-2023

Fracture and Plasticity (Civil Engineering, 8 credits), 2010-2023

Adjunct Professor of Structural Mechanics (6 credits), National School of the Italian Army, 2018-2022

Chair Professor of “Fracture Mechanics: Fundamentals and Advanced Applications” (6 credits), Shantou University, Shantou-China, 2019-

ORGANISATION OF MAJOR SCIENTIFIC EVENTS

Organizer and Chairman, International ESIS-RILEM-CEB Workshop on “Applications of Fracture Mechanics to Reinforced Concrete”, Turin-Italy, 1990

Organizer and Chairman, International CNR Workshop on “Advanced Technology for Design and Fabrication of Composite Materials and Structures”, Turin-Italy, 1993

Organizer and Chairman of the Scientific Committee, IUTAM

Symposium on “Size-Scale Effects in the Failure Mechanisms of

Materials and Structures”, Turin-Italy, 1994

Organizer and Chairman of the Scientific Committee, 11th International Conference on Fracture (ICF11), Turin-Italy, 2005. Record in the ICF history: 1041 official participants

Organizer and Chairman of the Scientific Committee, 6th International Conference on Fracture Mechanics for Concrete and Concrete Structures (FraMCoS-6), Catania-Italy, 2007

Organizer and Chairman, Mini-Symposium on “Cohesive Zone Models of Fracture and Failure”, 22nd International Congress of Theoretical and Applied Mechanics (ICTAM-22), Adelaide-Australia, 2008

Organizer and Chairman, 15th International Workshop on “Anomalies in Hydrogen Loaded Metals”, Assisi-Italy, 2022

Organizer and Chairman, Mini-Symposium on “Fracto-emissions in Structural and Seismic Monitoring”, 15th International Conference on Fracture (ICF15), Atlanta-Georgia, USA, 2023

SCIENTIFIC ACTIVITIES AND MAJOR ACHIEVEMENTS

H-Index (Google Scholar) = 95

Total Citations (Google Scholar) = over 36,000

H-Index (Scopus) = 67

Total Citations (Scopus) = over 17,000

H-Index (Web of Science) = 55

Total Citations (Web of Science) = over 11,000

Ranking order position as a Top Scientist according to Research.com (Microsoft Academic) in the area “Engineering and Technology”:

D-Index = 81

Total Citations = over 24,000

n. 3 in Italy

n. 31 in China and Hong Kong

n. 246 in the World

Author of over 1,000 publications, of which more than 500 appear as articles in Refereed International Journals, and 59 are authored or edited volumes, on the following research topics:

Structural mechanics, fracture mechanics, fatigue resistance and fatigue crack growth, thermo-elasticity, seismic structures, reinforced concrete, structural health monitoring, contact mechanics, fragmentation and comminution, drilling and wear, multi-layered and functionally-graded materials, nano-structured and hierarchical

materials, acoustic, electromagnetic, and neutron emissions from fracture and earthquakes, buckling and snap-through in shallow roofing structures, dynamic flutter instability in long-span suspension bridges, tall buildings, seismic precursors, dynamics of macromolecular and protein structures, next-generation reinforced concrete, high-performance prestressed concrete, FRP-bar reinforced concrete, fibre-reinforced concrete, hybrid-reinforced concrete, ductile-to-brittle size-scale transitions

Five single-authored books published by major International Publishers:

A. Carpinteri: *Mechanical Damage and Crack Growth in Concrete: Plastic Collapse to Brittle Fracture*, Martinus Nijhoff Publishers, Dordrecht (1986), XIII + 234

A. Carpinteri: *Structural Mechanics: A Unified Approach*, Chapman & Hall, London (1997), XV + 761

A. Carpinteri: *Structural Mechanics Fundamentals*, CRC Press (Taylor & Francis Group), Boca Raton (2014), XIV + 498

A. Carpinteri: *Advanced Structural Mechanics*, CRC Press (Taylor & Francis Group), Boca Raton (2017), XIII + 531

A. Carpinteri: *Fracture and Complexity*, Springer Nature, Heidelberg (2021), XXXI + 949

RESEARCH TOPICS AND CUTTING-EDGE RESULTS

Several specific topics have been considered, always giving them an original and personal contribution. In some cases such a contribution resulted to be also innovative, anticipating even by years the trends in cutting-edge international research. Among these peculiar topics, it is significant to recall the following ones.

(1) Static-kinematic duality and its crucial role in Computational Mechanics

(2) Application of Dimensional Analysis (Buckingham's Theorem) and definition of the dimensionless Brittleness Number in the scaling competition between plastic collapse and brittle fracture, which are failure mechanisms governed by generalized forces with different physical dimensions

(3) Interpretation of the phenomena of mechanical instability, such as brittle crack propagation (*Cohesive Crack Model*), frictional stick-slip, and buckling in thin cylindrical and spherical shells, in the general context of Catastrophe Theory

(4) Solution to the problem of propagation stability for cracks bridged by reinforcements and/or fibres on the basis of rigorous conditions of static equilibrium and kinematic compatibility on the beam cross-section (*Bridged Crack Model*)

(5) Multi-fractal Scaling Laws (MFSL) for tensile strength (lacunar fractals) and fracture energy (invasive fractals) in concrete-like and ceramic materials

(6) Application of Fractional Calculus to the field and boundary equations of the elastic problem for bodies deformable only over fractal sub-sets of their domain

(7) Scaling and fractality of Fatigue Limit (Woehler's Curve) and Fatigue Threshold (Paris Law). Solution to the *short crack* problem in the framework of Fractal Geometry

(8) Mechanics of hierarchical, nanostructured, layered, and functionally graded materials

(9) Acoustic, electromagnetic, and subatomic particle emissions from fracture and earthquakes. Fracto-emissions as seismic precursors

(10) Dynamics and stability of elastic structures: from mega-structures (long-span bridges and high-rise buildings) to nano-structures (proteins and macromolecular structures)

MAJOR INVITED PRESENTATIONS AT INTERNATIONAL CONFERENCES, INSTITUTIONS, AND ADVANCED COURSES (LAST FEW YEARS)

Several Invited Courses and Lectures at

International Conferences, Universities, and Research Institutions, in the following 35 countries: Italy, Republic of San Marino, Switzerland, Austria, France, Spain, Germany, The Netherlands, United Kingdom, Hungary, Poland, Greece, Denmark, Russia, Portugal, Finland, Sweden, Serbia, Turkey, Czech Republic, Belgium, USA, Mexico, South Africa, India, Japan, Australia, China, Malaysia, Canada, Brazil, Korea, Norway, Thailand, Hong Kong

Opening Lecture on "Fracture mechanics and complexity sciences", 16th European Conference on Fracture (ECF16), Alexandroupolis-Greece, 2006

Invited Lecture on “Asymptotic analysis in Elasticity: From the pioneering studies by Wiegardt until today”, Karl Wiegardt and George Irwin Centenary Conference on Structural Integrity, Vienna-Austria, 2007

Introductory Lectures as the principal Organizer for the two following courses, International Centre for Mechanical Sciences (CISM), Udine-Italy:

“Non-linear Fracture Mechanics Models”, 2008, and “Fractals and Fractional Calculus in Continuum Mechanics”, 1996

Introductory Lecture, Mini-Symposium on “Cohesive Zone Models of Fracture and Failure”, 22nd International Conference of Theoretical and Applied Mechanics (ICTAM-22), Adelaide-Australia, 2008

Keynote Lecture on “The mitigation of stress-singularities in linear elasticity”, 12th International Conference on Fracture (ICF12), Ottawa-Canada, 2009

Opening Lecture on “Application of nonlinear fracture mechanics to the assessment of rotational capacity in reinforced concrete beams”, 51^o Congresso Brasileiro do Concreto (IBRACON-51), Curitiba-Brazil, 2009

Plenary Lecture on “Energy emissions from fracture of concrete: Acoustic, electromagnetic, piezonuclear”, 7th International Conference on Fracture Mechanics of Concrete and Concrete Structures (FraMCoS-7), Jeju-Korea, 2010

Opening Lecture on “Evidence of piezonuclear fission reactions: Neutron emissions, microchemical analysis, geological transformations”, 9th Youth Symposium on Experimental Solid Mechanics, Trieste-Italy, 2010

Honorary Lecture on “Dimensional analysis and fractal modelling of fatigue crack growth”, ASTM Fracture and Fatigue Conference, Anaheim-California, USA, 2011

Closing Lecture on “Piezonuclear reactions produced by brittle fracture: From laboratory to planetary scale”, 19th European Conference on Fracture (ECF19), Kazan-Russia, 2012

Opening Lecture on “Failure mode scaling transitions in reinforced concrete beams in flexure: Tensile, shearing, crushing”, 8th International Conference on Fracture Mechanics of Concrete and Concrete Structures (FraMCoS-8), Toledo-Spain, 2013

Honorary Presidential Lecture on “Piezonuclear fission reactions due to fracture and earthquakes: From the chemical evolution of our planet to the so-called cold fusion”, 13th International Conference on Fracture (ICF13), Beijing-China, 2013

Invited Lecture on “Piezonuclear fission reactions from fracture and turbulence: The chemical evolution in the planets of the Solar System”, European Academy of Sciences, Toulouse-France, 2013

Distinguished Lecture in Solid Mechanics on “Acoustic, electromagnetic, and neutron emissions from brittle fracture and earthquakes”, California Institute of Technology, Pasadena-California, USA, 2014

Invited Lecture on “Hydrogen embrittlement, microcracking, and piezonuclear fission reactions at the Ni and Pd electrodes of electrolysis “cold fusion” experiments”, 12th International Conference on Nanostructured Materials, Moscow-Russia, 2014

Invited Seminar on “Acoustic, electromagnetic, and neutron emissions from brittle fracture and earthquakes”, Perm State University, Perm-Russia, 2014

Keynote Lecture on “Opto-acoustic and neutron emissions from fracture and earthquakes”, Annual Conference and Exposition on Experimental and Applied Mechanics (SEM), Costa Mesa-California, USA, 2015

Opening Lecture on “Static-kinematic duality in beams, plates, shells and its central role in the Finite Element Method”, International Conference on Shells, Plates, Beams, Bologna-Italy, 2015

Invited Lecture on “LENR induced by nanomechanics instabilities and vibrations: From the geochemical evolution of the planet to cold fusion”, Seminario ENEA sulle Reazioni Nucleari a Bassa Energia, Rome-Italy, 2016

Invited Lecture on “Nano-scale fracture phenomena and TeraHertz pressure waves as the fundamental reasons for geochemical evolution”, 14th International Conference on Fracture (ICF14), Rhodes-Greece, 2017

Honorary Professorship Lecture on “Fracto-emissions as seismic precursors”, Tianjin University, Tianjin-China, 2017

Invited Lecture on “Size-scale transition from plastic collapse to brittle fracture”, Tianjin University, Tianjin-China, 2018

Opening Lecture on “Scaling and fractality in fatigue crack growth: Implications to Paris Law and Woehler’s Curve”, 2nd Structural Integrity Conference and Exhibition (InSIS), Hyderabad-India, 2018

Invited Lecture on “Nano-mechanics instabilities and THz vibrations: Their strong correlations to low energy nuclear reactions (LENR)“, Southern University of Science and Technology (SUST), Shenzhen-China, 2018

Plenary Lecture on “Earthquake neutrons and Earth-Crust LENR: From seismic precursors to geochemistry evolution“, 22nd International Conference on Condensed Matter Nuclear Science (ICCF-22), Assisi-Italy, 2019

Plenary Lecture on “Correlation between nano-mechanics instabilities, THz phonons, and subatomic particle emissions: Implications to geo-

and electro-chemistry”, 14th International Workshop on Anomalies in Hydrogen Loaded Metals (IWAHLM-14), Assisi-Italy, 2021

Plenary Lecture on “Calorimetric measurements and heat generation in electrolysis experiments: Correlations to electrode microcracking, chemical changes, and subatomic particle emissions”, 15th International Workshop on Anomalies in Hydrogen Loaded Metals (IWAHLM-15), Assisi-Italy, 2022

Plenary Lecture on “Renormalization group and Catastrophe theory in Geomechanics: From universal (fractal) material properties to scale-invariant constitutive laws”, Sustainable Industrial Processing Summit (SIPS), Phuket-Thailand, 2022

Plenary Lecture on “Correlation between nano-mechanics instabilities, TeraHertz phonons, and subatomic particle emissions: Implications to Geophysics and Geochemistry”, Sustainable Industrial Processing Summit (SIPS), Phuket-Thailand, 2022

Plenary Lecture on “Highly correlated phenomena in Geo-physics and Geo-chemistry: Nano-mechanics instabilities, THz phonons, subatomic particle emissions, compositional changes”, International Forum on Condensed Matter Physics, Porto-Portugal, 2023

Induction Speech on “Fracture & Complexity”, Academy of Athens, Athens-Greece, 2023

Invited Lecture on “Fracture and Complexity”, Shantou University, College of Engineering, Shantou-China, 2023

Opening Lecture on “Micro-damage instability mechanisms in composite materials: Cracking coalescence versus fibre ductility and slippage”, 4th International Conference on Damage Mechanics (ICDM-4), Baton Rouge-Louisiana, USA, 2023

Keynote Lecture on “Compressive failure in rocks: Fracture emissions and related stoichiometric balances”, 15th International Conference on Fracture (ICF15), Atlanta-Georgia, USA, 2023

Opening Speech on “Remembrance of Takeo Yokobori by Alberto Carpinteri”, Memorial Session, 15th International Conference on Fracture (ICF15), Atlanta-Georgia, USA, 2023

Acceptance Speech for the ASTM Irwin Medal on “Fracture & Complexity”, 21st International ASTM /ESIS Symposium on Fatigue and Fracture Mechanics, Washington-DC, USA, 2023

Opening Lecture on “Fractals in strength, fracture, and fatigue”, Silk Road International Symposium, Xi’an-China, 2023

Invited Lecture on “Fracture & Complexity”, Northwestern Polytechnic University, Xi’an-China, 2023

Invited Lecture on “Scale effects on the ductile-to-brittle transition in plain and reinforced materials”, The Hong Kong University of Science and Technology, Hong Kong, 2024

Invited Lecture on “Fracto-emissions as seismic precursors”, City University of Hong Kong, Hong Kong, 2024

Honorary Professorship Lecture on “Scale effects on the ductile-to-brittle transition in plain and reinforced materials”, Northeastern University, Shenyang- China, 2024

Invited Lecture on “Scale effects on the ductile-to-brittle transition in plain and reinforced concrete structures”, Tsinghua University, Beijing-China, 2024

Invited Lecture on “Scale effects on the ductile-to-brittle transition in plain and reinforced concrete structures”, Tianjin University, Tianjin-China, 2024

Lectio Magistralis on “Teaching Structural Mechanics: The integration of Fracture Mechanics”, Bologna Academy of Sciences, Bologna-Italy, 2024

Guest Professorship Lecture on “High-performance reinforced concrete structures: Brittleness size-scale effects”, Harbin Institute of Technology (HIT), Harbin-China, 2024

Invited Lecture on “Size-scale ductile-to-brittle transition in the structural response: Definition of Cohesive Crack Model in the Catastrophe Theory context”, Wuhan University of Technology, Wuhan-China, 2024

Invited Lecture on “Static-kinematic duality in beams, plates, shells and its crucial role in Computational Mechanics”, West Lake University, Hangzhou-China, 2024

Xuhua Honorary Lecture on “High-performance reinforced concrete structures: Brittleness size-scale effects”, Shanghai Jiao Tong University, Shanghai-China, 2024

Opening Lecture on “Size-scale effects on brittleness and safety. Next revolution in Structural Engineering?”, 3rd National Symposium on Complex Behaviour of Structures, Shantou University, Shantou-China, 2024

MAJOR RESEARCH GRANTS (LAST FEW YEARS)

The following research grants exceeding Euro 400,000 were coordinated by Alberto Carpinteri as Project Leader or Principal Investigator.

(1) Italian Ministry of Education, Research and University: “Process Development, Innovative Methods of Implementation, and Design of Composite High-tech and Coating Ceramic Materials” (PROMOMAT), 2002-2005

(2) Italian Ministry of Education, Research and University: “Fracture Mechanics Advanced Applications to Ductility and Durability of Reinforced or Retro-fitted Structural Elements” (PRIN), 2010-2012

(3) Regione Piemonte: “Preservation, Safeguard, and Valorization of Masonry Decorations in the Architectural Historical Heritage of Piedmont (RE-FRESCOS)”, 2010-2013

(4) MetalWork S.p.A. (Private Company): “Hydrodynamic cavitation, nano-bubble implosion, THz vibration, and correlated energy aspects”, 2015-2019

(5) European Union: “Clean Energy from Hydrogen-Metal Systems (CleanHME)”, 2020-2024

(6) Shantou University, Shantou-China: “Next-generation reinforced concrete structures: Brittle behaviour and fracture mechanics assessment”, 2023-2026

February 2025